

CAP 2014-2020: Scenarios for European Agri-Food and Rural Systems

Proceedings of the 51st SIDEA Conference

Benevento, Palazzo De Simone, 18-20 September 2014

Edited by

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PROCEEDINGS OF THE 51th SIDEA CONFERENCE

INTRODUCTION

The 51st Annual Conference of the Italian Society of Agricultural Economics (SIDEA) has been held at University of Sannio, in the city of Benevento, on the theme of “The Common Agricultural Policy 2014-2020: scenarios for the European agricultural and rural systems”. This Conference aimed to develop a critical scientific debate, in the agricultural economics, on crucial issues related to the new programming period and the reform implementation in Italy.

From one side, it seems appropriate to wonder whether the general policy decisions and the measures planned are actually able to achieve the objectives set and the challenges of globalization. From the other side, the works and papers presented at the Conference, develop analysis and reflections on the foreseeable effects of the new Common Agricultural Policy (CAP) configuration.

Agriculture is an essential component of European economy and society. For this reason, the new CAP aims to promote greater competitiveness, efficient use of public resources, food security, respect of the environment and fight against climate change, social and territorial equilibrium. These goals are included within the main objective of a sustainable, smart and inclusive growth of the rural Europe and the Europe 2020 Strategy.

To this end, in line with the Communication on the Budget Review (2010) and with the market orientation which it pursues, the new CAP is based on a first pillar, “greener” and more equally shared, and on a second pillar more focused on competitiveness, innovation, climate change and environment. The reserve of support to the only “active” farmers and the remuneration of the collective services which they provide to society can enhance the effectiveness and efficiency of support and help to legitimize the CAP.

Essentially, the new reform aims at making the European agriculture sector more dynamic, competitive and effective in pursuing the objective of the Europe 2020 Strategy, as confirmed in the EC Communication “The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future”. The goal is to promote a green growth in the agricultural sector and the rural economy which will allow to reach a greater welfare thanks to an economic growth which respects the environment. For this reason, the EU Agriculture and Rural Development Commissioner Dacian Cioloş has underlined the importance of making the CAP “greener, fairer, more efficient and more effective”. He continued: “The CAP is not just for farmers, it is for all EU citizens – as consumers and taxpayers. It is therefore important that we design our policy in a way which is more understandable to the general public and which makes clear the public benefits that farmers provide to society as a whole. European agriculture needs to be not only economically competitive, but also environmentally competitive”, with three principal objectives:

- viable food production (the provision of safe and sufficient food supplies, in the context of growing global demand - according to FAO estimates it should increase by 70% by 2050 -, economic crisis and much greater market volatility to contribute to food security);



- sustainable management of natural resources and climate action (farmers often have to put environmental considerations ahead of economic considerations – but such costs are not rewarded by the market);
- maintaining the territorial balance and diversity of rural areas (agriculture remains a major economic and social driving force in rural areas, and an important factor in maintaining a living countryside).

The CAP reform for the period 2014-2020 therefore highlights many unresolved issues, some of which are innovative and considerable, and the need for a broader scientific debate on the main themes, to which the policy refers, and its implications for Italy. It seeks to address, then, in an unprecedented global scenario, economic, environmental and social challenges.

The economic crisis, the market globalization, the increasing pressure on natural resources, the increasing diversity of agriculture and rural areas due to the successive enlargements of the EU, and citizens' expectations regarding the environment, safety and food quality, healthy food, health and animal welfare, preservation of the countryside, ecosystem services, biodiversity and climate change, the unequal distribution of resources, are some of the major issues that this policy has faced, in a production context directed by principles of fairness and efficiency.

The necessary instruments to address these challenges and achieve these objectives appear greatly transformed and made up of two complementary pillars, the first focusing on direct payments and market measures, the second on the multi-annual measures of rural development.

For direct payments, the Communication outlines the importance of a redistribution, redesign and better targeting of the support, based on objective and equitable criteria, easy to understand by the taxpayer. These criteria should be both economic (noting the "income support" element of direct payments) and environmental (reflecting the public goods provided by farmers), with support better targeted towards active farmers. A more equitable distribution of funds should be organised in an economically and politically feasible way with a transition to avoid major disruption.

The rural development policy (second pillar of the CAP) aims at promoting competitiveness, sustainable management of natural resources and balanced development of rural areas by means of more specific measures, giving the Member States, through co-financing, the flexibility to meet their priorities. The scientific debate on these issues is therefore wide and articulated.

In summary, the new CAP should contribute to the development of a socially responsible and more balanced European agriculture, at territorial and environmental level.

Given such a framework, the SIDEA Conference intended to promote a scientific debate on the perspectives that the new CAP provides in order to reach a competitive repositioning of the European agricultural and rural systems, in particular, through the depth study of the following themes, analyzed, respectively, in three plenary sessions:

1. *CAP 2014-2020 and new challenges for agriculture and rural areas*
2. *CAP 2014-2020 and market*
3. *CAP 2014-2020 and rural development*

The plenary session of the first day of work was chaired by Pietro Pulina from the University of Sassari. This session saw the participation of a prestigious speaker, Tomas Garcia Azcarate, Euro-

pean Commission representative, on the theme “CAP reform, a vision from Brussels and Spain”. During the second plenary session, where Gianluca Nardone from University of Foggia was the chairman, Angelo Frascarelli, Agricultural Economists to University of Perugia, was invited as keynote speaker discussing on the topic “The support of the CAP between competitiveness and public goods”.

Finally, the third plenary session has regarded the rural development, with Gianluca Brunori from University of Pisa as a chairman, and, as keynote speaker Charalambos Kasimis from University of Athens, president of the Rural Sociology Society, which has discussed the theme “The economic crisis and return to the land in Greece: what lessons for rural development policies?”. The two days of the conference have been dedicated to the presentation of **41** short papers accepted after a blind review process. Papers were divided into 3 parallel sessions. In the first day of work, two scientific sessions have been held on the themes “CAP 2014-2020 and new challenges for agriculture and rural areas” and “CAP 2014-2020 and market”, chaired by Gianni Cicia - University of Napoli “Federico II”, and Roberto Furesi - University of Sassari, for the first parallel session, Roberto Pretolani - University of Milano, Gervasio Antonelli - University of Urbino “Carlo Bo”, Leonardo Casini - University of Firenze, and Luigi Cembalo - University of Napoli “Federico II”, for the second parallel session.

In the first parallel session the following papers were presented:

- *Greenhouse gas emissions in the EU agri-food system: empirical assessment, economic evaluation and policy implications* (Luca Camanzi, Azra Alikadić, Giulio Malorgio, Luigi Vannini);
- *The profitability of microalgae biomass farming in Mediterranean environments* (Gianni Cicia, Maria Crescimanno, Antonino Galati, Teresa Del Giudice, Luigi Mennella, Domenico Tosco, Giorgio Schifani);
- *Food waste, consumer attitudes and behaviour. A study in the North-Eastern part of Italy* (Francesco Marangon, Tiziano Tempesta, Stefania Troiano, Daniel Vecchiato);
- *Land Grabbing Models in the International Scenario: the Case Study of the European Union* (Anna Carroccio, Maria Crescimanno, Antonino Galati, Antonio Tulone);
- *Assessing the ex-ante impact of the CAP post 2013 reform on land market. A case study in Tuscany region* (Fabio Bartolini, Gianluca Brunori, Oriana Gava);
- *Assessing the CAP influence on the livestock number reared. The European farmer’s stated response* (Rosaria Viscecchia, Giacomo Giannoccaro).

The works presented in the second parallel session were:

- *Assessing the impacts of Reg. (EU) No. 1307-2013 on Italian farms. A comparison between three alternative convergence models* (Angelo Frascarelli, Stefano Ciliberti);
- *Effects of cap green Payments in Lombardy: a Comparison of proposed and approved Measures based on Census Data* (Daniele Caviccholi, Danilo Bertoni);
- *Price Transmission mechanism in local market for table grape in south-eastern Bari using fuzzy cognitive maps* (Arturo Casieri, Umberto Medicamento, Bernardo De Gennaro);
- *Survival strategies of mountain dairy farmers: the case study of local milk production system in the Mugello area* (Chiara Landi, Giovanni Belletti, Giaime Berti, Massimo Rovai);
- *Analysis of the consumptions of functional foods in the main countries of the European Union* (Gaetano Chinnici, Teresa Manuela Carnemolla, Biagio Pecorino);
- *Health and Green consciousness in consumer behavior of food products: a case study in Italy* (Mario Gregori, Federico Nassivera);
- *An analysis of food safety private investments drivers in the Italian meat sector* (Gaetano



Martino, Miroslava Bavorová, Rossella Pampanini);

- *Sustainability performance of local and global supply chains: a comparative assessment on bread* (Francesca Galli, Fabio Bartolini, Gianluca Brunori, Luca Colombo, Oriana Gava, Stefano Grando, Andrea Marescotti);
- *Antitrust intervention and price transmission in pasta supply chain* (Luca Cacchiarelli, Alessandro Sorrentino);
- *The taste of sustainability: effect of labeling on consumers liking and willingness-to-pay for wine* (Eugenio Pomarici, Riccardo Vecchio);
- *Drivers of eco-innovation in the wine industry* (Antonio Stasi, Alessandro Muscio, Gianluca Nardone);
- *The consumer preferences of Parmesan cheeses in foreign countries: a non parametric analysis using CUB models* (Luca Rossetto, Luigi Salmaso, Paolo Bordignon);
- *The advantages of being short: Farm perspective of short food supply chain* (Luigi Cembalo, Alessia Lombardi, Francesco Caracciolo, Pasquale Lombardi);
- *Fair Trade Attitudes and Consumer Behavior in Italy: a Comparative Analysis of two Attitudinal Scales* (Teresa Del Giudice, Fabio Verneau, Mario Amato, Francesco Caracciolo, Teresa Panico);
- *Personal Values and pro-social behaviour: the role of socio-economic context in fair trade consumption* (Fabio Verneau, Francesco Caracciolo, Teresa Del Giudice, Teresa Panico, Adele Coppola);
- *Organizing the co-production of health and environmental values: the constitutional experience of the Italian Solidarity Purchasing Groups* (Gaetano Martino, Giulia Giacchè, Enrica Rossetti).

The second day of the conference started with the third and final session on “CAP 2014-2020 and rural development”, chaired by Paola Gatto - University of Padova, Biagio Pecorino - University of Catania, Emanuele Schimmenti - University of Palermo, Marcello De Rosa - University of Cassino, and Francesco Contò - University of Foggia.

In this third session the following papers were presented:

- *Ex-post evaluation of the impact of rural development policy using farm-level data. An example from the 2000-2006 program in the Lazio Region* (Carlo Russo);
- *Are the RDP objectives coherent with the distribution of funds? A case study in Tuscany* (Gabriele Pagnotta, Emanuele Gabbrilli, Gabriele Scozzafava, Leonardo Casini);
- *The Access to Public Payments (RDP) and the Socio-Economic Structure of Farms: a Comparison between Urban and Rural Areas in Tuscany* (Chiara Landi, Laura Fastelli, Fabio Bartolini, Gianluca Brunori, Massimo Rovai);
- *New urban-rural relations in Tuscany: what consequences for land uses and food security in a long term perspective* (Daniela Toccaceli);
- *Network governance evaluation in rural areas: an Adaptive Co-Management approach* (Roberta Sisto, Gioacchino Pappalardo, Biagio Pecorino);
- *Can Social Network Analysis help the implementation of joint actions in agriculture? Case study: social connectedness of farmers in the Italian province of Pisa (Tuscany)* (Silvia Arighetti, Oriana Gava, Gianluca Brunori);
- *The role of Local Action Groups in stimulating territorial and farm evolution: an empirical test in Lazio Region* (Silvia Chiappini);
- *Understanding Collective Action in Sustainable Consumption: a Relational Approach* (Giuseppina Migliore, Francesca Forno, Giovanni Dara Guccione, Giorgio Schifani);



- *Implementing the Future Rural Policy. A Multi-stakeholder Governance Test in Reality* (Graziella Benedetto, Gian Luigi Corinto, Francesco Marangon, Stefania Troiano);
- *Implementation and Prospects of the rural Development Policy in Sicily to support young Farmers* (Emanuele Schimmenti, Valeria Borsellino, Antonio Ferreri, Mariarosa Di Gesaro, Marcello D'Acquisto);
- *Rural Tourism and Agritourism: a virtuous green circuit promoting multifunctionality and sustainability of rural areas* (Filippo Fiume Fagioli, Francesco Diotallevi, Adriano Ciani);
- *The Urban Marches versus the Rural Marches. A Statistical Analysis in a Local Development Perspective* (Gian Luigi Corinto, Francesco Musotti);
- *Family farms and policies for farm development: Who decides what?* (Felice Adinolfi, Luca Bartoli, Marcello De Rosa, Riccardo Fargione);
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- *Capturing the impacts of LEADER: the aggregative role of Local Action Groups* (Antonio Lopolito, Roberta Sisto, Angela Barbuto, Riccardo Da Re);
- *Economics of Social Capital: theoretical and empirical approaches. The case study of the Basilicata Region* (Alba Distaso, Michele Distaso);
- *Social Capital and Rural Development in Southern European Regions: The Case of EU-funded LEADER Projects* (Asimina Christoforou, Elena Pisani).

Finally, the proceedings contain the first three contributions of the prize "Antonio Cioffi". It is an initiative aimed at awarding the best doctoral thesis on a relevant subject on Agriculture and Nutrition.

Below are the contributions in order of classification:

- *The Role of EU Agri-environmental Programmes. A Farm Level Analysis by Propensity Score Matching and by Positive Mathematical Programming Incorporating Risk* (Linda Arata);
- *Strategic quality choices in PDO Consortia with heterogeneous members* (Antonella Di Fonzo);
- *Innovative Applications of Q Methodology in Socio-Economic and Environmental Research* (Serena Mandolesi).

The conference was held under the patronage of University of Sannio. We also acknowledge the support of Chamber of Commerce of Benevento, Mediterraneo Sociale scarl, Gal Alto Tamaro, Gal Taburno, Gal Titerno, Cooperativa "La Guardiense", Comune di Sant'Agata De' Goti, Confedertecnica.

Giuseppe Marotta
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PLENARY SESSION



CAP Reform, a Vision from Brussels and Spain¹

García Azcárate Tomás

Economic Adviser in the Directorate General for Agriculture and Rural development of the European Commission; Maître de Conférence in the European Study Institute of the Free University of Brussels (IEE-ULB); President of the Spanish Association of Agricultural Economists (AEEA); member of the Accademia dei Georgofili.

Summary

This contribution tries first to assess the final results of the negotiations of the Common Agricultural Policy (CAP) which will apply from 2014 to 2020 and have ended on the summer 2013. It is structured around the following four points: the improvement of CAP legitimacy; the contribution to a more competitive and balanced food chain; better taking into account the diversity of European farming systems; an improve agricultural research and a innovation.

In part 2, it looks more in detail to each of those objectives and in part 3 present how Spain is expected to make use of the different flexibilities foreseen in the final agreement

1. Introduction

The negotiations of the Common Agricultural Policy (CAP) which will apply from 2014 to 2020 have ended on the summer 2013. We will not explain the main element of the final compromises as we suppose that, in September 2014, they are well known by the agricultural economists². In order to assess the final results, we have summarized the objectives pursued by the Commission in the following four points:

1. To start building a new legitimacy for EU agricultural support based on public goods;
2. To contribute to a more competitive and balanced food chain;
3. To better take into account the diversity of European farming systems;
4. To promote research and innovation.

We will, in part 2 look more in detail to each of those objectives and in part 3 present how Spain is expected to make use of the different flexibilities foreseen in the final agreement.

2. Are the objectives achieved?

2.1. New legitimacy

The most recent survey on how European citizens perceive the CAP has been published in March 2014³. They are ready to support a policy which not only delivers enough quality food at reasonable prices but also which protect the environment and contribute to sustainable economic activity and employment in rural areas. Direct payments should be more focussed and rational and promote the respect of environmental rules.

The new CAP includes several tools which aim to answer to those concerns:

- Greening: 30% of direct payments will be linked to three environmentally-friendly farming practices: crop diversification, maintaining permanent grassland and conserving 5%, and later 7%, of areas of ecological interest as from 2018 or measures considered to have at least equivalent environmental benefits.

1. The opinions expressed in this contribution are only personal and no dot prejudice of the official position of the European Commission

2. For more details on the final result, you can look to the Didactical Unit 15 of my course on CAP (in French): <http://tomasgarciaazcarate.com/en/content/university/programme/312-ud15-la-reforme-ciolos> or go the specific webpage of DG AGRI http://ec.europa.eu/agriculture/cap-post-2013/index_en.htm

3. Eurobarometre special 410 (2014): Europeans, Agriculture and the Common Agricultural Policy (CAP) http://ec.europa.eu/public_opinion/archives/eb_special_419_400_en.htm#410.

- Less-favoured areas: Member States will be able to allocate increased amounts of aid in those areas.
- Young Farmers: In order to encourage generational renewal, the Basic Payment awarded to new entrant Young Farmers (those under 40) should be topped up by an additional 25% for the first 5 years of installation. This is in addition to other measures available for young farmers under Rural Development programmes.
- Internal Convergence: Those Member States that currently maintain allocations based on historic references must move towards more similar levels of payment per hectare. It is the beginning of the end of the historical references born with the CAP reform 1992.
- “Active farmers”: In order to iron out a number of legal loopholes which have enabled a limited number of companies to claim Direct Payments, even though their primary business activity is not agricultural, the reform tightens the rule on active farmers.

2.2. *A more competitive and balanced food chain*

Rebalancing the food chain has to be and is a core element of any modern food and agricultural policy. Agriculture plays a vital role as the first step in the food supply chain, but the sector is highly fragmented and unstructured, and its added value is not recognized. To strengthen the position of farmers, the agreement includes increase support and role for producer organizations, their associations and Interbranch organizations in both the first and the second pillar of the CAP.

2.3. *Diversity*

The new CAP includes also several tools aiming supporting the increase diversity of European farm systems:

- External convergence: No single Member State receives less than 75% of the Community average by 2019.
- Organic farming: specific treatment in both the first and second pillar of the CAP.
- Direct sales, short circuits, mountain products: between producers and consumers, supported and promoted in particular by the Rural Development regulation.

2.4. *Research and innovation*

EU new financial perspectives foresee for 2014-2020 around € 4.billions to research and innovation in agriculture and the overall supply chain (Societal Challenge “Food Security, sustainable agriculture, marine and maritime research and the bio-economy”). This is double what is available at present.

In addition, fostering innovation and a knowledge-based agriculture should be a key element of the new Rural Development Policy, through Operational groups.

The target is to develop the technologies that are the most relevant for the different actors of the food chain and can be easily transferred into practices.

2.5. *Conclusions*

As it often happens after long negotiations and last minute compromise, the bottle is half full... or half empty.

The spirit of the reform has survived a conservative Council, and an even more conservative European Parliament, in particular its Commission for Agriculture, the COMAGRI, despite the effort of its President and some other parliamentarians.

The Greening of the CAP has not achieved the ambitions of the environmental NGOs nor of the Commission, but the «public good» legitimacy is now officially accepted.

As far as the food chain is concerned, it is too early to draw any conclusion. We have to wait the implementation and to see how the different sectors will act and react. Agricultural and Competition policies can be mutually supportive but tensions are unavoidable. Both policies are ranked high in the Treaties and a balance has to be found.

At the end, a lot will depend of the national implementation. National governments would be well advice to be proactive as far as changes are concern. Status quo has not been an option for the CAP 2014-2020, i twill even less be an option for CAP post 2020.

3. Implementation in Spain

Spain is a complex country. It is close to be a federal state, with 17 regions, without the internal mechanisms of a real several states which ease the agreements amongst the different regions, as it happens in Germany.

From a political point of view, the situation is even more complicate. We have strong self-called «nationalists» and even independence movements in at least 2 Autonomous Communities. Any change in the political competences of the regions, and obviously any decrease in the regional CAP budget envelop, is extremely difficult.

In addition, we have a region, Andalucía, which is receiving for historical reasons per has more direct payments than any other. «Internal convergence» in Spain means transferring CAP budget from Andalucía to the rest of Spain.

It happens that, today, the socialists (in coalition with another left party) govern the region and are not specially committed to make life easier to the central government, of the Popular Party. Even more, if the Popular Party wants to win the next election, it has to obtain a very good electoral result in Andalucía. This makes budget redistribution extremely challenging.

Therefore, the Spanish implementation of the new CAP can be summarizing as such: to change everything in order to change nothing.

3.1. Direct payments

Both the regionalization of the direct payments and the convergence, have been done in a “peculiar” way. The geographical basis is the county. In each county, you have 4 categories of land: Arable land irrigated; arable land non-irrigated; trees irrigated; trees non-irrigated. The convergence is done inside each of the 4 categories of each of the counties.

3.2. Coupled payments

12,08 % of the envelop (the maximum allowed was 15%) is devoted to coupled payments for beef and veal, some fruit and vegetables (processed tomatoes, nuts), grain legumes, milk, oil-seeds, protein crops, rice, sheep and goal meat and sugar beet.

3.3. Other issues related to direct payments

As far as capping is concerned, Spain has chosen the softest way to implement it: to decrease by 5% the amount of the basic premium when is its higher than 150.000 €.

Spain has not make use of the equivalence possibilities for greening.

3.4. Rural development

During the previous programing period (2006 – 2013), Spain has 17 Rural Development plan, one for each Spanish regions. Now ii twill has a national programme, for actions (in particular support to growing agricultural cooperatives) which are developed in several regions at the same time.

Due to the difficult economic situation in Spain and the proactive policy of the central government to limit the budget deficit, the national contribution to the regional Rural Development



plans will decrease, as general rule, from 50 to 33%. Regional government will have to increase therefore their contributions from 50 to 66%. Many analysts are pessimistic as regional and local government are also facing severe budget restrictions.

3.5. Conclusions for Spain

The ending result of the CAP post 2014 negotiations can only be qualified as successful for Spanish authorities. Practically, the Spanish government has achieved all its negotiating goals. The agricultural budget has been, more or less, stabilized in nominal terms; Spain will continue to be the second beneficiary of CAP expenditure; Olive and fruit plantations are excluded in practice from greening obligations; the compulsory internal convergence is limited; the impact of the capping of direct payments is, in practice, anecdotal; member States have significant margins in the transposition of the decision taken in Brussels in order to adapt them to their realities...

Do this means that Spain, has win 7 years? All depend how this period will be used. If Spanish farmers believe that the Commission has been defeated; that the reform has failed; that "business as usual" is again possible for at least 7 years, they will not have win 7 years, they will have loose it.

If, at the opposite, they take advantage of this additional period for adopting more environmental practices; for decreasing their production costs; for segmenting the markets; for developing powerful producers' organisations; for building active and responsible Interbranch organizations; for creating research operational groups, it will be possible to conclude that they have really win 7 years.

CAP Support within Competitiveness and Public Goods¹

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1. Introduction

Over the last 20 years, the Common Agricultural Policy (CAP) went through five reforms – MacSharry reform, Agenda 2000, Fischler reform, *Health Check* and the new 2014-2020 CAP – which deeply modified the original structure based on price support and border protection measures. International negotiations on trade liberalization, the awareness about a higher economic and environmental sustainability of agricultural activities as well as the will to redirect production towards markets instead of aids, have determined the revision of the support model which, gradually and with more and more bonds, has transformed the coupled aids into a support decoupled from production and conditioned to environmental targets. Mainly reforms implemented during the last ten years have intensely renewed the European policies supporting the agricultural sector through a clean break with past targets and instruments. Such first statement may sound banal, even if not expected at all in consideration of the fact that CAP is continuously under strong critics, mainly from the scientific world, and both from the right and left wings. Conservatives regret the old CAP, especially the policies for price, market and income stabilization and the greening orientation of the last reforms. The progressive party aim to a more innovating, focused and selective CAP, targeted to a rural development and with no sectorial logic and income support, since progressists seem to be disgusted by the existence of an economic policy for the agricultural sector support. Both positions criticize the CAP policies adopted in the last years, even the most recent approved on December 13th, 2013 for the period 2014-2020. On the contrary, my evaluations lead to the conclusion that the last CAP reforms – besides any political mediation they generated from – have marked a fundamental change and a balanced evolution of the agricultural support through many positive and useful aspects to face present and future challenges. This study is not an ambitious inclusive assessment of the CAP policy, it is meant to offer both a scientific and a political analysis of the most discussed themes and frequent questions with the aim to assess those targets and instruments adopted by the income and market support policy (the CAP “first pillar”). To this purpose, the first part of my work provides an analysis of the most recent CAP changes specifically referred to the first pillar so to assess differences between the previous market and income policy and the latest for the period 2014-2020.

The second part deals with a theoretical and empirical analysis of those unconventional instruments adopted by the agricultural policy and mostly discussed within the recent CAP reforms and which are among them compared: 1) direct or indirect instruments for market stabilization; 2) coupled and decoupled payments; 3) first and second pillar.

2. CAP Most Recent Changes

The new CAP targets, at the basis of the latest reforms, have brought about a deep change in the first pillar instruments.

2.1. Market Measures: A Clean Break With The Past

The 2003-2008 reforms brought about a complete transformation in the market policy: the introduction of the single CMO² of January 1st, 2008, where EU simplified the market policy through

1. This study is the result of passionate discussions on CAP I had with some colleagues from Sidea, whom I sincerely thank for their useful suggestions for drafting my work.

2. The single CMO generated together with the EC regulation CE n. 1234/2007 of October 22nd, 2007

a single regulation for any market measure is a relevant and meaningful step within the context of this path. Up to December 31st, 2007, market policy was represented by twenty-one CMOs instated between 1962 and 1970; each CMO was supported by the Council of Europe basic regulation, often supplied with integrative laws from the Council.

The single CMO replaced the previous twenty-one and groups and harmonizes under a single regulation each regulation of the traditional instruments of the market policy: intervention, private storage, tariff quota for imports, export refunds, protection measures, regulations about state aids and competition. Operationally speaking, the single CMO does not introduce any new instrument: it only simplifies the legal frame work through an operation of regulatory architecture. However, if on one side there is no relevant innovation, on the other the single CMO is politically important, since it expresses any effect of a path of CAP radical change started in 2003 with Fischler reform (Frascarelli, 2007). With the decoupled aids, the specific supports to each sector converge into the single farm payment scheme (SPS), leaving to CMOs the control on exchanges with third Countries, general provisions and a number of regulations about the internal market. In other words, 2003 reform cleaned or reduced specific supports to CMOs (price supports and/or coupled aids), therefore, since 2008, market measures could develop an horizontal approach towards any sector.

Table 1 – Evolution in CAP market interventions

Period	Instruments
Previous CMOs (1962-1983)	Foreign trade strong policy (duties, quotas, subsidized exports, export taxes). Price stabilization (intervention price, <i>deficiency payments</i>). Management of stocks (public storage and private storage). Fruit and vegetable PO programming and interventions. Other aid instruments.
First reform (1984-1987) and second reform (1988-1992)	Foreign trade strong policy (duties, quotas, subsidized exports, export taxes). Price stabilization (intervention price, <i>deficiency payments</i>). Public storage and private storage. Other aid instruments. Production adjustments (quotas, set aside, vineyard planting rights). Financial adjustment instruments (co-responsibility levy, financial stabilizers). Fruit and vegetable PO programming and interventions. Other aid instruments.
MacSharry reform (1993-1999) Agenda 2000 (2000-2004)	Foreign trade policies with reduced protection. (Lower) Price stabilization. Management of stocks. Production adjustments (quotas, set aside, vineyard planting rights). Fruit and vegetable PO revision. Other aid instruments.
Fischler reform (2005-2009) <i>Health Check</i> (2010-2014)	Reduced border protection. Reduction of intervention prices for milk and sugar. Reduced management of stocks. Abolition of set aside, announcement about milk and sugar quota abolition and vineyard planting right abolition. Abolition of processing aids (citrus, dried forage, fiber flax). Reinforcement of fruit and vegetable POs in the management of market crisis.
Milk package (2013) and 2014-2020 CAP	Market interventions reduced to safety network. Confirmation of milk and sugar quota abolition and of vineyard planting right abolition. Strengthening of PO, POA and IO roles. Strengthening of contract agreements. Risk management. PDO and PGI cheese and ham production programming.

about the common organization of agricultural markets and specific provisions for certain agricultural products (CMO single regulation), PJEC n. 299 of November 16th, 2007. By the last reform, the single CMO is represented by the EU regulation n. 1308/2013.

The *Health Check*, 2007 CMO reform on fruit and vegetable and 2008 wine CMO have completed 2003 reform with the abolition of the remaining coupled payments and the further dissolution of the market support policy.

The new 2014-2020 CAP has confirmed the previous choices with the abolition of the last control offer instruments (milk quotas, sugar quotas and vineyard planting rights). The last three reforms have therefore modified or abolished each instrument of the market policy; in many cases, they have been cancelled, in others replaced by new instruments, as we will see in detail in paragraph 3. This means that guaranteed prices, storage, quotas and sectorial aids will be no more part of the new CAP, with the exception of situations of great crisis.

Such market policy reforms highlight the fact that CAP season as sectorial policy is over. With the abolition of coupled aids, export refunds, milk quotas and intervention prices have been dismantled by CAP during the 60s (table 1).

In short, CAP reforms have introduced a radical change in the market measures, reducing their expenses and distorting effects. For this reason, the five reforms of the last twenty years can be considered as five steps to a single reform for agricultural competitiveness and sustainability, a fundamental passage which today makes CAP much more defensible within and outside EU. However, as we will see in paragraph 3, the fact of having abandoned such intervention policy in favor of markets raises some problems.

2.2. From The Coupled Support To Decoupled, Consistent And Unpacked Payments

Since 2005, the last three reforms have substantially modified direct payments in four different ways: decoupling, regionalization, unpacking and eco-conditionality, being this last meant as the requirement to public goods direct payments.

Decoupling was introduced by Fischler reform in 2003 and has progressively come into force from 2005 to 2008 affecting all sectors; afterwards, from 2008 to 2012, the decoupling course has been completed by the *Health Check*. With such reforms, partially coupled direct payments and price supports to different sectors have converged into a single farm payment scheme.

After these reforms, farms received a completely decoupled support which is no more bound to the different sectorial policies. This was an impacting choice both for the changing from the previous uses and for the related political difficulties³ (Tranter *et al.*, 2007).

Regionalization or the “regional model” for the application of the decoupling, better known as flat-rate aid, had already been established by the Fischler reform as the alternative to the “historical model”. According to such model, farmers were entitled to receive an aid for each hectare of their farm surface, the value of which is considered as consistent to any other farmer of a specific region.

First with the *Health Check* and later with CAP 2014-2020, EU has suggested again to pass from historical data based payments to “flat-rate” aids. If with the *Health Check*, regionalization was optional, with CAP reform 2014-2020 it becomes mandatory⁴, determining a break with the link between the support and the historical factors which have generated it.

On the contrary, *unpacking* is a new entry of 2014-2020 CAP; it allows the articulation of the direct payment scheme through different components with the double purpose to:

3. Decoupling was opposed by some important member States, among which France. The political competence and the vision of Franz Fischer, the Commissioner for Agriculture at that time, could bring to a reform which was however approved only after much hesitation.

4. Regionalization is mandatory in 2014-2020 CAP; however, some member States can slow down the distributive effects of regionalization through the application of two potential converging models for aids: total convergence by 2019, allowing the implementation of regionalization at that date; partial convergence by 2019, or the “Irish model”, allowing implementing a partial regionalization at that date. Partial regionalization delays total regionalization beyond 2020.

- Ensure an appropriate *income fixed support* through a basic decoupled payment as an aid equal for any farmer of the same member State or region (regionalization);
- Strengthen CAP environmental effectiveness as a support to the supply of agricultural *public goods*.

This choice was inspired by the goal to reach a more focused, equal and “green” support. In this aim, the new CAP 2014-2020 has abandoned the undifferentiated support fostered by Fischler reform and the *Health Check* and it articulates direct payments through seven typologies, three of which are mandatory and four are optional for the member States, to be activated within the expected domestic maximum percentage (table 2).

Decoupling, regionalization and unpacking have allowed a radical change to purposes and instruments of the direct payment system.

The passage from coupled payments to decoupled payments has fostered the orientation to the agricultural business market allowing the remuneration of agricultural public goods, first through direct payments for consideration of conditionality as introduced by Fischler, then through its further reinforcement with the *greening*⁵ payment.

Table 2 – 2014-2020 CAP Direct Payment - Seven Types

Typology	Maximum domestic %	Choice of Italy
Mandatory payments for the member States		
1. Basic payment	max 70%	58%
2. <i>Greening</i> payment	30%	30%
3. Payment to young farmers	up to 2%	1%
Optional payments for the member States		
4. Distributive payments for the “first hectares”	up to 30%	not enabled
5. Payments to less-favored areas	up to 5%	not enabled
6. Coupled payment	up to 15%	11%
7. Payment to small farmers (*)	-	-

(*) Payment to small farmers does not absorb a percentage of the maximum coverage since it is a simplified payment replacing other kind of payments.

A good policy should be based on fixed contractual commitments (Frascarelli, Sotte, 2010); it should be *targeted*, meaning that it should determine specific behaviors and be *tailored* on the required costs so to adopt such behaviors.

Decoupled, regionalized and unpacked payments aim to the same goal: they are targeted (conditionality, *greening*), they modify behaviors and they can be (potentially) related to costs⁶. Besides, when regionalization is totally implemented, the equal and homogeneous distribution of such aid simplifies management, abolishes historical profits, impacts less dramatically on the land market, provides incentives for competitiveness and creates minor barriers on the settlement of young farmers.

5. Some Authors define *greening* payments as a “reinforced conditionality”; *greening* constraints are actually mandatory for the farmer who wants to access the full direct payment system and, shouldn’t they be met, the farmer will be obliged to pay a basic compensation (De Filippis, Frascarelli, 2012; De Filippis, 2014). Some analysis about the application of *greening* to farms have demonstrated that it is always convenient for farmers to respect *greening* constraints without therefore renouncing to the related payment (Schulz, Breustedt, Latacz-Lohmann, 2014).

6. By now, CAP 2014-2020 payments, *greening* payments included, aren’t related to costs, since they are subject to the *path dependency*. They are, however, potentially related to those costs for environmental benefits by them generated.

In addition, regionalized and uniform payments are more favorable to International negotiations, because, abolishing any historical reference, they are more compatible with WTO rules and targets. Old CAP price support instruments, still in force before the arrival of the new 2014-2020 CAP, weakened any EU negotiation to dismantle extremely protectionist policies on global scale and ensure a positive conclusion of the Doha Round (Reform The Cap, 2009).

In the end, decoupling, regionalization and unpacking strongly follow the goal of competitiveness of the European agriculture, which is, let's not forget it, the first purpose of such reform. This change finally aims to a rural, integrated and land development policy in the place of a sectorial policy, as it was already anticipated by some economists (Buckwell, Sotte, 1998) many years before Fischler reform.

The analysis on the evolution of CAP direct payments carried out from 2003, brings to the conclusion that CAP can't absolutely be accused of general paralysis, even of such accusation is valid in some cases. Community level innovations have been impeded by some conservative countries, among which Italy, where the choices of the *policy makers* for the CAP implementation have slowed down the change, privileging many *status quo* elements (partial convergence or "Irish model") and denying some benefits to modernization from CAP application.

3. A New Standard in the Market Policy

The previous paragraph showed that EU has abandoned the traditional sectorial policy as well as the old instruments for market stabilization: price support, market regulation, production adjustment, export refund. The single CMO and the abolition of any production quotas are the most evident events towards this direction.

If today there is no sectorial policy, does this mean that there will be no problems linked to price crises and market uncertainty in the near future? Or that these crises are negligible for the community and the interests of the agricultural policy? Definitely not.

On the contrary, over the last five years, some market issues have grown even worse and become more evident to the attention of the agricultural policy: an agricultural price volatility and a larger wedge between production and consumer prices, being the consumer prices a consequence of the constant decrease in the negotiating power of farmers along the production chain (Cavicchioli *et al.*, 2010).

The opening to the global market, to which come new and powerful competitors and many more new consumers (together with old consumers with new needs), upsets the traditional balance of competitiveness. Beside this, we should consider the climate changes generating strong oscillations in production on global scale.

Such new emergencies have brought about the discussion within CAP, especially from 2009, about *annus horribilis* related to the dairy sector, hard-hit by a heavy and fast price decrease. EU has reacted with the establishment of a new "group of high-level experts on milk products", who, after a long legislative process, has approved in 2012 the proposals about the so called "milk quotas" (European Commission, 2010), inspiring the new single CMO innovations for CAP 2014-2020.

The topic about the market stabilization is still current, since the phenomenon of price volatility has grown even worse and affects most of the agricultural *commodities*.

In the light of this new scenario, it is possible to formulate some questions about the agricultural policy future. If EU has dismantled the market policy, which instruments are going to be used to face crises due to the effect of structural and business surplus? How can shortage of goods and supply requirements be faced? After detailing targets and instruments at the base of the common market policy, the following paragraph offers an analysis and an assessment of advantages, critical aspects and political and economic consequences.

3.1. From Direct to Indirect Instruments

The scientific literature classifies agricultural policy instruments for price and market stabilization under two main categories (table 3):

- *direct* instruments of the public authority for import control, stabilization and agricultural price cover at production, stock control and management, production adjustment;
- *indirect* instruments to foster the central role of farms and agribusiness: concentration of the offer, improvement in the relationship between producers and first buyers, producers' self-organization through cooperation, associations, inter-branch agreements (Saccomandi, 1991; Frascarelli, 2012).

Table 3 – Agricultural Policy Instruments For Market Control

Direct instruments	Interventions on foreign trade	- fixed duties and compensatory duties - quotas - non-tariff barriers - export refunds - export taxes
	Price stabilization and agricultural income guarantee measures	- price support and stabilization - price integration - income safety
	Stock control and management	- public storage - private storage
	Production adjustment	- quotas - prohibition on planting - set aside - productive reconversion
	Offer guarantees	- food aid
Indirect instruments	Offer concentration	- producers' association (cooperatives, producers' organizations)
	Relationship between producers and first buyers	- inter-branch agreements

Since the generation of CAP in 1962, the European Union has largely used direct instruments, but the negative results of such policy and the WTO restraints have progressively limited their use up to an almost total dismantling of the market policy through the last CAP reforms (*Fischler* reform and *Health Check*), which have cancelled any coupled aids, reduced export refunds to the minimum, abolished milk quotas, weakened the public intervention role on a safety network (table 4).

Over the last five years, in consideration of the price volatility increase, the agricultural sector has come to regret the old sectorial policy for the price cover. However, it is not possible to go back to such policy. Even if the previous CAP was very successful during its first twenty years from its birth (1962-1982), in the following years (1982-2000), the market support has generated more problems than advantages (Frascarelli, 2012). This does not mean that today the same motivations, which gave birth to the modern agricultural policy, first in the 30s with the national States, mainly as a result of 1929 depression, and later to the Common Agricultural Policy in 1962, are no more so strong. The scientific literature on agricultural policy (Hallet, 1983; Saccomandi, 1991) presents those motivations which have always justified the public intervention on the agricultural market and farmers' income stabilization:

- the atomized structure of the agricultural offer;
- demand inflexibility;
- low flexibility of offers in the short term;
- biological nature of agricultural production.



These motivations haven't become weaker in the present economic agricultural scenario, because, especially in a strong evolution market, such problems persist and these agricultural peculiarities remain, but the agricultural policy instruments necessary to face such problems can't be the same of the previous CAP, since they are not the most appropriate instruments to ensure an efficient and effective response to the present needs. This evolution is configured as a real change to the paradigm of the market policy: the passage from direct instruments for EU intervention on markets (guaranteed prices, offer control, public storage) to indirect instruments through the engagement of the industry actors, especially the farmers.

Table 4 – Evolution In The Agricultural Policy

Instruments	1993-2004 CAP	2005-2013 CAP	2014-2020 CAP
Fixed duties and compensatory duties	Higher levels	Lower levels	Not modified
Export refunds	Higher levels for almost all sectors	In limited amounts for cereals, rice, milk, sugar, beef and pig meat, eggs, poultry, transformed fruit and vegetables	Cancelled
Price support and stabilization	All sectors, except oil seeds	Only for cereals, rice, milk, beef and pig meat, sugar (but much more limited)	Safety networks
Price integration	Oil seeds, tobacco, olive oil, cotton	Cancelled	Cancelled
Transformation aids	Dried fodder, fiber flax, transformed fruit and vegetables	Dried fodder, fiber flax	Cancelled
Coupled aids	Seeds, beef and sheep meat, rice, pulse and hop	Transformed fruit and vegetables, tobacco, rice, nuts, protein plants, seeds, specific aids (article 68 Reg. 1782/2003, article 69 Reg. 73/2009)	Coupled aids for specific productions (article 52 Reg. 1307/2013)
Decoupled aids	-	Support main mode	Support single mode, with the exception of article 52 Reg. 1307/2013
Public storage	All sectors, except oil seeds, protein plants, flax and hemp	Only for cereals, rice, butter, dried milk, beef and pig meat, sugar	Only as safety networks
Private storage	Pork meat	Butter, dried milk, cheese, olive oil, beef, pig, sheep and goat meat, wine	Yes, with modifications for simplification
Production quotas	Milk, sugar, wine, tobacco	Milk, sugar, wine	Cancelled
Mandatory set aside	Yes	Cancelled	Cancelled
Stimulus to the offer concentration and demand adjustment	Only fresh fruit and vegetables, olive oil, tobacco	Fresh fruit and vegetables, olive oil, milk (with milk quotas from 2013)	All sectors
Measures to improve the food industry chain	-	-	All sectors
Risk management instruments	-	Subsidized insurances and mutual aid funds (article 68 Reg. 73/2009, CMO wine and fruit and vegetables)	Subsidized insurances and mutual aid funds (second pillar, CMO wine and fruit and vegetables)

Such evolution was clear in 2009 with the crisis of the milk sector where the policies related to this sector, known as “milk packages” have launched the new paradigm of the market policy. The political meaning of “milk package” goes beyond the specific measures adopted by the dairy sector and has anticipated the leading change of the paradigm about market policy 2014-2020. The “milk package” has set out the end of the direct instruments for interventions on markets (intervention prices, quotas, storage) as well as the passage to the agricultural policy indirect instruments.

With the latest 2014-2020 CAP to face the important problem related to market stabilization, EU has approved a new strategy to increase the farmers’ power of negotiation and allow a better functioning of the food supply chain:

1. producer organizations (PO) and producer organization associations (POA);
2. inter-branch organizations (IO);
3. market transparency and new instruments;
4. contract agreements, meant as mandatory by the public authority (with the extension of the milk package to other sectors);
5. short production and distribution chain development, from producers to consumers, with no intermediaries;
6. offer for PDO and PGI productions (beside cheese, already included in the “milk package”, it has been extended to ham).

Together with these instruments, we have to consider even those implemented for the risk management, especially mutual aid funds, identified within the second pillar of CAP.

3.3. *Some Considerations*

The functioning of food and agricultural supply chains was and still is central within the new CAP debate, which the effectiveness of the entire 2014-2020 seven year planning shall depend on. In fact, it would be unnecessary to provide income support – which in Italy is about € 320 euro/ha – if the farmers, due to their ineffective price transmission and the unbalanced negotiation power, shall continue to loose added value along each chain well beyond the value of the direct payments they received.

In a moment of strong market turmoil, the European Union cannot afford to leave the European farmers alone, since the CAP still decisively influences the strategic choices, indirectly, orienting the natural input management, the production dynamics and the nature of the buyers-suppliers (Bartolini, Viaggi, 2013; Kazukauskas *et al.*, 2013; Raggi *et al.*, 2013).

If the needs and objectives are fully shared, there were and still are different positions on the effectiveness of the instruments.

Shall the indirect instruments of agricultural policy be effective to deal with the challenges of the agricultural market? To answer this question, a thorough analysis is necessary, although in this framework only two evaluations shall be made: the criteria for a good market policy and the instruments ability to pursue the objectives.

A good agricultural market policy should first of all help the markets to work well, without replacing them, through shared rules, a system of controls and timely and effective sanctions against any form of *free riding* and speculation on the agricultural *commodities*, to protect the weaker subjects of the supply chains (consumers and farmers).

The goal to let the markets work and assign them tasks of regulating the demand and the supply implies that the agricultural policy shall concentrate its resources and limit itself to intervene against the “market failures”.

None-the-less the continuous market crisis, just like the fruit and vegetable crisis of 2014 and the market difficulties resulting from the Russian embargo, feeds again the debate on the necessity

or not of the agricultural policy's intervention measures. Although the old market instruments are unanimously considered as too rigid, too costly and distorting, there is still a strong debate on the immediate efficacy of the solutions that the new 2014-2020 CAP proposed in their place: the indirect instruments of agricultural policy, to increase the main role played by the farmers, without a EU direct intervention on the markets.

In the light of the economic theory teachings the strategy seems correct, but most likely the operative solutions proposed shall encounter remarkable difficulties in their implementation. If it is true that the indirect instruments of agricultural policy are more suitable in the long-medium term, it is necessary to find a solution for emergency situations, such as for instance the sharp fall in prices due to cyclical factors (climate change trends) or out of the ordinary ones (such as the Russian embargo). The risk management instruments on this account are the most suitable ones, after the direction followed by the recent US agricultural policy.

On this account, the operating effectiveness of the indirect instruments of agricultural policy shall be assessed too. In some European countries (including Italy), the cooperation among the producers and the inter-branch organization so far was difficult and within the framework of each chain there was more contrast than cooperation. Thus, it will be necessary to have a transitional stage during which the new direct instruments and some of the market management direct instruments shall coexist, to be implemented as safety nets in case of a strong market crisis.

Notwithstanding the difficulties linked to the practice, the PO, the IO, the contracts and the market transparency are potentially effective instruments – the only possible, in any case – and allow to pursue the new goal of the CAP, above all the increase of market and negotiating power of the farmers, more particularly when these instruments complement each other (Frascarelli, 2012). In fact, in order to reverse the constant decreasing trend of the added value percentage and stabilize market relations, the farm must get out of the conditions of perfect competition and of price-taker, in order to pass to the oligopolistic competition, which means that it shall decide not only the production quantity but also the offer price (*price-maker*), considering both competitors's constraints and the fact that the price shall affect sales (Saccomandi, 1991).

Within this scenario, the role played by the agricultural policy shall continue being essential in the interest of the entire community and the change of paradigm of the CAP – from the market policy to the food chain functioning – it is the only path to be followed, although imperfect and full of obstacles.

The main role played by the players of the food and agricultural chain shall be crucial. From this point of view, Italy shall be called to quickly make up for its chronic difficulty in organizing and managing its food and agricultural chains, by proving its effectiveness and efficiency from both a political and operational point of view.

In conclusion, a market policy combined with safety nets, indirect instruments for improving the functioning of the food and agricultural chain and risk management instruments shall be most effective.

4. Coupled or Decoupled Payments?

A particularly debated theme during the CAP negotiation and national level implementation was about the coupled payments, in contrast to or complementing decoupling.

Such a debate leads to question the effectiveness of coupled payments.

It is interesting to notice that the orientations of the academia, both in its scientific works and reports which are often required by the same EU institutions, are diametrically opposite to the ones expressed by the political decision-makers (Pupo D'Andrea, 2014).

The academia agrees in considering that coupled payments should be eliminated, or at least limited in time, because they are not effective as to the purpose they were devised for and also limit the

farmers' freedom to produce or not. It also shows the undesirable effects of coupled payments due to the distortion of production and of the market as to the free market situation. In general, all the price and/or coupled payment policies were ineffective as to the purposes they were conceived for, also as to preventing arable land from being set aside. (Tangermann, 2011; Swinbank, 2012). The decoupled policies are more effective in remedying the "market failures", more particularly, in particular to encourage the nature of public good of some aspect of the agricultural activity and guaranteeing a compensation of the external economies agriculture and farmers produce (environment, landscape, hydraulic-agricultural set-up) which a free market price system does not manage to remunerate adequately (De Filippis, 1988).

The argumentation supporting the decoupling of the agricultural policies is based on the commonly accepted firm belief that deregulated markets are more efficient than the ones subjected to public intervention. However, it is necessary to notice that the social consequences of the liberalization of the agricultural markets depend on the level and the nature of the competition and shall be carefully assessed (Russo, 2007). Many analysis on decoupling, in fact, ignore the problem of the market power exerted by the agricultural chain middlemen downstream the farms, notwithstanding the substantial literature suggesting that the food and agricultural markets are imperfectly competing (Russo *et al.*, 2011).

It is possible to demonstrate that, in the presence of market power, the decoupling of the agricultural policies does not necessarily increase social welfare. However, a minimum price or decoupled payments scheme is a less efficient solution than a policy based on the joint adoption of decoupled policies and interventions fostering competition (Russo, 2007).

Within the debate on the CAP, scholars and *think tanks* have always emphasized the elimination or drastic reduction of direct payments (both coupled and decoupled ones) of the first pillar of the CAP and the introduction of payments intended for remunerating environmental services and supporting rural areas (Buckwell, 2008; Bureau and Witzke, 2010).

The European Court of Auditors shares the same view and identifies the lack of clear and measurable objectives and of monitoring procedures as the main limitations of the specific support scheme.

On the other hand, the *policy makers* and the agricultural and the agro-industry organizations have always deem it appropriate to propose a coupled payment system. This difference in views was evident even during the 2014-2020 CAP negotiation.

Along the same line, the Copa-Cogeca (2010) was supporting a coupled aid within the framework of a more general preservation of the direct aids of the first pillar of the CAP, which are essential for maintaining a sustainable production, protecting the territory and the economic prosperity of the rural areas. Thus, the coupled aids are seen positively even on the basis of the production of public goods.

The conservative positions of the *policy makers*, in defence of the coupled payments were supported by the European Parliament which, complying with the demands of the agricultural organizations, managed to obtain an increase of the *ceiling* of the coupled payments up to the 15% direct payment capping.

On the contrary many reserves were expressed by those who instead expected a bold reform effectively aiming at reaching the objectives which the Commission itself stated in the Communication of 2010 (Tangermann, 2011; Swinbank, 2012; Mahè, 2012). If the coupled support mentioned in Art. 69 and Art. 68 could be justified to accompany the aid decoupling process, within the CAP 2014-2020, such a tool had to be eliminated and its sphere of action transferred to the second pillar.

The international institutions such as the OECD (2011) stated the necessity to make the objectives of the first pillar of the CAP clearer and to improve the statistical collection of the informa-

tion for monitoring policy effectiveness, implicitly criticizing any recoupling trend.

Similarly, the European Court of Auditors, within its opinion about the CAP reform proposals (European Court of Auditors, 2012), dwelled on the efficacy and effectiveness of the instrument, maintaining that the Countries which decided to apply coupled payments must single out clear objectives that could be monitored⁷.

Some studies (Bureau, Witzke, 2010) present the possibilities to use coupled payments only if they are necessary to produce particular public goods and within the scope of such a task.

This was the choice made by the Commission with its proposal of 2011, which nonetheless was deeply modified by the Parliament and the Council in favor of a greater relevance of coupled payments. Within the new 2014-2020 CAP, the coupled support is established by art. 52 of the EU Regulation no. 1307/2013, which entails that coupled support can be granted “only to those sectors or to those regions of a Member State where certain types of farming or specific agricultural sectors shall be considered as being in difficulties”.

In summary, the limits of the coupled policies are indisputable; therefore the only cases when the coupled payments are justified, according to the new CAP, are the ones when production is associated to public goods and where the processing sector is not very concentrated. It is the case of the extensive animal husbandry on the mountains (suckler cow, sheep, lamb and goat), where this type of farming and animal husbandry production is the only one able to provide a certain level of public goods.

About this theme, the discussion on a community level was already described during the 2014-2020 CAP negotiation. The discussion in Italy during the negotiation between the Ministry and the Regional Governments on the application of CAP was even more heated. Italy, like any Member State, was supposed to decide the percentage of the national capping to be allocated to coupled support and the financed sectors. Member States were given a wide margin of discretion as to the choice of the help types to be provided among the possible ones. The margin of discretion was also extended to the choice of the productions to ensure additional support and its extent, as well as the eligibility conditions to access it. The national choices on the coupled payments provoked a heated discussion among the supporters in favor of the decoupled payments who wanted a low percentage of coupling and those in favor of the maximum coupled support (15% of the national capping). The discussion about the sectors to which coupled payments were destined to was even more harsh.

This debate turned into a “stage coach holdup” which contributed to weaken the coupled support turning it into an instrument through which drawing political consensus by ensuring support to some local productions.

Coupled payments seem doomed to be poorly useful both in general and for the selected individual sectors. One part of the decoupled aids was taken from the farmers in order to feed the plafond for the coupled support and then it was given back as coupled aids in order to please all the Regions; by doing so, an expensive clearing account was created (both from a financial and an administrative point of view) with poor benefits to the agricultural economy of the Country.

7. The Court of Auditors suggests in addition to homogenously define the conditions to comply with in order to get help EU wide: meaning of “difficulty” the sectors or the regions must be in; meaning of “special importance” and “economic, social or environmental reasons” of the sectors or of the regions affected by the measure; the indicators to set the “current levels of production” and those necessary to monitor the trend of such production levels. In general, the Court of Auditors confirms that the CAP continues to be “expenditure oriented” namely more careful to comply with the regulations than to the results ensuing from the application of the regulations. Consequently, within the direct payment system, the objectives and the expected results are not clearly singled out, and there is no reference to the impact of the policy and to the indicators to measure it.

6. Between Competitiveness and Public Goods

Scholars, especially economists, tend to consider CAP as a policy which is unable to adjust to the needs and evolution of agriculture and of the social and economic context.

This idea includes only some real aspects which are more appropriate to the Italian context than than to the rest of the EU. The analysis of the previous paragraphs tended to show that the last five reforms led to a radical change of the CAP, that rotates around two objectives: competitiveness and public goods.

These two objectives were constantly pursued over time within the CAP, although with an uncoordinated and confused combination of instruments which were heavily conditioned by the path dependency, full of sectorial and territorial political mediations.

Is it possible to agree on such an evolution of the CAP? Is it suitable to face future challenges? Is it consistent with the suggestions of economic theory?

Before trying to answer these questions, some preliminary remarks are necessary. The CAP reform is not the main driving engine of change for farms, mostly, and its impact is not homogeneous (Lobley, Butler, 2010). A great quantity of modeling and simulation exercises⁸ about the intentions of the farmers after the CAP reforms (Tranter et al, 2007; Matthews et al, 2006; Balkhausen et al, 2008; Gorton et al. 2008; Moro, Sckokai, 2013) have led to shared results only as to some behaviors and most estimated effects are differentiated according to the territories, the sectors and the types of holdings⁹. Many simulations were not confirmed by the final effects of the reforms that – in most cases – were much “lighter” than as initially postulated (Gorton et al. 2008). That demonstrates that the CAP should not be considered as the driving engine of all the transformation of agriculture.

Change is driven by other factors, such as product market, tax policies and dynamics of the production factors (land, labor). It is true though that the relevance of such factors increased since the CAP gave more freedom to farmers by decoupling, giving up sectorial policies and strengthening the second pillar (Matthews et al, 2006).

Nonetheless, CAP plays an important role and going back to the questions mentioned above, as already mentioned in in the previous paragraphs, a policy must focus its resources and limit itself to intervene against “market failures.” There are two types of them and concern, in the first place, those mentioned in the fourth paragraph) and, secondly, all the circumstances where “there is a market, but it does not work,” due to such structural unbalances and information asymmetries that no acceptable solutions can be offered in an acceptable timeframe (Frascarelli, Sotte, 2010).

6.1. The Remuneration of Public Goods

The market is not formed in all those cases when the produced goods or services that are consumed are at the same time “non-excludable” (everyone can enjoy them freely) and “non rivalrous” (the enjoyment of the good by someone does not exclude others to enjoy it as well). This is the general condition of all the so called public goods: environmental goods, biodiversity,

8. On this account, some authors observed that Europe invested a lot on information and modelling systems to measure the impacts of policy change on farms, on the market and on the sectors, yet it showed a very limited ability to prove the environmental impact of politics which in the meantime became much more environmental. This was a handicap for the development of fair political measures (Buckwell *et al.*, 2014).

9. For instance, some studies showed that the decoupling of direct payments shall lead to a decrease of cereal and livestock production and an increase of forage surfaces (Balkhausen *et al.*, 2008); in Ireland, it shall lead to increase the probability that the farmers participating to the off-farm work market with an increase of the amount of time devoted to off-farm work (Hennessy, Rehman, 2008) and finally to the extensification of livestock breeding and a greater orientation to the farm market (Matthews *et al.*, 2006).

landscape preservation¹⁰, soil fertility, water quality, water resources-agricultural use, contrast to climate change, rural development¹¹, etc.

In all these cases, when regulation and/or of public valorization (as cost or proceed) are lacking, the market value of the public good is in fact null. It ensues that such good shall be excessively exploited every time it should be an input included in the production processes (just think about biodiversity or water), while it would not be taken into account if it had to be an output.

Defining a value of the public goods is therefore the necessary solution in order to dampen the impact of the negative externalities ensuring at the same time that their production is stimulated. This solution is particularly advantageous in all those cases where, just like in the agricultural practice, the public benefits are obtained by means of multifunctional processes. In these cases, the advantage to produce takes advantage of the connection between the public good, paid at a market price and the public good paid by the State.

The alternative would be socially more expensive, as in order to produce the so called public goods (or to avoid public ills), an alternative program to agriculture should be activated by using professional landscape service men, ecological workers, civil protection, fire department, park white and blue collar workers, gardeners etc. It is a solution which is practically impossible on a large scale. This statement may be debatable, as it is not adequately supported by scientific analysis. In fact, if on the one hand, the agricultural and environmental policy and rural development became an increasingly important part of the CAP, on the other, there was no parallel development on the basis of measurable evidence as to the farm to support such policies¹². This is demonstrating to be a handicap when providing the evidence for political change (Buckwell *et al.*, 2014).

The need for a European Common Agricultural Policy aiming at “paying” publicly the production of public goods and services of the primary sectors became progressively evident in the evolution of the CAP. From MacSharry onward, all the CAP reform always increase the financial resources in favor of an agriculture that is more compatible with the demands of environmental sustainability.

The early agricultural and environmental measures were drafted with the *Mac Sharry* reform of 1992, a real innovation in the history of CAP. At first they were received with suspicion by the farmers, but within a few years everybody started becoming familiar with them and to use them. They were strengthened with *Agenda 2000*, which instituted the second pillar of the CAP (rural development).

10. Most benefits resulting from a diversified, traditional and well preserved landscape are directly enjoyed within a country – as it is an advantage to draw qualified human resources – or thanks to tourism. These benefits are by priority national public goods rather European ones. But also the European citizens enjoy the landscapes of other Member States and this can justify some EU intervention of collective nature (Reform the Cap, 2009).

11. A country may be wanting to boost a more decentralized distribution of the population within its territory; it is yet a national choice rather than a European public good. Notwithstanding that, the principle of cohesion assigned the EU a role in helping disadvantaged regions to reach their full potential (Reform the Cap, 2009).

12. There two other sectors requiring additional efforts on the indicators to guide the politics. The former one is the development of methods and metrics for international comparisons as to agricultural sustainability. Without them, for instance, it is very difficult to evaluate the environmental impact of displacing a protein versus the EU production. The latter one is to better understand the relations between the territory management practices, the factors guiding them and the impact on the environmental variables. Such information is paramount for determining the policy. An example about the lack of evidence on the relation between the corporate practices and the environmental results was highlighted in 2012-2014 during a negotiation on the CAP reform. Hart (2014) identified the issues in the negotiations between the Council, the Parliament and the Commission during which the proposals of the Commission about the most demanding ecological methods were discarded for lack of objective supporting evidence.

The *Fischler reform* continued along this line, while introducing the environmental objectives of the CAP through conditionality, so that direct payments had to comply with environmental regulations (CGO) and good agronomic and environmental conditions (BCAA).

The 2008 *Health Check*, later, strengthened the second pillar of the CAP, increasing modulation and allocating more resources for specific agri-environment measures: biodiversity, contrast to climate change, water management, bioenergies.

With the 2014-2020 CAP, finally, the remuneration of agricultural public goods took an additional step forward, in line with the objectives of Europe 2020 economic strategy. We cannot hide in principle, and as to economics and political economy, that the new CAP is disappointing having in mind what could be theoretically desirable in terms of efficiency and equity. It does not keep all its initial promises in terms of innovative change and real thrust towards a policy intending to remunerate public goods and the positive externalities of agriculture (De Filippis, 2014). Nonetheless, keeping realistically in mind the functioning of the “political market” and of the complicated decision making process¹³, it can be considered as an acceptable compromise which – although it does not meet the initial ambition – does not move away from the main objective of the remuneration of public goods.

Its concrete expression involves both the first and the second pillar through:

- the payment of the greening on the first pillar of the CAP (direct payments);
- the enhancement of the agri-environmental measures in the second pillar of the CAP (PSR).

The evolution of the CAP in this direction is consistent with the indications of economic policy, if anything, the problem is the need for its rationalization, in order to ensure greater effectiveness in terms of instruments, and at the same time, of its more targeted adaptation both in terms of objectives to be pursued and funds to be committed.

6.2. *Competitiveness and Interventions for a Failing Market*

Well functioning markets, with no public interventions, are the best way to have an innovative and competitive demand oriented agricultural sector (Reform the Cap, 2009), nonetheless the agricultural policy has the task to make markets work out and remove “failures” (information asymmetries, unbalances in the market structure), which do not resolve in socially acceptable times and conditions. The risk is that the “failures” trigger chains of undesired events, so as to undermine the levels of overall competitiveness of the agricultural systems and even their own survival.

There are many cases of market failures and to resolve them, public intervention is needed. They include structural weakness of agriculture and of the unbalanced contract relations of the production and supply chains, harming especially farmers as to value distribution and price determination. The structural weaknesses are: the atomized structure of the agricultural supply makes production planning hard; seasonality and agricultural supply variability; the problems of structural modernization of holdings and the corresponding infrastructural and organizational adaptation of the environment they collectively work in; the difficulties of generational turnover in agriculture.

A consequence of the market failure which particularly surfaced over the last five years is linked to the price volatility and the structural unbalance between the form of the agricultural market and that of the upstream and downstream sectors.

The main objective of the agricultural policy to contrast market failure is to relaunch competitiveness.

The CAP of the past, through the internal market isolation and guaranteed prices, provided a solution to the problem, as wicked as it could be, due to its side effects (in terms of supply sur-

13. The 2014-2020 CAP is the first reform voted after the Treaty of Lisbon, which introduced the procedure of codecision between European Parliament and Council.



pluses, creation of pockets of inefficiency, higher prices imposed on the consumers, stressing market unbalances to the detriment of the poorest world economies etc.).

During the recent transformation of the CAP, new solutions were proposed to remove the obstacles of the failing market: on the one hand the decoupled payment while on the other that indirect instruments for market stabilization.

The decoupled payment, representing a certain income which is not subject to variations, effectively contributes to income stabilization, yet the most efficient and effective solutions (at least potentially) are the new instruments: associations, inter-branch organizations, contracts, competition rules and market transparency.

For some of these cases such as a non functioning market, CAP entails also some forms of incentives of the second pillar: it is the case of the structural modernization of the farms and the generational turnover, through a policy of rural development.

The indirect instruments for stabilizing the markets, which were mentioned in Par. 3, are in conclusion more suitable for the dictates of the economic theory; the former are less distorting the international trade, stimulate a market oriented agriculture and play a role in “curing” the failures of the market.

6.3. CAP between Competitiveness and Public Goods

Upon establishing that fostering competitiveness and remunerating public goods are objectives that can be shared, are the CAP recent reforms following this direction?

After demolishing or downsizing the old policies of intervention on the market, the 2014-2020 CAP is based mainly on regionalized payment, on indirect tool, on the market and on the support to rural development. It is therefore a policy going in the desired direction, aiming at contrasting market failures, for those goods that have no market (public goods) and to remove the obstacles when the market is failing (table 5).

Tab. 5 – Outline of the EU Food and Agricultural Systems

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	INTRUMENTS
Public goods <i>(when there is no market)</i>	<i>Productopm o f European Public goods</i>	Regionalized decoupled payment and conditionality <i>(Greening payment)</i>
	<i>Agriculture in territories with handicaps and natural unbalances</i>	Compensation (mountains, disadvantaged areas, Natura 2000)
	<i>Production of public goods differentiated by territory</i>	Agri-climate.environmental and silvi-climate and environmental payments
Competitivity <i>(when the market does not work)</i>	<i>Direct interventions for a basic regulations and seriously critical situation</i>	Direct intervention on the markets: safety nets, stock management (in case of serious crisis)
	<i>Market transparency</i>	Marketing regulations, competition rules
	<i>Adaptation of the supply and promotion of organized production and distribution chains</i>	OP, AOP, OI, contracts, DPO or PGI production planning
	<i>Modernization, innovation and human capital in the food and agricultural and rural systems</i>	Incentives for modernizing, introducing innovations and generational turnover Incentives to territorial supply chains. Incentives for partnerships

Some economists continue deeply criticizing direct payments, considered as an indifferently granted of resources to the agricultural sectors¹⁴, an “aid to the past”, intended to replenish the income of the farmer who otherwise would be penalized by the redistributive effects of the Fichler reform: a support distributed in a non uniform and discriminant manner. In other words a fixed annuity.

It is not possible to ignore the limits of the surface related support, that although uniform and adequately conditioned, presents the serious defect to favor land ownership. Every time public support is linked to agricultural production or land ownership, well-off farmers and land owners collect most of the aids (Reform the Cap, 2009). This problem, currently, was not still solved by the EU’s current management of direct payments.

Notwithstanding the criticism and therefore the need for a better application of the conditionality, the agri-environmental payments and in the future of the *greening*, the regionalized direct payments guarantee a minimum level regulation of the entire European Union rural territory.

The entire European agricultural surface is cultivated and/or kept in good agronomic conditions, to the benefit of the landscape and of the hydrogeological balance, protecting biodiversity and the land from erosion. In other words a series of positive and desirable effects would be guaranteed by the community. To reach such results, any other policy would be more expensive.

In addition, it should not be forgotten that greening conditionality and commitments are not a rigid and unchangeable body of regulations, rather they can be strengthened, modified and shaped over time to reach new goals, to face new environmental emergencies (for instance, fire prevention, hydrogeological instability, climate change) or to meet the new expectations of the European citizens.

The decoupled and uniform support may take a different value in different territories: in the marginal areas support is justified for maintaining farmlands at risk of abandonment, while in the more fertile regions it is justified to ensure an agriculture having a less serious impact on the environment. In both cases, support would foster agricultural production and therefore, in a situation of a growing world demand, the provision of foodstuffs at reasonable prices for the consumers; this is also a desirable effect for the community.

This is not a negligible detail. In the EU food security is not under discussion, since it is a wealthy area having the necessary purchasing power to buy goods on the world markets, even when prices are high. None-the-less, making sure that the EU is ready to face any future threat and preserving a production capacity, which can be easily revived if food is persistently lacking, are still legitimate goals (Casati, 2008; Reform the Cap, 2009). To this purpose, decoupled, targeted and conditioned payments – for instance to preserve soil fertility and water resources or to keep the production activities above a critical threshold – would be more effective than the indiscriminate subsidies granted with the goal to preserve the current levels of production or employment.

A policy with rules decided on a European level, nonetheless, shall not be able to take into account local specificities and needs, therefore it shall be completed on a territorial level with the interventions of the second pillar, to induce or reward specific behaviors, aiming at meeting the territorial needs with selective measures, within the logic of subsidiarity (Bartolini *et al.*, 2013). It shall therefore be necessary to accompany support with direct payments and a rural development policy strengthened by greater resources, one that should also be more effective thanks to less muddled instruments, thus resulting in a complementarity between the first and the second pillar for the production of cumulative public goods (Bartolini *et al.*, 2013) (figure 2). Is a CAP oriented to competitiveness and public goods remuneration able to face the new challenges of agriculture in a world contest, above all as to the forecasted increase of the world demand?

14. For instance Sotte F. (2005), *La natura economica del PUA*, Agriregionieuropa, no. 3, year 1.

According to FAO, the world demand of foodstuffs is destined to increase by 70% within 2050 (FAO, 2010). Such a skyrocketing increase shall be accompanied by a strong increase of the demand of feedstuff, fibers, biomass and biomaterial leading to an inevitable reaction as to the demand of the EU agricultural sector which is one of the main supplier of the agricultural markets worldwide (De Castro, 2010). The EU agricultural sector accounts for 18% of the world food export and is worth 76 billions euros. As to the value of the production, agriculture in the EU provides more than 40% of the OCDE overall food production.

The growing food demand shall exert a huge pressure on natural resources that shall affect agricultural production (soil, water, air and biodiversity). The theme of sustainability therefore is similarly emerging: 45% of the European land has soil quality issues, as shown by the low levels of organic matter and almost one quarter of it is affected by moderate to high erosion. Precious ecosystems and services rendered by them were harmed or even disappeared.

During the last twenty years, the birds populations living in a farming habitat decreased by 20-25% while common butterflies decreased by 70% and pollinators like bees are greatly threatened. About 40% of the farm land is exposed to nitrate pollution, putting the water resources at risk. In addition, the agricultural sector accounts for 9% of the EU green house gas emissions (European Commission, 2012).

These challenges show the direction for the future of European agriculture, summarized by an indissoluble pair, productivity and sustainability. The analysis on the future of agriculture shows an increase of production along with greater sustainability, better summarized with the slogan “sustainable intensification,” as suggested by Buckwell *et al.* (2014).

According to such authors, the necessary policies to improve both productivity and environmental management of farmlands may be divided into four categories: 1) R&D, training, counseling, training and innovation¹⁵; 2) the environmental policy¹⁶; 3) the agricultural policy; 4) the other collective actions to spur the supply of environmental services.

The most important policy instrument to direct European agriculture shall be the additional evolution of its agricultural policy, still applying the CAP objectives defined in the Rome Treaty in 1957. The first objective is to «increase agricultural productivity, developing technical progress, and ensuring the rational development of agricultural production.»

Buckwell (2014) concludes that including the environment in agricultural policy is the safest means to reach those objectives. None-the-less, during the process of negotiation of the 2014-2020 CAP, the agricultural organizations successfully convinced the politicians to cut down the environmental ambitions of conditionality and greening, in order to ensure the minimum impact of the reform and less constraints for agricultural production; evidently such motivations were stronger than the ones supporting the improvement of the environmental performance of agriculture.

In this situation, environmental benefits risk being negligible (Matthews, 2013). An analysis of the Defra (*Department for Environment, Food and Rural Affairs*) estimated that the net environmental benefits of the greening amount to a billion pound, mostly resulting from the EFA (ecological focus area), equal to less than a quarter of the payments to the farmers for greening itself. It is not evident therefore that the CAP decisions go in the right direction and to this purpose it is possible to agree on the questions raised by Buckwell (2014): thus, is the greening strategy within the first pillar wrong? If the ecological payments of the first pillar are of poor value for

15. About this theme, the European Commission launched a European Partnership for Innovation EPI on the theme “Productivity and Sustainability of Agriculture” (COM(2012) 79 del 29.02.2012). The EPI shall contribute to build a competitive primary sector, guaranteeing the availability of foodstuff on a worldwide level, the diversification of the productions and of the products, the long term supply of different raw materials for food and food use and a better division of the added value along the food chain.

16. It refers to the European environmental legislation, mainly based on directives.

the public money, should they be reduced or revojed or should the greening commitments be more rigorous? Shall the environmental payments be based on results or rather on prescriptive commitments? If the environmental contracts with the individual farmers are too expensive and simply do not work, if the process works only through the collective associations of farmers, at a higher landscape or hydrographic scale, is the European policy wrong? Are there alternatives? These are the questions to be included in the agenda for public debate about the future reform of the CAP, starting from the mid-term review of the CAP.

It is undeniable that the instruments have to be perfected, just think about greening – which still has to come into force – and is already subject to ferocious criticism. Despite that, the future reforms of the CAP shall not be able to leave out an agricultural policy oriented to the remuneration of public goods, to better functioning markets and to risk management that jointly shall ensure competitiveness, productivity and sustainability or better sustainable intensification.

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From 'new rurality' to 'anew rurality': crisis and return to the countryside in Greece

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Abstract

In the past twenty years continuous change has transformed the face of rural Greece. The European agricultural and rural development policies, other international developments, as well as the recent economic crisis have accelerated past and created new rural transformation processes. 'De-agriculturalisation' and rural restructuring have been accompanied by 'rurbanization' and socio-economic integration of rural population. These interrelated processes have internally transformed the rural areas, forming a 'new rurality' characterised by contraction of agriculture, expansion of tourism and construction, increased pluriactivity, increased employment of international migrant labour and the reorganisation of farm operation and family labour division. In the environment of crisis, rural areas have been affected in diverse ways. On the one hand, they experience rising costs of production, falling incomes, increasing inequalities, contraction of public services and on the other, lower unemployment rates than urban areas, increased production and exports and a cowardly 'back to the land' movement in which agriculture's role is enhanced.

The paper will identify and discuss the main elements and the dynamics of the changing physiognomy of rurality in Greece over the past twenty years. On the basis of evidence provided by available statistical data, it will also investigate the main features of the internal and external to rural areas' mobilities in the context of the recent economic recession.

Keywords: de-agriculturalization, rural mobilities, new rurality, economic recession, crisis, return to the land

Introduction

Greek rurality has been transformed, modernized and reshaped over the past few decades. However, this transformation has not been isomorphic. It has rather been discontinuous and regressive. Drawbacks and delays have been equally important as progressions and innovations (Kasimis & Papadopoulos 2001, p. 200).

Greece exemplifies the way the rural remains alive while constantly changing, reshaping its agricultural and non-agricultural mix in rural locales. Even further, in times of recession the 'rural' acquires broader importance not only as a 'refuge' but also as 'opportunity'.

The 'rural' includes a number of connotations which cannot be easily dissolved. It is identified with specific places but also with the activities, movements and experiences of places. Therefore, the question of rurality is becoming increasingly complex as its boundaries expand inside the urban and vice versa. The importance of this for the case of Greece will become clearer later in my talk.

Today regional and other geographically dispersed local activities appear to complement the engagement of the farm family members in agriculture. *“The lack of crystallised social collectivities leaves significant room for ‘resistance’ to externally induced changes or integration movements. Even the apparent convergence to modernisation patterns may be linked to the resurgence of ‘informal’ phenomena which express some form of ‘social resistance’ to the formal rules of the division of labour within a modern society”* (Kasimis & Papadopoulos 2013, p. 276). The ‘resistance potential’ of farm households is shaped by and shaping strategies involving both the agricultural and the non-agricultural sectors. An inter-sectoral and cross-sectoral movement as a form of strategic adaptability results in a significant ‘room for manoeuvre’ on the part of small family farms, reflecting their flexibility for a differentiated utilisation of family and farm resources (labour, land, machines, gender division of labour, etc.). This strategic adaptability of family farm households is considered a form of ‘reflexive responsiveness’ to policy implementation and ongoing processes of European integration of the Greek countryside (Papadopoulos 1998). This reflexivity can be seen as part of the rural resilience of family farms, which utilize their resources in such a way as to achieve the maximum returns provided by their labour efforts. In order to follow all that, allow me first to give you a short account of agriculture and rurality in Greece before and during the crisis period.

The basic features of Greek agriculture

Over the entire post-world war II period agriculture in Greece experienced a continuous contraction in size. Agricultural, rural and regional development policies and external factors involving international trade and competition have contributed to its decline. Small average size (4.5 ha) and high fragmentation (6 land parcels per farm) of farm holdings epitomize the historic, cultural, geographic and geomorphologic construction of modern Greek agriculture.

Nearly 80 per cent of farm holdings have a size of less than one Economic Size Unit (ESU) and more than two thirds of them (70 per cent) cultivate less than 5.0 hectares, while the majority (71 per cent) cannot ensure full employment for more than one employed person. According to Eurostat Farm Structure data for 2007 show that only one in ten of those employed in agriculture have exclusive employment in it and receive income gained exclusively from it (against 16 per cent in EU-27). This is confirmed by the OECD (2004) which estimates off farm income of farm households at 40% of the total farm households income. Additionally, between 2000 and 2009, agricultural income per working person was reduced by 16.9 per cent, while in the crisis years (2009-2012), the decline totalled 10.8 per cent when in EU-27 there was an increase of 7.5 per cent (Eurostat 2012, p. 24). The high cost of production (disproportionally high compared to countries such as France, Italy and Spain) led to lower productivity and competitiveness and indicated accumulating structural problems and an undergoing agricultural crisis that was evident as early as the mid-1990s (Alpha Bank 2009). It is characteristic that between 2000 and 2009 labour costs doubled and production costs in crop agriculture increased by 40% leading to further loss of competitiveness. The contraction of competitiveness in agriculture is further explained by the decline of private investments, the irrational management of EU funds, and the ineffective structural policy implemented by Greek governments since the accession of the country into the EU. In short, structural problems connected to the small and fragmented size of holding, the ageing of farm and rural populations, the low levels of employment, the high cost and low competitiveness of agricultural production, the stagnation and decline of productivity and the wide regional and sectoral inequalities had created various deadlocks which were, however, until recently, masked by the CAP support and the mass arrival of cheap migrant labour. Yet agriculture



has continued to play a supporting role in the livelihoods of rural population accounting for 13 per cent of all employment (against 4.5 per cent in EU-25) contributing nearly 4.0 per cent to the country's GDP (Kasimis & Papadopoulos 2013). I argue here that today the 'rural' has been re-affirmed as a legitimate option for the country's population, while agriculture still remains an important component of present-day rural Greece despite recent transformations in the rural economy and society. In a contradictory manner various processes on the one hand restrict and on the other re-instate farming as a functional element of households, communities and regions contributing to the reshaping of rural areas. But allow me here a small parenthesis on the basic indicators of Greek crisis.

Economic recession and return to the land and the countryside

Crisis in Greece appeared initially as a crisis in the private financial sector, turned first into a fiscal crisis, and then into a debt crisis that contaminated institutional and political structures. Since the beginning of the crisis in 2008, the Greek economy has lost nearly one million jobs. In 2013 unemployment reached 27 per cent and youth unemployment surpassed 62 per cent. Within four years the country lost more than one fourth (26.2%) of its GDP and recession officially reached 4.8 per cent of the GDP in 2013 and continued falling in 2014. In the same period the purchasing power of Greek population declined by 37.2% and private consumption by 30%. Despite heavy lending by IMF, ECB and EU, consecutive austerity programmes and a generous "haircut," public debt has reached 322 billion (175 per cent of GDP General government gross debt in 2013), well over the percentage of 120 per cent where the crisis started from in 2008 (Figure 1).

Figure 1

Basic indicators of Greek crisis

	2009	2010	2011	2012	2013	2014
GDP at market prices (% changes)	-3.1	-4.9	-7.1	-6.4	-4.8	-1.25
Gross fixed capital formation (% changes)	-13.7	-15.0	-19.6	-19.2	-7.7	-2.5
Unemployment rate (%)	9.5	12.5	17.6	24.2	27.8	28.4
General government financial balance (% of GDP)	-15.6	-10.8	-9.6	-10.0	-4.1	-3.5
General government gross debt (% of GDP)	130.0	148.3	170.3	157.0	175.1	180.6
Current account balance (% of GDP)	-11.1	-10.1	-9.9	-3.4	-1.1	0.9

Source: Economic Outlook No 93, OECD, June 2013

The improved resilience of rural areas in the crisis years

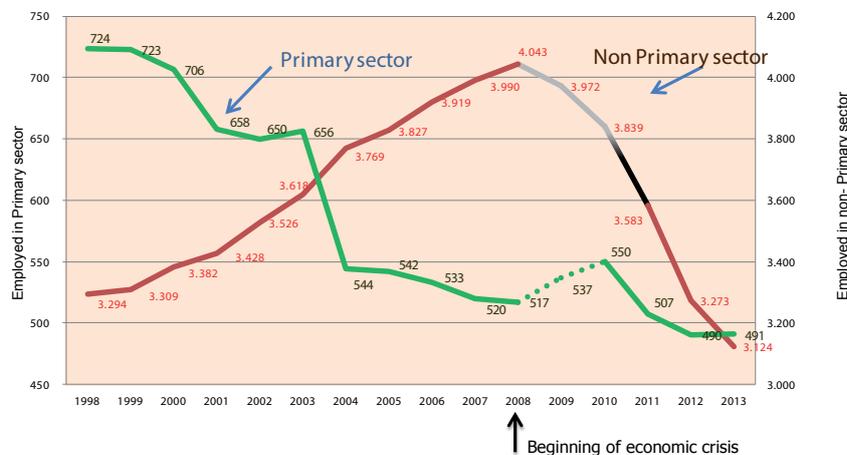
In employment

Quantitative and qualitative evidence suggest that the crisis has hit the urban areas mostly. In the recession years agriculture and rural areas seem to perform more 'resiliently' than other sectors of the economy and turn into a 'refuge' and a 'laboratory' of ideas and initiatives for various strata of urban population directed towards agriculture and the countryside. What is meant here by *resilience*, is the capacity of rural areas to absorb disturbances and to reorganize, while undergoing

changes, so as to retain the functions, structure, identity and reflexivity of rural activities in the current economic crisis (Davoudi 2012). What makes rural resilience possible in Greece in particular is the ‘openness’ of rural areas and their continuous historical connectedness to the ‘outer urban world’. A ‘rural-urban partnership’ has already been moulded as part of the interconnection strategy of particular places within the current socioeconomic arena in Greece. This has variously contributed to their survival in different historical periods and presents today alternatives to crisis-ridden city residents facilitating their ‘return’ (or expressed ‘will for return’) to the countryside. This is explained by the late urbanization of Greece, the maintenance of property by urban residents in rural areas, pluriactivity developed in both directions - urban and rural - by the maintenance of family and kinship ties with rural areas, by the attachment to the land and the limited land transfer as family property, as well as by the cultural references that still keep very close the ties of urban and rural population in Greece. What has been explained before is numerically depicted below. In the first three years of the crisis (2008-2010) both agriculture and the rural areas performed better in employment reversing the declining trend of the pre-crisis period (Figure 2). Overall, rural areas had the lowest job losses (7 per cent or 62,000 jobs against a loss of 16 per cent or 495,000 jobs in urban areas) compared to urban and semi-urban while agriculture and the primary sector increased their employment by 7.3 per cent (Tsiforou & Stavropoulou 2011, p. 7; PASEGES 2011, pp. 26-29) when the secondary sector lost 26 per cent and the tertiary 9 per cent of their total employment.

Figure 2

Employed in the primary, secondary and tertiary sector of economic activity
(in thousands, annual average)

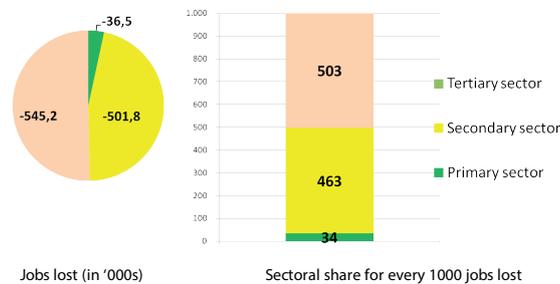


Source: External Trade, Hellenic Statistical Authority (EL.STAT.)

The immediate response of ‘shocked and threatened’ urban population in the first years was to seek refuge in agriculture and rural areas. After 2010 the decline started again following the sharp decline in overall employment. Recent evidence from the Labour Force Surveys (LFS) indicates a stabilisation of employment and even a small increase last year. Again agriculture seems to perform better in the overall contraction of employment. In 2013 employment increased by 2,400 when in the other sectors it dropped by further 150,000 jobs. This is reflected in an improvement of the share of agricultural employment in total employment from 11 per cent to 13.2 per cent. With an overall loss of nearly one million jobs in the six year period 2008-2014, agriculture seems to lose only 36,500 jobs and, as we will see later on, these are rather jobs lost from retirement or ‘unpaid family labour’ withdrawal (Figure 3).

Figure 3

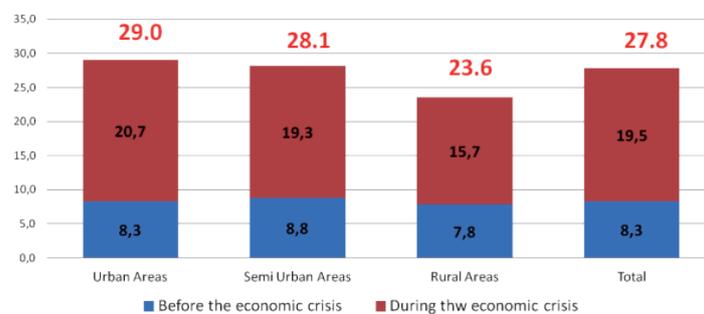
Jobs lost by sector, 2008-2014 (in '000s)



Similarly, better performance of rural areas we identify in unemployment. Although unemployment has increased from 6.2 per cent in 2008 to 22 per cent in 2013, it is still lower than in urban areas (29 per cent) (Figure 4).

Figure 4

Changes in unemployment rate
During the economic crisis: 1th quarter 2014 – 1th quarter 2008
Before the economic crisis: 1th quarter 2008



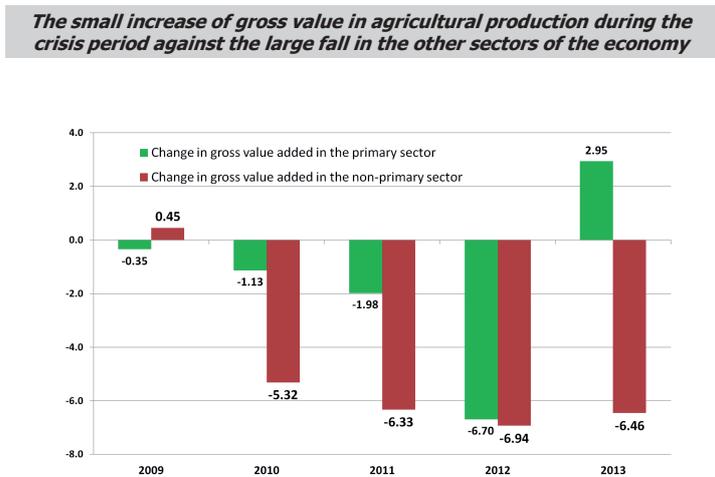
The outcome of changes in employment and unemployment has been:

1. A sharp decline of off-farm employment (secondary, tertiary sector) within rural areas
2. A comparative improvement of the position of agriculture (from 40 per cent to 42 per cent of the total employed).
3. A return of family labour to the farm household.
4. An increase of average weekly employment on the farm, particularly for the 35-50 years age group, the result of an internal to rural areas and the farm household reorganisation of labour employment.

In Gross Value Added formation

The positive reaction of agriculture has been reflected not only in employment but in GDP formation and external trade as well. In 2008 the contribution of agriculture stopped declining and reversed its trend, growing every year to reach 3.7 per cent in 2013 from 3.1 in 2008. This is partly the result of the decline of the other sectors of the economy. In 2013 there was an increase for the primary sector contribution of 2.95% when the fall of other sectors was 6.46%, as indicated in Figure 5.

Figure 5



Source: National Accounts, Hellenic Statistical Authority (EL.STAT.)⁶

If we use Gross Value Added, in constant prices, as an indicator, we identify an even higher increase in agriculture’s contribution, from 3.61 per cent in 2008 to 4.86 per cent in 2013.

On the other hand, during the crisis imports were reduced, exports recovered and the deficit in the balance of payments was brought down. In 2013 exports of agricultural products increased by another 10 per cent to overtake 18 per cent of the total size of exports while six out of the top ten exported products were agricultural.

Dependency on imported food products had been increasing well before the economic crisis. Improved standards of living, changes in consumption patterns and CAP implementation had affected negatively the structure of agricultural trade. In the period 2005-2011 nearly 40 per cent of home consumption was covered by imports while only 1/5 of food production was exported.

In closing the poverty gap

These developments are also reflected in the conditions of poverty and social exclusion in rural areas during the recession years.

Figure 6



High differentials of poverty indicators between rural and urban areas declined in the past five years. The percentage of urban households at risk of poverty increased from 14.5 per cent in 2008 to 20.9 per cent in 2012 (Eurostat, Survey on Income and Living Conditions, EU-SILC) when in the same period the percentage of rural households at risk of poverty did not show any increase and was maintained at 26.6 per cent with the consequence its difference from urban households to shrink from 12.1 percentage units to 5.8. Household Budget Surveys for the same period, show that the differences were reduced even further, down to 2.3 units in 2012 from 11.2 in 2008 (Zografakis & Karanikolas 2012).

Going back to the roots

Urban residents perceive the closing of the poverty gap as a mark of the rural areas' comparative advantage and assume that rural areas offer a higher quality of life, more employment opportunities and better living environment for their family members.

It comes as no surprise therefore, that new entrants to rural areas originate mostly from the large urban centres. One in two comes from areas worst hit by unemployment, the region of Attica/Athens (45 per cent of entrants), Central Macedonia and Thessaloniki (9 per cent), Thessaly and Central Greece (7 per cent), Eastern Macedonia (6 per cent), and Crete (5 per cent). Estimates give nearly 30.000 new jobs created in the primary sector for urban residents (Figure 6).

When we examine the employment conditions of new entrants one year before entry into agriculture, we find that nearly one third of them held no jobs (i.e. 21 of that percentage were unemployed, 24 were students, 22 per cent were in military service and 32 per cent were housekeepers). Two thirds moved into the sector from other sectors of employment (54 per cent withdrew from commerce, leisure, administrative and other professional activities and 29 per cent got probably early retirement from the public sector).

Newcomers are of a relatively younger age and a better educational background than farming population. Their age classifies them among the youngest group in the agricultural sector (nearly 6 years younger than the existing population): most of them (one fifth) belong to the 35-39 year age group. Their educational level is higher than the rest of the farming population (one third received tertiary education and nearly half secondary).

More than half of newcomers become 'self-employed' farmers in employment restructuring. Important in size is also the employment of new entrants as wage labourers, large part of who are migrants. In sectors like agriculture where labour relations are not subject to collective bargaining agreements, the participation of migrant labour has increased more than it has nationally. In 2008 migrants officially constituted around 50 per cent of total wage employment but by 2013 the percentage went up to 73 per cent. 'Employers' and 'unpaid family workers' suffered the largest losses. Nearly two thirds of the jobs lost were defined as 'family unpaid labour'. The changes on the side of jobs lost are rather the result of retirement of aged employers or of other 'unpaid family labour' changes in employment to benefit from various CAP subsidy rights and training programmes as well as from the provision of unemployment benefits. Intra-regional and inter-regional mobilities and transformations reflect the interweaving of rural and urban characteristics on particular rural locales. Mobilities between rural and urban areas and employment changes reinforce both the disengagement of rural residents from (conventional) agriculture and the engagement of former urban residents with local food production, alternative farming, subsistence-hobby-lifestyle farming, etc. (local food product processing, organic farming, aromatic herb cultivations, etc.).



Qualitative research shows that contemporary mobility from urban areas to the countryside reflects modernity and tradition, necessity and choice: return to the land of origin, new methods of organisation and employment, rediscovery of traditional and development of new crops and methods of cultivation (organic farming, greenhouse production, producer groups etc.).

A new space and time division of working and living between rural and urban areas are elements of these developments.

The tendencies for return to the land and the countryside studied through the Labour Force Survey statistics so far are supported by recent research (KAPA Research 2012) carried out in a representative sample in Athens and Thessaloniki. More than two thirds of those sampled (1,286 people) claimed that they had thought of leaving the cities to settle in the 'Greek province' (i.e. countryside or small towns).

Nearly two thirds of them are below 40 years old, and nine out of ten seek employment and a better quality of life in the countryside where, as they declare, have property they would like to 'exploit'. Agriculture attracted the attention of not more than one third of the respondents while the remaining are interested in other sectors of the rural economy like tourism, culture services and trade.

In another survey carried out in 2013 (www.iefimerida.gr, 30/10/2013) both the age group 18-35 and the unemployed age group 18-55 saw agriculture and rural development (at a percentage of 97 per cent) as the only solution to the problem of unemployment.

Future challenges and policy issues

The idea of 'rurality' itself, either as a novel synthesis of 'rurban' traits or as a nostalgic 'back to the land and the roots' movement, has become more and more popular in Greece. Because of the economic crisis, agriculture is now being reinstated and re-enhanced in the environment of a newly shaped rurality.

For the first time, the refashioning of rurality in Greece is somehow involving young urban residents.

However, their 'return to the land and the countryside' has not been as easy and ideal as thought. The first enthusiasm was followed by the difficulties of implementing farming ventures and living in the countryside. The new austerity programme imposed upon the farming population strict measures connected to diesel taxation, abolition of tax exemption, reduction of pensions etc. which, in combination with the cuts in public expenditure in rural areas, are expected to raise the costs of production and create a negative environment in the immediate future. On the other hand, return occurs against a background of heavy cuts in public spending in rural areas that has serious implications for the provision of health, school, transport and social services to rural inhabitants.

For some analysts, however, these difficulties will not obstruct return simply because of the worse conditions created in urban areas where unemployment and poverty have hit the roof pushing people to seek refuge in rural areas, despite the new measures imposed upon the farming population. Moreover, analysts expect unemployment rates to persist in the economy at levels over 20% into year 2020. It is no wonder, therefore, that agriculture and the agrofood sector are proposed as possible recourses for an exodus from the state of crisis. In various simulation



scenarios for the Greek economy in conditions of crisis, the primary sector either maintains or increases its employment positions compared to the other two sectors. This means that the primary sector can turn out to be a target of active employment policy.

However, all this is not so far accompanied by a targeted policy framework or a strategy of rural development well designed by the government.

Reforms are considered necessary to facilitate entry to the profession and to support those interested in becoming farmers.

For a young person, for example, to register in the Farmers' Register preconditions set like attendance of training programmes, taxation office confirmation that 35% of his/her income comes from agriculture and employment time in agriculture at 30% of the total employment time are considered tough measures.

Needless to say how deterrent are the problems of financial liquidity and of high interest rates by the banking system, following the privatization of the Agricultural Bank of Greece in particular.

Yet, despite all this, the prospects of Greek agriculture and rural areas remain still more favourable. In a period of intense fiscal changes agriculture and rural areas have ensured a more stable fiscal framework annually until 2020 through the EU Funds and the CAP support system.

In what follows I will attempt to discuss: first, the CAP framework and the provisions made for the support of new entrants and second, two other initiatives that highlight the attention drawn by agriculture and the agrofood sector.

to be more connected to markets, aware of market demands and of networking. On the other hand, possible involvement with conventional agriculture and methods of organization could place them in a comparative disadvantage compared to the already established farmers and even create conflictual conditions in rural areas. Consequently, advisory and knowledge management for new comers should differ a lot from the 'conventional' farming advisory and training services.

The need for the restructuring of agriculture and the agrofood sector has been identified and highly prioritized by two recent initiatives: the McKinsey & Company (2012) study "Greece: 10 Years Ahead" and the Stavros Niarchos Foundation (SNF) initiative "Recharging the youth" (announced to be financed by 100 million in the next 3 years), which work not against the government's/CAP framed policies but rather in parallel, if not complementarily.

After an analysis of the structural advantages and disadvantages of agriculture and the food sector the McKinsey study states that " despite the challenges, the fundamentals of the sector primarily in terms of product quality and underlying cost structures, remain promising and render themselves to an aggressive effort to boost the country's output and exports" (McKinsey & Company 2012, p. 55).

The study identifies nine priorities and measures grouped in four major strategic themes. These themes are:

1. Sharpening Greece's market and product strategy

- 'Export engines' and 'emerging traders' targeted at specific products and the improvement of their quality and competitiveness



- 'Domestic/processed focused' targeted at export growth and import substitution
 - 'Consumption/import majors' lowering the costs of their production targeted to lower imports
2. Improving competitiveness through scale, productivity and quality
 3. Ensuring international market access and presence through the establishment of 'Greek Foods Company'
 4. Revamping capabilities, reinforcing Agriculture (and Aquaculture) University education and creating an 'Agricultural Development Institute' to disseminate and promote innovation and provide incentives to farmers creating employment

In a 10 year period the study estimates that the annual incremental/direct GVA (versus 2010) will be 4.5 billion euros, employment could increase by an additional 140.000 jobs and the trade balance could improve by 2.7 billion. Similarly, the European Centre for the Development of Vocational Training (CEDEFOP) estimates that by 2020 employers in agriculture and fisheries would seek 270.000 skilled labourers despite the contraction of demand (-93.000) in order to replace the 363.000 farmers expected to retire in this period (<http://newpost.gr/>, 25/10/2013). The Stavros Niarchos Foundation's (SNF) "Recharging the Youth" initiative in agriculture and food systems for Greece is a programme involving a comprehensive approach that links know-how from Rutgers University, the American Farm School (AFS) and the Agricultural University of Athens (AUA) to target youth groups in Greece taking into account the Ministry's of Rural Development and Food proposed framework for the education and training of farmers. The SNF approach acknowledges that the challenges of recruiting youth, who may have contemplated other careers and futures to a new life in agriculture and food production, and the encouragement of them to consider new alternatives, is a complex and a multi-stage process. The initiative distinguishes between "commodity" agriculture, "value-added" or "entrepreneurship" agriculture and emphasizes the improvement of possibilities/ opportunities of the agrofood sector, and what rural areas can offer, assuming and addressing the relevant socio-cultural infrastructure. The initiative is organized in a two-stage process. First (phase 1), the planning proposal providing for a number of targeted studies on the structure and development prospects of particular sectors of agriculture and the food sector and second (phase 2) the implementation of a programme of youth engagement to work in multiple settings that can be refined and adapted to suit the unique needs of Greek youth.

The Planning Proposal (Phase 1) aims to:

- A. Survey, analyse and quantify the scope, needs and opportunities for developing the programmatic focus for an Implementation Proposal (Phase 2) that will be developed during Phase 1 and is planned to last for 3 years.
- B. Develop the programmes and strategies to effectively recruit, train and support Greek youth in new product/enterprise development within the agrofood sector.
- C. Understand and develop new networks and infrastructure to facilitate reengagement of youth in the agrofood sector.
- D. Lay out a road map for a full-scale, multiyear wrap-around programme that meets the Foundation's goals.

In order to turn the strategy of revitalization of Greek agriculture and rural areas into success, now more than ever the reform of the institutional environment of agricultural and rural development is imperative. The clientelism and corporatism that have led to the collapse and bankruptcy of farmers' cooperatives and organisations need to be replaced by other collective forms of organisation and cooperation. Changes in education, research, farmer collectives, support services and policy implementation are urgently required if Greece is to avoid a deeper food and humanitarian crisis.

In conclusion, return to the land and the countryside, plus other support initiatives, are taken, or proposed to be taken, in an environment of extensive cuts in public expenditure and the collapse of the welfare state. In rural areas social and administrative infrastructure are going through a deep crisis. Schools and medical centres are closing down, public transport has more or less collapsed, police stations and post-offices have ceased operating. Therefore, no matter what the initiatives are, they do not suffice to ensure a successful 'return' if the services of social infrastructure are not improved. But in order to have that there is an urgent need for a change of policy away from neoliberalism and austerity programmes, which have failed, as indicated earlier in my talk, to solve the problem and get the country out of crisis. The austerity programme of troika has brought the country to a worse economic situation and to a state of a humanitarian and food crisis, having seriously undermined the development prospects of the country. We are all now conscious of the fact that the public debt problem is not a Greek problem but rather a European problem, seeking a European solution.

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SESSION ONE

CAP 2014-2020 and new challenges for agriculture and rural areas



Greenhouse gas emissions in the EU agri-food system: empirical assessment, economic evaluation and policy implications

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Abstract:

The study intends to implement a measurement method assessing GHG emissions induced by food products in the EU throughout their whole life cycle, from production to consumption, so as to provide an useful information base for future mitigation strategies and sectorial policy implementation. To do that an Environmentally Extended Input-Output Analysis is conducted, based on a comprehensive and detailed model (E3IOT) representing the food sector and sub-sectors in the EU-25. This allowed us to provide: (i) a quantification of the magnitude of GHG emissions induced by each food sector along with their economic value; (ii) the identification of the most critical activities within each sector (i.e. sub-sectors and supply chain stages), that are responsible for the release of the largest share of GHG emission; and finally (iii) a discussion of the most appropriate strategies in the context of the recent new course of the CAP and European environmental policy.

JEL: O13, Q18, Q54,

Keywords: Greenhouse gas emissions; Climate change; Agri-food system, Environmentally Extended Input-Output Analysis; Common Agricultural Policy

1. Introduction

The EU's current climate and energy policies, part of the Europe 2020 strategy, are focused on preventing dangerous climate change by reducing emissions of greenhouse gases (GHG). More precisely, climate action is one of the three objectives (along with viable food production and balanced territorial development) set for the new Common Agricultural Policy (CAP) (EC, 2010). At the same time the European Commission set out indicative targets for the different sectors until 2050 (EC, 2011). As far as agriculture is concerned, a reduction in GHG of about 30% as compared to emission levels of 2005 is foreseen as a long-run target. Actually, direct agricultural GHG emissions in the EU have been estimated at about 465 Mt CO₂ equivalent per year, being around 9% of total EU GHG emissions (Lesschen et al., 2011). About 55% of these emissions consist of methane, mainly from ruminants in the livestock sector, and 40% is nitrous oxide (Westhoek et al., 2012).

However, agriculture cannot be considered the only source of emissions in the food supply chain. In fact, the food chain produces GHG emissions at all stages in its life cycle, from the farming process and its inputs, through to manufacture, distribution, refrigeration, retailing, food preparation in the home and waste disposal (Garnett, 2011). Moreover, the food supply chain interacts with other parts of the European economy and its importance is further enhanced by linkages within domestic and international markets. This is why it is difficult to determine the actual amount of GHG emissions produced within the agri-food system in the EU and significant differences are observed between various sources, such as between official data from National Inventories and those resulting from scientific studies.

In the light of these considerations the present study deals with the assessment of GHG emissions originated in the EU-25 agri-food sector. More precisely it intends to set up and implement a measurement method of GHG emissions induced by food products throughout their whole life cycle, from production to consumption, so as to provide an useful information base for future mitigation strategies and sectorial policy implementation.

Thus the study provides: (i) a quantification of the magnitude of GHG emissions induced by each food sector along with the economic value of the production supplied; (ii) the identification of the most critical activities within each sector (i.e. sub-sectors and supply chain stages), that are responsible for the release of the largest share of GHG emission; and finally (iii) a discussion of the most appropriate strategies in the context of the recent new course of the CAP and European environmental policy.

2. Methodology

Based on the scientific literature reviewed, we decided to adopt a top-down approach and to carry out an Environmentally Extended Input-Output Analysis (EE-IOA). In fact this method allows to take in consideration the whole sector and to analyze the contribution of food sub-sectors in a greater detail (Murray & Lenzen, 2010).

In the EE-IO tables the industries produce outputs by consuming inputs from other industries in a fixed ratio and the outputs of an economy are represented together with the related environmental emissions.

The sum of the industry output consumed can be calculated as follows:

$$x = Ax + y \quad (1)$$

where:

x : is the vector of total industry outputs;

A : is a $m \times m$ matrix of domestic intermediate industry outputs in monetary values;

y : is the vector of the total final consumption of industry outputs;

The total domestic industry output required to satisfy final consumption is:

$$x = (I-A)^{-1} y \quad (2)$$

The EE-IO model is calculated by assuming that the amount of environmental intervention generated by an industry is proportional to the amount of output of the industry, and that the identity of environmental interventions and the ratio between them are fixed. The total direct and indirect pollutant emissions and natural resources consumed by domestic industries to deliver a certain amount of industry output is calculated as follows (Tukker et al., 2006):

$$m = B (I-A)^{-1} k \quad (3)$$

where:

B : is a $q \times m$ matrix, showing the amount of pollutants emitted and natural resources consumed to produce one monetary unit of each industry's output;

I : is an identity matrix;

m : is the vector of total domestic direct and indirect environmental impacts;

k : is a vector showing the net industry output.

The total of direct plus indirect demand for each sector which represents the total supply of each industry can be calculated from:

$$x = (I-A)^{-1} k \quad (4)$$

where:

x : total supply vector.

Then the emissions associated with the total supply vector are calculated as follows:

$$m = Bx \quad (5)$$

To be able to analyze the contributing to Global warming from the food sector the E3IOT model (and the related CMLCA software) were used¹. E3IOT represents the EU-25 economy with a detail that no other database can provide. In fact it covers 500 commodities and services (250 directly bought and 250 as intermediate consumption), considering the environmental emissions during production, consumption and waste management phases.

Among all the sectors and environmental emissions assessed in the E3IOT model (up to 480*480 sectors), this study focuses on the "Food and non-alcoholic beverages" sector (44 products according to COICOP classification) and on the single "global warming" impact category (including 21 emissions). The main data sources used include OECD Input-output tables, Eurostat final expenditure studies, Technology matrix, USA, CEDA 3.0, LCA, processes database EcoInvent, Environmental interventions matrix, USA, CEDA 3.0, Environmental interventions tables, Western Europe. As a further methodological step, we conducted a Structural Path Analysis (SPA) so as to gain further insight in the activities that induce the highest emissions in the various paths of the final products upstream in the supply chain, in each sub-sector. In the SPA the Leontief inverse matrix expands the direct requirements matrix, so that it is possible to trace individual paths contributing to the total GHG emissions from the final consumption all the way back-up the supply chain. Quite often, in fact, the largest contribution to total emissions does not occur in the first stage of the supply chain and only a small number of sectors may contribute to the environmental impacts in a given tier (Minx et al., 2008).

3. Results and discussion

The calculations carried out showed that there are significant differences between the food sectors considered in their overall impact (Table 1). The three main sectors contributing more than 10% to total GHG emissions are (i) Meat (38% of total GHG emissions), (ii) Milk, cheese and eggs (17%) and (iii) Bread and cereals (11%). As few as two sub-sectors (namely Meat and Milk, cheese and eggs) cover 55% of total emissions. The remaining nine sub-sectors have an impact of 45% together with a limited contribution each. Considering the economic sector values, we observe a

1. E3IOT and CMLCA are developed by the Institute of Environmental Sciences (CML), University of Leiden and executed by TNO, CML, VITO and DTU for IPTS (Tukker et al., 2006), (Huppes et al., 2008).

similar structure, as the Meat sector has the highest value per year, followed by Bread and cereals and Milk, cheese, eggs. The sectors with the higher environmental impact have generally a higher economic value. However a different pattern is observed when looking at the emission unit value calculated. In this respect we can see that emissions originated by Meat, Oils and fats, Milk and coffee are associated with a lower production value per emission unit. On the opposite, Bread Mineral waters and Vegetable sectors emissions are associated with higher values. This means that, given the emission levels, the average final production value of the former product group is lower than the one of the latter (or, in other words, that the first group of products causes higher emissions per production unit value, as compared to the second group).

Table 1 - Food and non-alcoholic beverages

Sector	Emissions		Value		Unit value (euro/ton CO2eq)
	(mln ton CO2eq)	(%)	(mln euro)	(%)	
Meat	460	38%	115.590	28%	251
Milk, cheese, eggs	209	17%	66.689	16%	319
Bread and cereals	138	11%	72.270	17%	524
Fruit	82	7%	25.361	6%	309
Vegetables	59	5%	30.300	7%	514
Oils and fats	56	5%	16.465	4%	294
Fish and seafood	51	4%	21.970	5%	431
Sugar, jam, honey, etc.	51	4%	22.414	5%	439
Mineral waters, soft drinks, etc.	41	3%	21.430	5%	523
Coffee, tea and cocoa	35	3%	11.200	3%	320
Food products n.e.c.	30	2%	13.668	3%	456
Total	1.213	100%	417.357	100%	344

Source: Authors elaboration based on the E3IOT database.

The results obtained for the most contributing sub-sectors emerged from this general analysis are further disaggregated in the following Table 2, illustrating the environmental impact of the top ten products out of the total 44 products in the Food sub-sectors. The data displayed show that the first five products contribute to half of total emissions originated within the Food and non-alcoholic beverages sector. Among the top five products, three derive from the Meat sector and contribute to 37% of total emissions; the following two products belong to the Milk, cheese and eggs sector and contribute to 13% of total emissions. The market value of the first five products is also relevant, as it accounts for 39% of total products value. As far as emission unit value is concerned, Meat, Fruit, Poultry and Prepared meat products show the lowest intensities, while Vegetables, Soft drinks, Fruits and Bread have the highest ones.

Table 2 – Top 10 food and non-alcoholic beverages products – emissions and value

Products	Emissions		Value		Unit value
	(mln ton CO ₂ eq)	(%)	(mln euro)	(%)	(euro/ton CO ₂ eq)
Meat packing plants	209	17%	49.900	12%	239
Poultry slaughtering and processing	146	12%	41.000	10%	281
Sausages and other prepared meat products	90	7%	20.900	5%	232
Fluid milk	88	7%	27.400	7%	311
Cheese (natural, processed, and imitation)	73	6%	21.800	5%	299
Edible fats and oils, n.e.c.	56	5%	16.300	4%	291
Vegetables	53	4%	18.000	4%	340
Bread, cake, and related products	39	3%	27.400	7%	703
Bottled and canned soft drinks	37	3%	18.400	4%	497
Fruits	37	3%	9.960	2%	269
Top 10 products	828	68%	251.060	60%	303
Total (44 products)	1.209	100%	417.357	100%	345

Source: Authors elaboration based on the E3IOT database.

The further SPA analysis conducted considered the emissions with the stronger impact on global warming, namely Carbon dioxide, Methane and Dinitrogen oxide, that contribute together to almost 90% of total GHG emissions. Structural Paths were analyzed for each emission with path length maximum 3 and with a contribution boundary of 1%².

The results show that no Carbon dioxide emissions could be attributed to the agri-food sector and sub-sectors, while significant emissions of Methane (Table 3) and Dinitrogen oxide (Table 4) were detected. As far as Methane emissions are concerned, the largest contribution comes from the Meat industry, in total 11%, with the main contribution from product Meat packing plants (10%). The second contributor is the Poultry and eggs industry with 6%, with Poultry slaughtering and processing products contributing with 5%. And the remaining industries contribute with a share of 2% from Dairy farm products and 1% share from Miscellaneous livestock. As for Dinitrogen oxide emissions, the two most contributing sub-sectors are Vegetable and Fruit processing (respectively 12% and 10%).

Table 3 – Food industry methane emissions by sector and sub-sector

Sector >> sub-sector	Contribution Paths	
	(%)	(no.)
Meat	11%	
>> meat packing plants	10%	3
>> sausages and other prepared meat products	1%	3
Poultry and eggs	6%	
>> poultry slaughtering and processing	5%	3
>> poultry and eggs	1%	2
Dairy farm products	2%	
>> natural, processed, and imitation cheese	1%	3
>> fluid milk	1%	3
Miscellaneous livestock	1%	
>> miscellaneous livestock	1%	2

Source: Authors elaboration based on the E3IOT database.

2. The contributions lower than 1% were not considered significant in this analysis.

Table 4 – Food industry dinitrogen oxide emissions by sector and sub-sector

Production >> sub-sector	Contribution Paths	
	(%)	(no.)
Vegetables	12%	
>> vegetables	9%	2
>> frozen fruits, fruit juices, and vegetables	1%	3
>> potato chips and similar snacks	1%	3
>> eating and drinking places	1%	3
Fruits	10%	
>> fruits	5%	2
>> roasted coffee	3%	3
>> frozen fruits, fruit juices, and vegetables	1%	3
>> wines, brandy, and brandy spirits	1%	3
Food grains	2%	
>> cereal breakfast foods	1%	3
>> prepared flour mixes and doughs	1%	3
Oil bearing crops	1%	
>> edible fats and oils, n.e.c.	1%	3

Source: Authors elaboration based on the E3IOT database.

4. Conclusions

The study conducted focused on food product categories in vertically integrated supply chains. The empirical results obtained confirmed that the agri-food system is a significant contributor to Global warming and assessed the product groups with the highest environmental impact along with their total economic importance and emission unit value. The product groups with the highest emissions and lowest average production values are Meat, Milk, cheese and eggs, as well as fruits; product groups with the lowest emissions and highest unit values include Bread and Vegetables.

Since food supply chains involve a large number of processes, concrete mitigation interventions entail both technological and managerial enhancements at various stages of the supply chain. As far as agriculture is concerned, the most effective measures to be adopted are those aimed to reduce methane emissions from animal farming (e.g. by improving feeding practices), to enhance carbon removals (restore degraded land, afforestation, etc.), to optimize nutrient use and improve productivity (breeding, pest and disease management), to manage biomasses and reduce carbon intensity of fuel inputs. At the post-farm gate stages (processing, refrigeration, transportation and packaging) the main options for reducing GHG emissions are those targeting energy efficiency, cleaner and renewable fuels and resource efficiency (Garnett, 2011).

However, quite interestingly, the SPA conducted showed that often GHG emissions of agriculture are low as compared to total supply chain emissions. In fact, the highest environmental impacts observed relate to fruit and vegetable production - that contributes to about 22% of total dinitrogen oxide emissions along the food supply chain, and to animal production - that is

responsible for less than 20% of total food chain methane emissions (no Carbon dioxide emissions could be attributed to the agri-food sector and sub-sectors).

These data confirm the findings of previous studies showing that the contribute of agriculture to overall GHG emissions originated along the food supply chains is restrained, as most of its final products is used as intermediate inputs by processing industries and the environmental impacts of services is growing considerably (Marin et al., 2012; European Environment Agency, 2014). These results induce to consider the whole food chain when we face global warming concerns. In fact, climate stability itself should be considered from a wider perspective, acknowledging that is actually a pure public good (Cooper et al., 2009) and it is necessary to consequently design and implement efficient and effective interventions.

As far as the recent CAP reform is concerned, it aims at improving the environmental performance of agriculture by means of a new greening architecture, based on the combined and complementary effects of various instruments, namely the compulsory Cross Compliance and Green Direct Payment (in Pillar 1), and voluntary compensations in the Rural Development (RD) Policy (Pillar 2). The focus of the second Pillar on sustainability is clearly visible by the fact that at least 30% of the budget of each RD Program must be reserved for voluntary measures that are beneficial for the environment and climate change. The main critical points of this architecture are the voluntary participation of farmers and the role of the various Member States. In fact, the effective provision of environmental public goods will be conditioned not only by the resources available, but also by the willingness of stakeholders to participate in the new CAP schemes. Thus, substantial financial resources are required to implement information and dissemination campaigns, involving farmers together with the system of knowledge in agriculture, institutions and citizens. Furthermore the implementation of environmental actions in both pillars of the CAP and the need to adapt them to specific local conditions will likely entail a great effort in terms of data collection, monitoring and evaluation.

Overall, the results of the study point out the need for an integrated approach in the assessment of the environmental performance of the agri-food system that should cover not only the CAP, but also the interactions with other EU policy objectives impacting (positively or negatively) on the competitiveness and sustainability of agriculture and on rural development. These include policies on the environment, climate change, energy, regional development, research and development, health and consumer affairs, fiscal matters and different sources of funding (especially EU and national) (Hart et al., 2011).

In this view, some interesting propositions have been advanced by the High Level Group on the Competitiveness of the Agro-Food Industry (EC, 2009). Among these, stakeholders underlined that investments in environmental R&D should be increased along the food chain in order to tackle major future environmental challenges, including climate change, water scarcity and resource depletion. At the same time the dissemination of existing environmental technologies and best practices across the sector should be enhanced, in order to ensure that all companies, including SMEs, are informed about the latest developments in environmentally friendly techniques. Furthermore, in order to improve the competitiveness and environmental performance of EU agri-food products a proposal has been put forward to extend the product scope of the Eco-design and Energy Labelling Directive as well as to simplify and extend the Ecolabel Regulation by linking them with financial incentives. The relevant legislative proposals have already been adopted by the Commission and are now subject to the “co-decision procedure” by Council and Parliament.

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The profitability of microalgae biomass farming in Mediterranean environments¹

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1. Introduction

In recent years, the production of biofuels from energy crops to replace fossil fuels has been at the center of an international debate. Even if biofuel production has a number of advantages, it is also a source of concern because of the conflict with food supply and the potential increase in the price of staple foods (Khan et al., 2009; Araujo et al., 2010; Campbell et al., 2011). This concern has shifted the attention of researchers and firms to non-food energy crops (Balat et al., 2010). In this context, microalgae have received particular attention during the last few years (Khan et al., 2009; Ahmad et al., 2011; Delrue et al., 2012; Taberner et al., 2012). However, their actual ability to produce sustainable energy from both an environmental and an economic point of view remains controversial.

Taberner et al. (2012) point out the lack of economic viability of plants for the production of biodiesel and found that only the creation of a microalgae byproducts market (thanks to their high nutritional value) can increase their profitability. Sawaengsak et al. (2014) compared four alternatives related to two different production systems (open ponds versus photo bio-reactors - PBR) and two microalgae byproducts (glycerin and omega-3), finding that none of the considered alternatives was economically viable, even when selling the byproducts.

Other studies, however, after comparing alternative technologies have identified some potentially sustainable solutions. Kiss et al. (2010), comparing homogeneous and heterogeneous catalysis processes, point out the advantages of the latter in terms of higher yields, higher purity of glycerol, and lower maintenance costs. A similar result was obtained by West et al. (2008) on comparing four different technologies.

In evaluating the effect of different alternatives for microalgae cultivation, harvesting, extraction and trans-esterification, Rios et al. (2013) found that economic feasibility was linked to the fossil fuel market price. At the current price none of the tested technologies was competitive with oil. The aim of the present study was threefold:

- assess the economic sustainability of microalgae cultivation in PBRs, assuming that all the algal biomass is used for the production of dietary supplements;
- ascertain in what conditions of productivity and price it is possible to achieve similar results to those of the first case, allocating part of the microalgae biomass to the production of dietary supplements and part to oil production, obtaining biodiesel through a transesterification process with ethanol;
- assess the impact that the results of plant management could have on the balance sheets of farms which may have an interest in expanding their production.

2. Methodology

The main characteristics of the plant for the joint production of biodiesel and biomass with a high nutritional content are:

1. Research financed by Italian Ministry of Agriculture, Food and Forestry, BIOFORME Project.

- the microalga species cultivated is *Phaeodactylum tricornutum*;
- the production of algal biomass of high quality with the use of advanced technologies takes place in a PBR. It consists of vertical tubular glass positioned in a greenhouse to ensure optimum control of the environmental conditions of algae cultivation for 11 months per year and high productivity per unit of area used.
- on the basis of preliminary analysis, a plant production area of 1,500 m² is considered necessary to obtain sufficient economies of scale; the total area involved is 2,000 m².

The plant for biodiesel production comprises a pilot biorefinery which uses the oil extracted from the algal biomass together with the bioethanol obtained from the plant biomass of giant reed (*Arundo donax*) or Italian sainfoin (*Hedysarum coronarium*)². The analysis of the economic impact of such production on farm balance sheets for the year 2012 was conducted on a sample of farms in Campania and Sicily belonging to the Farm Accountancy Data Network (FADN). The sample was split into six homogeneous groups of farms (Table 1).

In the first region (Campania) two agricultural districts north of Naples were chosen, namely a coastal strip known as the *Litorale Domitio* and the area inland called the *Agro Aversano*. The above choice was made due to: 1. the presence of medium and large farms; 2. the possibility of using polluted soil for the cultivation of giant reed; 3. good climatic conditions which make the conditioning of greenhouses required to produce microalgae less burdensome.

In Sicily the reference area covered the provinces of Palermo, Enna and Ragusa, where Italian sainfoin is widely grown in rotation with other crops and is used for fodder production. In these areas, which are hilly for the most part, there are medium-large farms with livestock-cereal specialization, producing chiefly milk or meat. In particular, in Campania, dairy farms specializing in water buffaloes were chosen; in Sicily dairy cattle farms and those for meat production were selected. In both regions the 20-50 ha and > 50 ha classes of Utilized Agricultural Area (UAA) were considered. All farms were well-capitalized. This is a necessary prerequisite to undertake the business of microalgae cultivation which requires substantial investment. In addition, especially for dairy farms, intensification of production often leads to large increases in livestock/UAA close to the legal limits. In this respect crop diversification with algae cultivation is an alternative that does not require significant increases in UAA.

It should be noted, however, that even for medium and large farms, each farm cannot realistically manage an industrial plant such as the type indicated. Indeed, in this case the investment required would correspond to the average net capital of buffalo farms with an average area of 90 hectares and those of dairy cows with more than 110 ha. Given these considerations, provision was made for joint management of the production facilities and the treatment of algal biomass, with participation of farms in relation to their economic size. For the analysis, shares amounting to 25% of the equity of each company were hypothesized.

As is customary, the method of economic analysis was divided into three phases:

1) plant budget valuation, comparing the scenario that the plant is used to produce only dietary supplements with hypothetical production of both supplements and biodiesel; 2) analysis of the average budget results of the above-mentioned farm groups; 3) evaluation of the impact on the indicators of these balance sheets arising from participation in joint management of algal biomass production and processing.

Under the hypothesis of considering positive and negative cash flows constant in time to invariance of the price system, the economic and profitability indicators considered for the plant budget analysis and for the convenience analysis were: net income (NI), the difference between production value and explicit costs (EC), reference net income (RNI), as the opportunity cost of own capital; profitability index (PI) equal to the NI/RNI ratio; return on own capital (ROE - return on equity);

2. The quantities were 11.1 tons for giant reed and 9.6 tons for Italian sainfoin.

discounted pay-back period; break-even point in terms of the price of algal products (€/kg) and algal biomass yield (g/m²/day); sensitivity index comparing variations of PI with respect to price. Valuation of the average budgets of the six homogeneous groups with reference to the current situation and the hypothesis of industrial plant joint management, the following indicators were estimated: the RNI, as the sum of the opportunity cost of own factors, such as capital, land and family labor³; the PI (NI/RNI ratio) and the real remuneration of own production factors, obtained by distributing the NI in proportion to the composition of the RNI.

It should be pointed out that the valuations and comparisons are first defined, *inter alia*, to take into account the problematic market and technology which characterizes the sector analyzed and the underlying risk. Moreover, the types of farms considered achieved return on capital that can even exceed 10%.

Certainly, establishing the yield and price of dietary supplements to be considered for result estimation constitutes a problematic aspect. The plant type hypothesized, the results of experimental work carried out under the project BIOFORME⁴, together with the findings reported in the technical literature (Chisti, 2007, Sawaengsak et al., 2014), justify the decision to vary the yield per unit of bioreactors from 36 to 44 g/m²/day.

The average prices adopted for the algal biomass with high nutritional value assumed in the simulations were in the range 37-55 €/kg, determined on the basis of information from a few plants that have recently emerged in Italy⁵ and checks carried out by the technical/scientific literature (Egardt et al., 2013). The trends show significantly better prices for the national product obtained under the best conditions of microalgae cultivation.

3. Results

To analyze the economic performance which could be achieved with the production and processing of algal biomass the performance indicators on the two types of plant considered were compared. For the type geared to produce only dietary supplements, plant costs (comprising the PBR, buildings and equipment for biomass treatment) were estimated at euro 2.31 million (including start-up costs), 75.5% of which were attributable to the PBR.

The total revenues of this first type of plant were estimated at euro 639,560, corresponding to a total algal biomass production of 17,820 kg (17,285 net of losses), with a yield of 36g/m²/day and an average price of 37 €/kg. Explicit costs accounted for 79.1% of the total cost, consisting primarily (46.9%) of consumption (nutrient, energy, etc.), and depreciation and maintenance to a lesser extent (30.5%). Net income amounted to euro 257,942.

Investment profitability (PI = 2.55) corresponded to an ROE of 11.13%, higher than the minimum acceptable (IR = 1 corresponds to 4.35% opportunity cost of capital). The discounted pay-back period was relatively short (9 years). The break-even point to obtain a PI of 1 in terms of the price of the main output was 27.16 €/kg, amounting to 73.4% of the values used in the analysis. The sensitivity index, comparing variations of PI with respect to yields, was 2.48.

As may be seen, the indicators of economic sustainability were all positive. In other words, this type of production process, employed in the livestock context of southern Italy, appears sustainable from an economic point of view and to be an interesting element of production diversification.

Analysis of the second type of plant showed that, to obtain results comparable to those of the first type and to attract medium/large farms with good levels of profitability, high levels of pro-

3. To establish the unit opportunity cost the following are taken into account: 10-year Government bond yields (2010-2012 average) for the capital, rent for the land and agricultural wages for family labor.

4. The maximum yield was determined at 55 g/m²/day.

5. Langelloti A.L. (2014), University of Naples Federico II, CRIAcq : personal communications.

ductivity and good market prices of dietary supplements need to be achieved. Albeit possible, such assumptions currently appear a substantial source of risk.

The estimates made for the above plant type were: total investment of euro 2.36 million; algal biomass produced 21,780 kg (21,127 net), corresponding to a yield of 44 g/m²/day, 54% of which was used for the production of dietary supplements and 46% for fuel production; revenues amounted to euro 663,364 (+ 3.7% compared to the first type), 94.2% of which consisted of dietary supplements, at an average price of 55 €/kg, 5.1% of processing residues for biodiesel production and 0.7% for biodiesel (3 t) and glycerol. Explicit costs accounted for 79.7%, and the NI amounted to € 262,215. With these assumptions the indicators were essentially the same as those for the first plant type (PI = 2.55 and ROE = 11.11) albeit, as already stated, within a considerably higher risk perspective. To evaluate the impacts on farm budgets we used elements of the budget of the second plant type, which, as noted above, are substantially equivalent to those of the first.

Figure 1 – The integrated production plant: dietary supplements and biodiesel

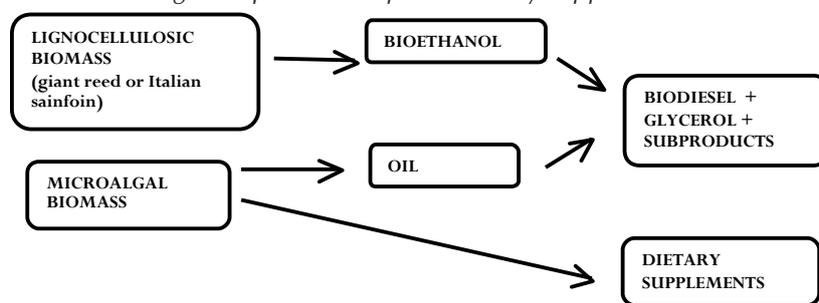


Table 1 - Impact of plant results on the economic indicators of farms

Farm type	Type	Profitability indices		
		NI ^a - €	PI	ROE- %
17 Campania buffalo farms (CBF1), average UAA ha 32.17	Basic scenario (a)	181,256	1.99	8.64
	Post-investment scenario (b)	228,801	2.08	9.06
	(b)-(a)	47,545	0.09	0.42
12 Campania buffalo farms (CBF2), average UAA ha 98.28	Basic scenario (a)	239,141	1.83	7.96
	Post-investment scenario (b)	334,319	1.99	8.66
	(b)-(a)	95,178	0.16	0.70
10 Sicilian dairy farms (SD1), average UAA ha 33.05	Basic scenario (a)	64,531	1.28	5.55
	Post-investment scenario (b)	79,243	1.41	6.12
	(b)-(a)	14,712	0.13	0.57
8 Sicilian dairy farms (SD2), average UAA ha 111.69	Basic scenario (a)	262,453	2.35	10.22
	Post-investment scenario (b)	327,754	2.39	10.38
	(b)-(a)	65,301	0.04	0.16
23 Sicilian beef farms (SB1), average UAA ha 35.00	Basic scenario (a)	24,445	0.84	3.65
	Post-investment scenario (b)	32,126	1.00	4.35
	(b)-(a)	7,681	0.16	0.70
19 Sicilian beef farms (SB2), average UAA ha 98.14	Basic scenario (a)	54,631	1.19	5.17
	Post-investment scenario (b)	75,533	1.40	6.07
	(b)-(a)	20,902	0.21	0.29

a = Remuneration of own factors.

The analysis examines the changes in the indicators NI, PI and ROE (Table 1). They are based on the comparison for each homogeneous group of farms⁶ between the mean budget for the current situation and that which would result from participation in the joint management of the industrial plant. In the latter case, moreover, the participating farms would provide the vegetable biomass and would use biodiesel production.

Participation in plant investment was associated to economic size, which is why the impact in absolute terms of NI was higher in the most capitalized farms. This applies to larger dairy farms (CBF2 and SD2). In terms of PI and hence ROE, the lower the starting profitability the more significant were the increases. This applies to the first group of dairy cattle farms (SD1 = + 10.2%) and those producing beef (SB1 = + 19.1% and SB2 = + 17.2%). For the type with higher profitability (SD2) the benefit was significant only in terms of increasing NI. For the latter, given the economic performance of the plant previously highlighted, the appeal to farmers should primarily come from the real opportunity to diversify their investments, in a sector which is both new and growing.

4. Conclusions

In Italy there have been few initiatives involving algae cultivation. However, those few have attracted considerable attention and have generated a need for in-depth knowledge concerning the production process and especially the economics of algae farming.

The analysis reported in this study shows that, while prospects are encouraging, there is a need to develop structured supply chains able to confer greater stability to the market and to ensure a higher degree of certainty to stakeholders. The basic problem for the development of the agriculture sector is undoubtedly anchored to the availability of the required capital. Under the conditions analyzed and the levels of profitability estimated, we can assume the use of the banking system to capture a portion of the resources needed.

As regards production of biodiesel from algal biomass, whilst agreeing with those who deem that, under current conditions, it would not appear to be a viable economic proposition, we believe that it is useful to continue the improvement in production technology, albeit in the context of an integrated system of the type proposed by the present work. Finally, there is a need for a more detailed regulatory framework of this activity on the farm in order to eliminate current uncertainties, including those of a fiscal nature.

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Food waste, consumer attitudes and behaviour. A study in the North-Eastern part of Italy

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Abstract:

Reducing the amount of food that is wasted is a key element in developing a sustainable food system. Large quantities of produced food are discarded in Italy and, to a large extent, the waste is avoidable. The wastage of food occurs at all stages of the life cycle of food, starting from harvesting, through manufacturing and distributing and finally consumption, but the largest contribution to food waste is from homes. The reasons of wasting food have been investigated in Italy to some degree. In this paper, the aim is to focus on the consumption food waste to explore reasons of wasting food on family level, which is a significant fraction of total, in order to overcome food wasting behaviour and point out options to design prevention measures.

JEL: Q01, Q21, P46

Keywords: Food waste, consumer behaviour, sustainable consumption

Introduction

During recent years there has been increasing international interest in the amount of wasted food and its negative consequences. Reducing the amount of food that is wasted is a key element in developing a sustainable food system. In fact, firstly, food waste represents a monetary loss, secondly, has a social impact as it contributes towards increases in food prices, making food less accessible for the poorest and increasing the number of malnourished people (Graham-Rowe et al., 2014; Stuart, 2009), thirdly, contributes to decreasing the quality level of natural resources generating also greenhouse gasses (FAO, 2013 and 2014; WRAP, 2011).

Recently the question of the adverse environmental impact of food waste has shifted from being something of interest to a select group of researches only, to a position at the centre of public and institutional attention. This is due to the diffusion of more precise information about the economic, social and environmental impacts of the increasing amounts of food wasted especially in the industrialized countries. Large quantities of produced food are discarded around the world (Gustavsson et al., 2011) – as stated by FAO (2011) 280-300 kg per capita per year in developed countries and 120-170 kg per capita per year in developing countries – and, to a large extent, this type of waste is avoidable (Refsgaard and Magnussen, 2009; Swami et al., 2011). The wastage of food occurs at all stages of the life cycle of food, starting from harvesting, through manufacturing and distributing and finally consumption, but the largest contribution to food waste is from homes (EPRS, 2014; FAO, 2011 and 2012; Thøgersen, 1996; Williams et al., 2012). According to the literature review, food losses refer to the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption. They take place at production, postharvest and processing stages in the food supply chain (FAO, 2011; WRI, 2013). Food losses occurring at the end of the food chain (retail and final consumption) are rather called “food waste” (Parfitt et al., 2010; WRI, 2013). It has been estimated (FAO, 2011) that in developing countries 40% of losses occur at post-harvest and processing levels, while in industrialized countries more than 40% of losses happen at retail and consumer levels. Although consumers were the single biggest contributor to food waste volume, little is known about the drivers of food waste in households (Stefan et al., 2013) and

more in general only a few studies to date have investigated from the consumer behavior and food choice perspective. The findings of such research have indicated that, on the one hand, people share an ethic intention not to waste food, but, on the other hand, they tend to waste food (Bolton and Alba, 2012).

The reasons of wasting food have been investigated also in Italy to some degree (Capone et al., 2014; Garrone et al., 2011; Segrè and Falasconi, 2008 and 2011; Waste Watcher, 2013), but there is only little insights about the possible drivers among Italian households. In fact, although the themes uncovered in these researches represent an important starting point there is still a lack of understanding of the nature of household food waste minimization behavior in Italy. As sustainable household waste management is becoming an important concern for local and national authorities also in Italy, thus a good understanding of factors that contribute to the amount of wasted food seems to be essential if we/they design effective interventions. For that reasons, in the current study, we aim to analyze food waste by focusing on the consumption to explore reasons of wasting food on family level, which also in Italy is a significant fraction of total, in order to overcome food wasting behaviour and point out options to design prevention measures.

Methodology

As food waste is the result of multiple, interacting activities (Cohen et al., 2014; Graham-Rowe et al., 2014; Quedsted et al., 2011, 2013), we aim to understand this issue at household level by identifying some of the main reasons related to waste.

To achieve this aim we conducted a survey through the distribution of a questionnaire to consumers. The questionnaire was pre-tested. The data were obtained during a two-month period with beginning in October 2013 using two data collection methods: on-line questionnaire forms (350) and questionnaires administered by the researchers (162) in order to reach all relevant age groups. Altogether 512 responses were received. For the data analysis, we used 490 completed questionnaires. In the questionnaire different statements regarding attitudes to food waste, as well as purchase habits were posed to the respondents. As we were interested in investigating the main explanatory factors in predicting the probability of wasting food in a family, we elaborated a logistic model. The dependent variable is a dummy, whose value is one if the interviewed stated that usually his/her family wastes part of food they weekly buy and zero otherwise.

Results

Sample characteristics and waste attitudes

Examination of the sample socio-demographic characteristics indicates a majority of female respondents (59%) compared to males (41%). Each relevant age group is represented (from 15 years old), 58% of the respondents had successfully completed high school and 27% held a University or postgraduate degree. More than half of the respondents (59%) are employed, 26% are housewives or students and 9% pensioners ("other" 3%). A vast majority (89%) of the respondents live in the North-Eastern part of Italy. Fifty per cent of respondent are the person mainly responsible for shopping. Respondents were asked to identify their first and second choice of shop they use for their main grocery shopping. The majority of respondents undertakes their main shopping from hyper- and supermarkets. We also asked them to declare if they waste food: 56% stated they do not. We noticed that the more respondents spend during the week, the more they waste. Moreover if respondent is a woman or an elder the probability to produce waste decreases. Fifty-five per cent affirmed they do not waste food. The respondents who usually waste food throw mainly food and vegetables away. The majority of respondent (89%) stated that the problem of food waste is important, while 31% asked for more information about how to store food better in order to avoid waste.

Economic analysis: backward stepwise regression

The model was estimated using the SPSS[®] (14 version) program with a backward stepwise regression procedure (Tab. 1). All variables were significant at the standard level (95% confidence interval) with the exception of "once-a-week regular shopping" ($p=0,082$) and "grocery shopping" ($p=0,062$). Although the model is able to correctly estimate the probability of 64,7% of cases, it provides some interesting insight about the factors affecting food wasting.

It has been found that purchasing behaviour can influence food waste. In fact, food wastage is higher for families that purchase from supermarkets and hypermarkets, that make once-a-week shopping and spend more than 100 euros per purchase.

It seems also that packaging could play an important role in producing food waste, in particular as regard packages that contain a quantity of food larger than the real needs. Moreover, food waste can be related to respondents' and families' socio-economic and demographic characteristics. In detail, the wastage of food decreases with age, but increases with growing educational qualification and family dimension. From these results, it seems to be possible to state that family composition and habits are the main factors that can explaining the wastage of food. Consumers with higher educational qualification devote a lot of time to work. This characteristic is particularly common in younger families with higher number of sons. According to these characteristics, these respondents have no enough time to devote to shopping and have to concentrate purchases during a morning or afternoon once a week, to shop from hyper- or supermarkets, where it is possible to choose among several goods in order to satisfy different family needs. By means of the model, it is possible to estimate that the probability of wasting food in such a family, with graduate components, aging less than 30 years, with two sons, making once-a-week shopping and spending more than 100 euros is 76%. On the contrary, among senior consumers with lower educational qualification (primary degree), belonging to single-family units, making shopping at several shops, the probability decreases at 11%. Nevertheless, it seems to be worthwhile to note that the opinion about the importance eliminating wasting could drastically cut wastage probability. For example, referring to younger households, the probability decreases from 76% to 54%. The estimated model points out that family structure and purchase habits created by the modern socio-economic model gradually widespread in Italy affect food wasting. On the one hand, waste attitudes seem to be an aspect dominating food waste, as consumers that consider food wastage as being a big problem tend towards decreasing their waste, on the other hand, food waste problem is mainly due to structural characteristics of households. Although young respondents perceived waste food as a problem in urgent need of solution and seem to have high self-consciousness, their consumption style produces waste.

Tab. 1 Estimated model explaining waste food probability in the home

Variable	B	E.S.	Wald	df	Sig.	Exp(B)
I think that waste is an important problem	-0,992	0,325	9,305	1,000	0,002	0,371
Too big packages	0,639	0,229	7,787	1,000	0,005	1,894
Under age 31	1,175	0,461	6,491	1,000	0,011	3,239
Age 31 - 45 years	1,219	0,467	6,813	1,000	0,009	3,383
Age 46 - 60 years	1,055	0,449	5,513	1,000	0,019	2,871
Family size	0,208	0,102	4,108	1,000	0,043	1,231
Years of education	0,097	0,035	7,774	1,000	0,005	1,102
Supermarket and hypermarket shopping	0,638	0,342	3,479	1,000	0,062	1,893
Once-a-week shopping	0,359	0,206	3,019	1,000	0,082	1,431

Food purchase: more than € 100,00	0,474	0,214	4,902	1,000	0,027	1,607
Constant	-3,586	0,757	22,428	1,000	0,000	0,028

Right predicted percentage	Predicted			
	Yes waste		Right percentage	
	0,00	1,00		
Yes waste	0,00	209	64	76,6
	1,00	103	97	48,5
Global percentage				64,7

-2 log likelihood	Cox and Snell R-squared	Nagelkerke R-squared
580.165	0,13	0,17

Actually, activities undertaken by increasing information among consumers about the impact of their lifestyle in order to decrease household food waste seem to have only partially effectiveness. Nevertheless, areas for future research and engagement to reduce the quantity and impact of food waste are wide, in particular as regards the opportunities linked to the increase of awareness enabling consumption style change.

Conclusions

The generation of food waste in the home is a complex issue, relating to consumer shopping habits and kitchen practices. The types of food consumed, their packaging and how they are bought impacted it.

As a large quantity of avoidable food waste has been generated also in Italy, the paper develops an analysis of consumers' attitudes and behaviour in order to increase consumers' awareness about the importance of reducing household food waste.

The present study has highlighted specific factors that may motivate household food waste. The results identify the relationship between household waste production and consumption styles pointing out some structural drivers linked to modern lifestyle that seem to be able to influence consumers' food waste. As planning and shopping routines are important predictors of food waste behaviour as well as some socio-economic and demographic household characteristics, activities undertaken to raise consumers' awareness seem to have only partially effectiveness. Nevertheless highlighting the benefits of reducing household food waste by providing more information could support people to reduce food waste, as there is great potential for food waste minimization.

Findings provide insight about the elements of consumer behavior and practices that can be influenced to reduce household food waste and its environmental and economic impacts, although some structural lifestyle characteristics may be barriers not easy to be overcome.

Considerable amount of research remains to be done to explain better the phenomenon of food waste, which in any case represents a relatively new research field (Katajajuuri et al., 2014). Future research is required to better understand consumer behavior, in order to provide people with practical tools to improve their habits. In particular, it seems that multidisciplinary research would provide the identification of best practices and effective ways to implement waste reduction.

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Land Grabbing Models in the International Scenario: the Case Study of the European Union

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Abstract:

The worldwide increase in population and consumption has produced a growing demand for food and energy in the rich and developing Countries and has intensified the search for land on which to carry investments without transparency rules and without creating real conditions of development of local populations. The aim of this paper is to identify, through a cluster analysis, homogeneous group of investor countries and to verify if exist Land grabbing model for the EU Member States. The results show that the strategies adopted by the investors are driven by the need to achieve energy security and reduce CO₂ emissions and to cope with the problems of food security in view of the exponential growth of the population. In particular, the acquisitions of EU Member States are driven by the need to reduce the energy deficit in view of the achievement of the objectives set out in the “Europe 2020.”

JEL: O13; Q 15; Q17.

Keywords:

Land grabbing, EU investor Countries, Food security, Energy security, European Union Policy.

Introduction

The land grabbing phenomenon has prompted a lively and wide-ranging scientific debate about its alarming spread and the implications for economic, political, ethical, and social issues. The term “land grabbing” describes large-scale and long-term farmland acquisition below the real market values but is also a factor strongly correlated with the political, social, economic and environmental aspects of nations and people of the world. According with the Tirana Declaration land is “grabbed” when land deals occur under one or more of the following: “(i) in violation of human rights, particularly the equal rights of women; (ii) not based on free, prior and informed consent of the affected land-users; (iii) not based on a thorough assessment, or are in disregard of social, economic and environmental impacts, including the way they are gendered; (iv) not based on transparent contracts that specify clear and binding commitments about activities, employment and benefits sharing, and; (v) not based on effective democratic planning, independent oversight and meaningful participation” (International Land Coalition, 2011, p. 2).

The phenomenon stems largely from world population growth, today approximately 7 billion and estimated to be 9 billion in 2050 (FAO, 2013), with consequent growth of food and energy consumption (including renewable energy) and insecurity. This is true, in particular, in many countries such as Africa where in the last few year was registered a growing food insecurity for the cereals due to rapid increase of population and urbanisation’ process (Galati et al., 2014). In the last few decades, the need to achieve food and energy security has been among the reasons that pushed governments and multinational corporations to search for land in which to invest. Other reasons can be traced to the need to: exert more control on the global market, especially for scarce resources such as water and soil; ensure economic viability and social stability of their own governments; expand and diversify company and funds investment (Buxton et al., 2012; Dei-

ninger and Byerlee, 2011). Land grabbing takes place mainly in underdeveloped and developing countries that are, thus, exploited and become further impoverished and robbed of not only their environment but also human capital. As asserted by Zagama (2011), the populations of the areas affected by land grabbing are frequently forced into exile without being able to claim the right of ownership of their land. In general, the contracts provide acquisitions or leases of vast fertile areas for periods between 25 and 99 years, with rents that can range from €0.60 to €16 per hectare and per year (Liberti, 2011). On the other hand, the recipient governments' consent is mainly due to opportunities to benefit from transnational capital allocated to start processes of growth and modernization through the creation of jobs, the production of cash crops, and the construction of infrastructure (Cotula et al., 2009; Lavers, 2012). As suggested by Longhitano (2010) the negotiations exploit the particularly favourable conditions of the land market in developing countries, on account of the lack of certainty regarding property rights, and appeal to local governments for potential returns in terms of infrastructure and increase in GDP and employment rates.

According to the Land Matrix Global Observatory,¹ the area covered by large-scale investments entered into by foreign investors is almost 35 million hectares (The Land Matrix Global Observatory, 2014). All continents are involved, but Sub-Saharan Africa is concentrated in the greatest percentage of surface acquired (Deininger and Byerlee, 2011).

The World Bank maintains that the increasing global interest in agriculture is a serious threat to small farmers in developing countries because of the problems that could stem from their inability to gain access to land and natural resources. On the other hand, the World Bank also considers these 'dangerous investments' as being an opportunity for development of poor countries (Deininger and Byerlee, 2011). Some authors wonder if this land grabbing phenomenon is a form of neo-colonialism or if it is instead an opportunity for development of developing countries highlighting, in this sense, two different effects of the phenomenon in the growth and development of the countries recipient. These diverse standpoints are summarised by De Shutter (2011) and Robertson and Pinstrup-Andersen (2010), who state that investments in agriculture by foreign investors are an important tool in raising the economies of poor countries, provided that populations' human rights are respected and that they are involved in the deals. This approach would allow them to decide their future and, thus, avoid the development of problems regarding food security and nutrition which are strictly connected to their ability to gain access to land.

The land grabbing phenomenon covers several European Union (EU) member countries, as not only investors but also, more recently, as recipients. Regarding EU country investors, the relationship between land grabbing and European policies for agriculture and environment is very closed. Every action and commitment made by the EU in policies to reduce carbon dioxide (CO₂) emissions in the fight against climate change and in food and energy policies have a common denominator: soil resources (European Commission, 2008, 2010a, 2010b; United Nations, 1992a, 1992b, 1998). The achievement of international goals for decarbonisation has pushed for the use of renewable energy and biofuels but the context has created a lively discussion on the intended use of the land. Today, biofuels are among the stronger competitors in the usage of arable areas for foods (European Commission, 2006, 2010a, 2010b; FAO, 2013).

With this in mind, the aim of this study is to identify homogeneous groups of investor countries, taking into account only the transnational investments and not the domestic land acquisitions,

1. The Global Observatory includes deals for agricultural production, timber extraction, carbon trading, industry, renewable energy production, conservation, and tourism in low- and middle-income countries. Deals must entail a transfer of rights to use, control, or own land through sale, lease, or concession; have been initiated since the year 2000; cover an area of 200 hectares or more; imply the potential conversion of land from smallholder production, local community use, or important ecosystem service provision to commercial use.

and verify if a land grabbing model exists for EU member states.

Methodology

In order to identify homogeneous group of country investors and verify the existence of a land grabbing model for the EU member states in the international scenario was used a cluster analysis largely used both to identify specific market segments, and to otherwise analyse socio-economic disparities among territories. In the first step of our study, 26 socio-economic and environmental variables related with the phenomenon were considered, among them the average dietary energy supply adequacy, political stability and absence of violence/terrorism, energy production, etc.. Some of these variables have been excluded for an high level of collinearity, while others for the lack of data both for all the 57 country investors and for the entire 2000-13 period. In greater detail, the *Land_grab_size* variable expresses the land area acquired by transnational investors in foreign countries. The variable CO_2 is the amount of CO_2 emissions stemming from the burning of fossil fuels and manufacture of cement. The per capita agroforestry surface (*Agr_For_Pop*) expresses the surface available per inhabitant to carry out activities in the agricultural and forestry sectors. The variable *Energy_dep* is the amount of energy imported, measured as a percentage of total energy use. Finally, the variable *Amv_Pop*, expresses the average annual rate of change of population in the 2000–2050 period. The main sources used are data sets from Land Matrix, the World Bank, and the Food and Agriculture Organization (FAO, 2014).

On the basis of the variables described, we conduct cluster analysis to identify several groups of countries. All the variables used have been standardised both for the purpose of this analysis and to delete existing differences among the measurement units. The cluster analyses start with a hierarchical method which yields the suitable number of clusters and the group of centroids. In the second step, the clusters are refined further using a non-hierarchical method – the k-means – which maximises the Euclidean distance between cluster centres while minimising the distance between members of any given cluster. In order to verify which is the better elaboration to classify the countries studied, different elaborations are carried out by varying the number of clusters, up until a number is identified beyond which additional groups contain only a few countries with significant short distances. Previously, an analysis of the correlation coefficients was performed in order to eliminate redundant variables (e.g. the food dependency index). Furthermore, in order to make the comparison between all the variables simultaneously and to track the ranking of the groups, we consider the average values from the variance matrix, standardised to overcome the constraint linked to the different units of measurement without losing the variation between the values.

Results

Our analysis allows the identification of four groups of countries (Table 1) that are described below. Table 2 summarises the distances between the clusters. Figure 1 both outlines the profile of each cluster identified through the analysis of the groups and compares these groups in relation to the importance that each variable assumes within them.

As we can see in Table 1, there is a significant concentration of EU member states (14 of 17 investors) in the first cluster. This cluster comprises 42 countries with lower average values than the other clusters for surfaces acquired, CO_2 emissions, and rate of population growth.

On the contrary, these countries show high energy dependency and poor agricultural and forestry area per capita. As suggested by Scheidel and Sorman (2012), the energy security threats directly drive land acquisition for the expansion of energy systems, especially in the presence of low availability of arable land.

Table 1 – Groups of countries identified by the cluster analysis (k-means method)

Cluster No.1 (42 Countries)	Cluster No. 2 (7 Countries)
Algeria, Argentina, Austria, Belgium, Brazil, Cambodia, Chile, China, Costa Rica, Côte d'Ivoire, Cyprus, Denmark, Egypt, Finland, France, Germany, Hungary, Indonesia, Iran, Israel, Japan, Libya, Lithuania, Mexico, Netherlands, New Zealand, Nicaragua, Pakistan, Portugal, Romania, Serbia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Syrian Arab Republic, Thailand, Turkey, Uruguay, Viet Nam, Zimbabwe	India, Italy, Luxembourg, Malaysia, Republic of Korea, United Kingdom, United States of America
	Cluster No. 3 (3 Countries)
	Kenya, Nigeria, United Arab Emirates
	Cluster No. 4 (5 Countries)
	Australia, Canada, Norway, Russian Federation, Saudi Arabia

Table 2 – Cluster distance: k-means method

Cluster name	No.	Cluster No.			
		1	2	3	4
Countries with a low agro-forestry land per capita	1	0	2.476	3.830	3.701
Countries with a higher rates of investment	2	2.476	0	4.085	3.990
Countries with a higher rate of population growth	3	3.830	4.085	0	4.692
Countries with a higher rate of CO ₂ emissions	4	3.701	3.990	4.692	0
Average		2.502	2.638	3.152	3.096

This result helps to explain the common behaviour of many investors in EU member states, which are almost entirely characterised by energy deficits and have committed to achieving the EU's objective of 20% of renewable energy within global energy consumption before 2020. However, inside this group, there are some countries that are self-sufficient in terms of energy and are, in fact, energy exporters; these countries, despite their high rates of population growth, have acquired limited foreign areas. The second cluster brings together seven countries (including three EU countries) which are characterised by the highest acquired surfaces and high energy dependence compared to the first cluster, but they are also prone to higher average values of CO₂ emissions. In addition, this group includes many countries that have limited availability of land per capita, which is one of the key factors behind pushes to acquire arable land. Spieldoch and Murphy (2009) emphasise that countries plagued by natural resource constraints (e.g. deficiencies in arable land) are the major exploiters of natural resources abroad. The acquisition of arable land, mainly in the Global South, occurs to establish tree plantations wholly or partly for biomass energy for export or domestic markets; to reduce greenhouse gas emissions

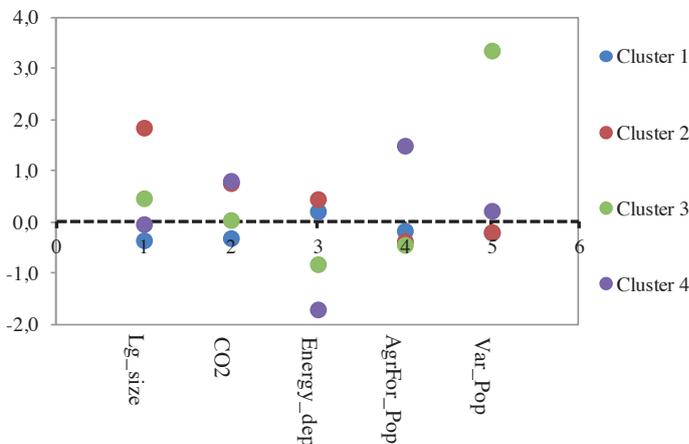


Figure 1 – Average values for each cluster based on standardized values

(Cotula, 2011, 2012); and, as in the case of India and Korea, to produce food for their growing populations (Hall, 2011).

Cluster 3 contains three countries characterised mainly by high rates of population growth compared to the average of the groups. Among these United Arab Emirates show a high level of acquisition. The link between demand for land and population growth, mainly in high- and middle-income countries, has been emphasised by different authors (i.e. Cotula et al., 2009; Robertson and Pinstup-Andersen, 2010). In fact, the increase of population has stoked an increasing pressure on subsistence land use, potentially depriving the very poor of their ability to support themselves (Cotula et al., 2009). These countries probably invest from a future perspective of food insecurity, which has prompted widespread corporate investment in food crops and energy security (Godfray et al., 2010; White et al., 2012).

Finally, in Cluster 4, there are five countries that are self-sufficient in terms of energy but that, in contrast, exhibit high CO₂ emissions, which is one of the main motivations behind the acquisition of productive land in foreign countries. This group has many countries that pose the greatest obligations to reduce emissions, in accordance with Annex B of the Kyoto Protocol (United Nations, 1998). As asserted by Peters et al. (2011), these countries have shifted an increasing proportion of their CO₂ emissions to countries without emissions ceilings.

The analysis of the differences between the F-ratios makes it possible to draw general conclusions about the role of the different mean variables in the forming of the clusters.

The results show that the average annual rate of change of population and investment size have great influence on the formation of the cluster, followed by the per capita agro-forestry surface and then by the CO₂ emission and energy dependence variables.

Conclusions

The main aim of our work was to establish guidelines that drive the choices of investor countries and assess whether EU member countries assume common behaviour in land grabbing scenarios. The results showed that it is possible to identify some homogeneous groups of countries according to socio-economic and environmental variables observed. In particular, in the global scenario, acquisitions by EU member countries (Cluster 1) are driven by the need to reduce the energy deficit and the CO₂ emissions, as per Europe's 2020 Strategy (European Commission, 2010).

In general, the four groups of countries identified highlight that the strategies adopted by the investors are driven by the need to achieve energy security and reduce CO₂ emissions (Clusters 1, 2, and 4) and to resolve food security problems (Cluster 3) linked to exponential population growth. A central role in this complex phenomenon is played by the international agricultural and environmental policies (particularly those related to climate change and to strategic programs for energy).

The research results were affected by the variables considered, whose choice was dictated by the need to have complete data for all the investor countries. Nevertheless, the results offer a contribution to the research on land grabbing. Up to now, this phenomenon in many studies has been focused more on recipient countries than investor countries. However, greater detail with regard to the size of the investment type (agriculture, forestry, or energy), data not available in international databases, would allow us to explain in greater detail the specificity within individual clusters identified.

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Assessing the ex-ante impact of the CAP post 2013 reform on land market. A case study in Tuscany region

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Abstract

Several Authors pointed-out positive effects of CAP measures on productive factors demand, driving both structural change and farm growth. Moreover, the effects of CAP on farm size and land markets are the most studied structural factors. The objective of this contribution is to conduct exante analysis of the impact of the new CAP policy instruments on the land demand and then to simulate the reform impact on land market. In particular in the paper the effect of greening payments and the introduction of regionalized payments will be investigated, through the implementation of mathematical programming model. The results of our work highlight the relevance of new CAP instrument in changing land demand. Our results can to contribute to the national debate by providing a better to understanding the potential effects of the CAP reform on the value of land and on the changes in land demand.

JEL: Q18 – Agricultural Policy; Food Policy; Q10 General

Keywords: common agricultural policy; mathematical programming model; land demand; regionalised payments; scenario analysis

1. Introduction

Agricultural economics literature widely studied how Common Agricultural Policy leads to changes in the use of productive factors at farm level. Most Authors pointed-out the positive effects of the CAP measures. Such measures had driven both structural change and farm growth (see for example Harrington et al., 1995; Happe et al., 2008; Ahearn et al., 2005). Thus, the effects of the CAP on farm size and land markets are the most studied among structural factors (Ciaian et al. 2010; Bartolini and Viaggi 2013). Agricultural economics literature is interested in land use changes and in land market, as land is among the key variables in farm household models, as well as a relevant constraint on those models. In addition, land can represent the overall output of farm household decisions (see Piorr et al., 2009).

At present, the CAP is facing a deep reform process. In October 2011, the European Commission published the official proposal for the CAP reform (COM(2011)625/3), which had been debated until June 2013, when the European Parliament and the Commission came to an agreement. The member states will not officially approve the CAP before August 2014. The proposed CAP reform reconsiders the first pillar policy, while introducing novelties within the second pillar policy. In Italy, the main innovations concern a) the introduction of “active farmers”, b) the shift of single farm payments from an historical towards a regional base, and c) the disentanglement of the basic payment into several components. As a result of the introduction of the “active farmers”, only those farmers who fulfil the requirements set by the Regulation (EU) No 1307/2013 (Articles 9(1) and (2)) will access the payments (COMMISSION DELEGATED REGULATION (EU) No 639/2014 of 11 March 2014). Shifting single farm payments from a historical towards a regional base means that basic payments will be proportional to the operated farmland. With the disentanglement of the basic payment, four different components would form the payment for each farm: (i) the basic payment for “active farmers”, (ii) the “greening” direct payment, (iii) the pay-

ment for less disadvantaged areas, and (iv) the payment to “young farmers” and “small farms”. The objective of this contribution is to conduct ex-ante analysis of the impact of the new CAP policy instruments on land demand, as well as to simulate the impact of the reform on land market. The present paper investigates the effect of the greening payments and the introduction of the regionalized payments by means of mathematical programming modelling. The results of our work highlight the relevance of new CAP instrument in changing land demand.

2. Methodology

Agricultural economics studies land use and its connections with policy under three different perspectives: a) changes in the preferences with regard to land tenure, b) the capitalization of payments into land prices or farmland rental prices, and c) effects of the policies on land demand, for, land markets, and land reallocations (Viaggi et al., 2013). The impacts of the policy on land market had been investigated through a number of different approaches, mainly econometric methods, statistical methods, and mathematical programming modelling (Latruffe and Le Mouél, 2009). Econometric and statistical methods are often used to investigate the determinants of certain expected changes over potential changes in land demand (See for example Douarin et al. 2008), as well as to assess the probability for farms to turn into definite possible states over time (e.g by applying the Markov chain model) (see for example Zimmermann et al. 2009). Mathematical programming is used to simulate both ex-ante impacts on land demand and changes on land prices (i.e. purchase and rent agreements). Mathematical programming also allows to test different hypothesis about relevant parameters such as changes in the level of prices, amount of payments, cost of labour, and other inputs (see for example Happe et al 2008; Galko and Jayet 2011). Following Bartolini and Viaggi (2013), the marginal changes in land demand result from the Willingness to Pay (WTP) or the Willingness to Accept (WTA) for land, given a fixed policy scenario and an initial land endowment. Where, the WTP and WTA are functions of the geographical household, the farmers and farm’s characteristics. Following Deininger et al. (2008), a generic farmer can claim for additional land when the WTP for the land exceeds the sum of rental prices and transaction costs (see Eq. 1 for the formal expression). Conversely, the farmer shrinks the surface of operated land when the WTA is under the rental prices (received) minus the transaction costs (TC) for rent out land (see Eq2 for the formula). Finally, there is no change in land demand at single farmers’ level when the sum of rental prices plus TCs exceeds the WTP, and, at the same time, the WTA exceeds the rental prices received minus the related TCs.

Agricultural economics literature widely studied the impacts of TCs on land demand and on land market. The total transaction costs depend on frequency and asset of transactions, farmers’ characteristics, quality of social relationships, and trust among peoples, as well as on institutional factors (see Williamson 1996, Allen and Lueck 2003 and Ciaian et al., 2012), When considered together, the transaction cost and the changes in land demand provide the sum of total time spent for collecting information about the availability of rentable land rent plus the cost of contract registrations. Moreover, farmers renting out land are subject to TCs, due to time spent for searching farmers interested in the transaction. The increase TCs leads to a reduction of the number of transactions number and positively affects rental prices.

$$WTP > r + tc_{in} \quad (1)$$

$$WTA < r - tc_{out} \quad (2)$$

$$r - tc_{out} > WTP / WTA > r + tc \quad (3)$$

The proposed methodology contains three steps: a) identification of representative farm households, b) development of policy scenarios, and c) mathematical programming modelling. The present study refers to farms located within a local administration (Province of Pisa) of the Italian Region of Tuscany. Representative farms were identified performing a cluster analysis. The implementation of simulations using built rather than real farms is common in agricultural economics literatures (see for example Bartolini and Viaggi 2012). The main advantage of cluster analysis is its ability to create groups of farms which are both homogeneous and very different from one another. In addition, median values of group characteristics allow to create farm profiles that are representative for each group of farms (see example in Galko and Jayet 2010). The cluster analysis returned 14 groups of homogeneous farms: 6 located in plain areas and 8 groups hilly areas¹. Policy impacts were quantified via scenario analysis. We simulated the impacts of the CAP post-2013 on changes in land demand by developing two alternative policy scenarios, based on different assumptions with regard to the amount of the regionalised payment and to the introduction of the greening measure. An additional scenario encompassing the complete abolishment of the CAP was built to capture the full effect of the Single Farm Payment (SFP). Table 1 shows the main assumption we made in order to build the alternative scenarios.

Table 1 Features of scenarios.

Scenario	code	Level of SFP per rights	Rights	Greening
Baseline HC 2008	ba	Historical	Current Entitlements	No
Baseline1	ba1	Historical	Current Entitlements	30% of basic payment
Regionalized 0	rp0	206.35	Current entitlement	30% of basic payment
Regionalized 1	rp1	135.94	Payment per ha of UAA	30% of basic payment

The baseline scenario (*ba*) is developed assuming 2013 payments SFP on a historical basis and number of rights equal to those endowed by the farms in 2013. The scenario is build under Health Check 2008 reform. Baseline HC 2008 scenario (*ba1*) differentiates from *ba* for introduction of greening measure. The level of SFP and entitlement mechanism remains constant. We simulated two regionalised payment mechanisms (*rp*): (i) *rp0* is based on the application of a uniform payment per entitlement (flat rate), and (ii) *rp1* is based on a uniform payment per hectare of UAA. Thus, the level of SFP will be higher for *rp0* (about 206.35 € per right) than for *rp1* (135.94 € per ha)².

The third step of the methodology relies on the simulation of farmers' behaviour in response to

1. Cluster analysis is conducted using a subset of farmers surveyed in the 2010 census in Pisa province (4868 farms). A sub-set is realized excluding farm with very low farm size. The groups are identified using k-means non-hierarchical clustering method and the groups are identified by the one with higher Calinski/Harabasz pseudo-F value. Cluster group are conducted using farm size, amount of SFP payments received and amount of household labor allocated to on-farm activities as variables. To detect collinearity among selected variables, a pairwise correlation test is applied. The test returns low coefficients of correlation among variables: 0.4243 for pair farm size and amount of SFP payments; 0.2843 for pair farm size and household labor allocated to on-farm activities and 0.1135 for household labor allocated to on-farm activities and amount of SFP received. Otherwise, farm specialization variables are not considered due to expected correlation with payments received and farmland size.

2. The SFP is calculated as sum of all SFP received by Tuscany farmers divided by the amount of eligible area. Thus for the *rp0* scenario eligible area is equal to the sum of all entitlements owned by Tuscany Farmers, while for all UAA in a case of *rp1* scenario.

policy changes. We modelled land demand using Mathematical Programming modelling. Generally, farmers aim at maximising the Net Present Value (NPV) of profit of their farm activity; the maximization on the NPV is subjected to a set of constraints. Formally:

$$\max NPV = \sum_{n=1}^{N=2020} \pi^n (1+i)^{-n} \quad (4)$$

$$\text{With } \pi^n = x_i(i_i - c_i) - x_i^d k_i + SFP_e * e - xl_{in} * p_{in} + xl_{out} * p_{out} - x_j * p_j \quad (5)$$

$$\text{s.t.} \\ \sum_i x_i = xl_{ow} + xl_{in} - xl_{out} \quad (6)$$

$$\sum_i x_i * a \leq A; e \leq ent; xl_{in} \geq 0; xl_{out} \geq 0 \quad \sum_i x_i > 0 \quad (7)$$

Where the profit for a generic year n is given by the sum of the farm income minus the variable and fixed costs of growing crops, i , minus the cost of renting-in land and the cost of labour paid, plus the received SFP and the costs of rented-out land (when applicable). Equation 6 is the land demand equation. Due to the short time period, we assumed that only rental market is activated, thus farmers could either increase the surface of the operated land by renting land or reduce the surface of the operated land renting-out a portion of their own land. The set of equations 7 show the technical constraints we activated: (j) a maximum number of entitlements endowed by the farmer (See Bartolini and Viaggi, 2013 and Severini and Valle 2011) and (ii) non negativity constraints of land and crops variables. The model refers to short-medium period, with a time horizon between year 2014 and 2020. The short-medium period allows only for adjustment in variable factors, while the fixed factors are considered as constants. Literature about the CAP's effects on land market largely focuses only on rental prices. Actually, rental price changes and land value either have a close relationship (see Bartolini and Viaggi 2013) or are more dependent on other factors rather than profitability of agricultural activities with respect to the demand for land (i.g. position; life cycle hypothesis, credit markets etc. see Swinnen and Knops 2013 for a review). Moreover, the selected time span (short–medium term) is not able to provide a coherent behaviour of farmers' investments; hence, neither the purchase nor the rental of land can be robustly investigated (See Puddu et al., 2012 for an analysis of policy impact on land demand considering both rental and buying market).

Data used for the simulation were obtained by merging CENSUS 2010 microdata with the ARTEA (regional payment agency of Tuscany) database. The latter has recorded all payments received by farmers since 2005, which we integrated with information about the dynamics of land market and prices, directly collected through interviews with experts.

3. Results

Results are presented in the two following tables. Firstly, model results under baseline scenario (historical system without greening measure) are presented. Scenarios' effects on marginal rental value are presented under the alternative assumption of transaction costs.

Table 2. Model results under baseline scenario.

Cluster	Alt.	NPV (1000 €)	SFP (1000 € per year)	Entit.(#)	Payment (€/entit)	UAA (ha)	Land owned (ha)	Land rented-in (ha)	Land rented-out (ha)
CL1	plain	170.09	5.39	22	239.80	35.1	16.94	18.16	-
CL2	plain	1,028.52	49.13	119	412.87	183.43	96.78	86.65	-
CL3	plain	940.69	75.46	105	718.69	122.04	237.52	-	115.48
CL4	plain	971.03	30.90	109	284.66	180.14	81.72	98.42	-
CL5	plain	68.26	-	-	-	12.69	9.04	3.65	-
CL6	plain	454.76	16.71	65	258.79	99.01	33.71	65.3	-
CL7	hill	1,060.43	32.81	264	124.30	265.8	184.05	81.75	-
CL8	hill	176.55	4.75	23	206.86	34.2	20.21	13.99	-
CL9	hill	638.45	22.11	94	234.03	141.21	60.08	81.13	-
CL10	hill	454.52	14.47	62	232.13	91.65	50.88	40.77	-
CL11	hill	790.34	23.72	159	149.20	161.97	90.38	71.59	-
CL12	hill	95.90	-	-	-	16.14	9.3	6.84	-
CL13	hill	99.81	2.00	11	183.46	17.34	11.17	6.17	-
CL14	hill	295.51	9.15	29	315.48	60.27	27.99	32.28	-

According to our analysis, most clusters present a similar behavior with respect to land demand under baseline condition. Almost all clusters use rented-in land to increase the surface of the land operated, while only cluster CL3 rents-out a portion of land. This cluster rents-out more than 50% owned land. The amount of SFP received by the farms are highly heterogeneous. All clusters get the SFP, but CL5 and CL12. SFP received by farms is under 10,000 € for CL1, CL8, CL13, and CL 14 and above for all other clusters. The amount of SFP is higher than the expected, because of the exclusion of all farms operating less than 1 hectare. Those farms were excluded due to negligible impact of SFP changes on small farms. (Viaggi et al., 2013). SFP provided to single farms is heterogeneous because of their amount of collected rights and their level of unitary payment. Three clusters (CL2, CL3, and CL14) show very high unitary payments, i.e. about two or three times bigger than all other clusters. The value of the unitary payment is above the average for CL9 and CL 10 and under for CL7 and CL11. However, the endowments which CL7 and CL 11 are entitled for are nearly twice other clusters' endowments.

Table 3 contains the changes in the surface of the operated land and in the marginal value of land, compared with baseline results.

Table 3. Policy impact on land demand (% of change in UAA and in WTP³).

Cluster	ba1		rp0		rp1	
	UAA	WTP	UAA	WTP	UAA	WTP
1	-	-	-	-	-	-
2	-	-	-0.07	-	- 4 .02	-
3	-	-	- 77.31	-	- 78.64	-
4	-	-	-	-	-	-
5	-	-	-	-	1.13	-
6	-	-	-	-	-	-
7	2.43	-	-	-	-	-
8	-	-	-	-	-	-
9	-	- 0.11	-	- 12.20	-	- 20.00
10	-	-	-	- 19.51	-	- 19.66
11	2.03	-	2.03	-	-	-
12	-	-	-	-	-	-
13	-	-	-	-	2.41	-
14	-	-	-	- 19.30	-	-14.20

Changes in the marginal value measure the increase of the objective value of having an additional hectare of land. Agricultural economists refer to the marginal value and to the changes in farmers' WTP as benchmarks to quantify changes in rental prices (Galko and Jayet, 2010). In fact, the model returns changes in the objective function (NPV) by adding one additional unit of land; then, the marginal value can capture changes in the willingness to pay for an additional land or in the willingness to accept for additional land.

According to our model, few farmers are affected by changes in land demand, due to the inclusion of the greening measure.. Only three farmers show reactions to the introduction of greening (*ba1*). Two clusters CL7 and CL11 show a relatively low increase(about 2%) in the surface of operated land, due to the needs to enlarge farm size to fulfill the greening requirements. It was not surprising noting that the clusters have entitlement endowment above the average of clusters, as well as the highest share of eligible hectares per UAA. Hence, farm types willing to maintain the whole SFP find profitable to rent-in more land to maintain the constraint of the maximum 75% land cultivated with the main crop. Conversely, CL9 only shows a reduction of WTP for additional land, due to the introduction of new crops within the crop mix, as it required by the diversification commitments.

The model shows that on third of clusters (CL2; CL3; CL5; CL9; CL 10; CL11; CL14; CL15:) seems be affected by a reduction in land demand following the introduction of the regionalized payments. expectation It was surprising noting that those clusters are the ones getting the highest payments per entitlements, rather than the ones with the highest support from SFP.. Those results seem to confirm previous literature findings on the impact of regionalized payments (Puddu et al., 2014). The introduction of both the uniformed payments per entitlements and the greening (*rp0*) resulted in a reduction in operated land in two farms and in an increase in cluster CL11 only, as it was observed for previous scenarios. The clusters with the higher unitary value of SFP are those which reduced the operated. The introduction of uniform payment per entitlements reduces by one third the unitary value of payments (CL2 and CL3). Cluster 2 shows a relative small

3. Willingness to pay refers is quite huge concepts and includes market value, not market value and option value. In this paper WTP can be approximated to shadow prices for increase of one unit the amount of operated land, due the private agents and the limitation at the rental market.

change in the operated land, while cluster 3 showed a rough 70% reduction, mainly due to a higher share of rented-out land. For other clusters, the model highlighted a reduction in WTP for an additional amount of land, while maintaining the same operated land (CL 9, CL10 and CL 19.30). The introduction of regionalized payments per hectares of UAA (rp1) produced patterns of changes very similar to previous scenarios, but for the higher magnitude. The introduction of uniform payment per hectare of UAA determined an increase in the operated land for the two clusters that do not receive payments under baseline. Contrary to all expectation, the increase is relatively small, thus highlighting other limiting factors to farm expansion. Overall, our results confirm previous literature findings about the positive effects of SFP in maintaining operated farm land (Bartolini and Viaggi 2013 and Puddu et al., 2014).

4. Conclusions

In this paper we simulated the policy impacts on the land demand. Changes in the land operated and in the marginal value of land were used as proxies for WTP or WTA. Several authors simulated ex-ante impact of new CAP policy instruments. The aim of this paper is to provide empirical evidence about the impact of the new CAP instruments. Our results highlight that regionalized payments would affect the change land demand more than other tested policy instruments. Our results point out the prominent role of the new SFP payments in affecting changes in land demand and confirm previous literature findings (Puddu et al., 2014). In particular, our results highlight the heterogeneity of the impacts of the new policy mechanism. A shared outcome of the new CAP, for some clusters, is the quite high reduction of the overall land demand. Such reduction might determine detrimental effects on rental value that can be attenuated by the implementation of the coupled payments for specific sectors (which were not included in the model for the uncertainty in the extent of the payments due to earlier stage of the reform process). In particular, it seems that livestock, cereal and olive farmers will benefit quite relevant coupled payments. As a result, those sectors are expected to be less affected by changes in land demand or in rental market.

Altogether, the results of our study confirm an overall reduction of land demand and land market activity, due to the introduction of rationalised payments, and show different impacts on different representative farms. The main drivers of the impact are the endowment of entitlement, the unitary payments level, and the share of eligible land over the total UAA. According to our results, the shift to the flat rate for SFP (the so-called “Irish model” that has been selected for Italy) should have a smaller impact on the change in land demand, as the convergence mechanism will allow for gradual adjustments. The Irish model scenario is a quite comparable with *rp0* scenario.

The paper is affected by several limitations, due to the attempt to simulate policy changes without having clear norms to refer about both the amount of regionalisation payments and the level of coupled payments (i.e. Art. 68). Moreover, the proposed model does not deal with uncertainty and risk in farming activities which literature point out as being able to affect changes in farmers’ behaviour. Finally, the paper does not simulate land market, but use the marginal value to as a proxy for land demand changes.

Further work would include further components of risk and investment in farmers’ behaviour, as well as the simulation of the interactions among different clusters.

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Assessing the CAP influence on the livestock number reared. The European farmer's stated response

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Abstract:

The study aims to analyze farmers' decision about numbers of livestock in the event of the Common Agricultural Policy (CAP) would be removed after 2013. The analysis is based on a survey of European farmers carried out in 2009. Intended responses of farmers to the CAP liberalization are analyzed by logistic model regressions. Although for the majority of respondents there would be no change in their intentions if the CAP were suppressed, more than 20% would intend to decrease while 6% to increase the livestock number reared. A different pattern of change is associated to livestock typology across EU region. While specialist dairying would experiment increase, within the last EU member livestock units would decrease.

JEL Classification: Q12, Q18

Keywords: CAP Reform, livestock, farmers' behaviour, logistic regression

Introduction

Over the past 20-30 years European livestock farming and the spatial distribution of livestock across Europe has been largely shaped by reforms of the European Common Agricultural Policy (CAP) (Hasha, 2002; Hermansen, 2003; European Commission, 2004, 2006). From 1980s CAP changes were prompted by different policy concerns which placed farmers' interest and international trading pressures as top priorities. There is a vast literature exploring the economic performance of an agricultural sector in which support policies are in place. Market policy instruments (1982-1992), direct payments coupled to production (1993-2004) and decoupled direct payments with single farm payment scheme SFP (2004-2014) were largely explored (for an update review see McCormack and O'Donoghue, 2014). Among other, European livestock rearing, especially high density livestock systems, is influenced by environmental themes. Since the McSharry reform and over a period of 10 years (1993-2004) an upper stocking rate limit per farm was introduced along with extensification premia. Finally, the last big reform approved in 2003 and enforced later in 2006 introduced the decoupled payment (SFP). These payments were based on a historical reference period and the number of coupled direct payments drawn during that time. In order to receive the payment, farmers have been subjected to the cross-compliance rules. With relevance for the livestock sector is the limits to the livestock unit (LSU) per hectare of utilised agricultural area. Currently, the post-2013 CAP has been approved. One of the key innovations in the post-2013 CAP reform is the single and uniform Basic Payment Scheme per hectare, at national or regional level, which replaces the Single Payment Scheme. This basic subsidy can be complemented by a payment for the provision of environmental public goods (the so-called greening component), by a payment for areas with natural constraints and by a payment for installation of young farmers. Complementary, each State Member will rely on an envelopment ranging from 10-12% of total CAP expenditure available as coupled payment which replaces the art. 68. Finally, payments are also included in the RDP in order to promote environmental protection mandatory standards, and to foster local rural economies according to their specific needs.

A special mention for the Italian case is due, where a unique national basic payment has been adopted. Also called Irish model, with the new payment system at least the reduction is expected

to be 30% of previous value while 60% of payment amount is guaranteed for all beneficiaries. In addition, in Italy the envelopment will account for 11% of total budget and, with relevance for livestock sector, a half (210 million EUR/year) addresses to rearing-related issues.

Generally, for the coming years a decrease in livestock numbers is expected in regions that are characterized by high livestock densities (Ciaian and Swinnen, 2006). To this regards, nowadays most studies examined the influence of CAP changes at a regional level (Matthews, 2011; Copus and Kelly, 1999; Toro-Dunay et al., 2012; Rocamora-Montiel et al., 2014) while literature encompassing a broader range of European regions (e.g. European Commission, 2010, Neumann et al., 2011) is still scarce. In light of these preliminary remarks the aim of this paper is to consider farmers' stated reactions to CAP scenarios and identify the extent to which these intentions would be influenced by the introduction of a CAP change starting in 2014. In particular the stated responses are analysed in order to stress the influence of CAP liberalization on the farmer's decision of how many numbers of livestock unit keep on-farm, with a specific focus on the different livestock typology (i.e. dairy cattle, fattening cattle, grazing species, pig and poultry). In addition, the paper seeks to identify whether there are any significant variations in the pattern of farmer response associated with key structural and socio-demographic variables. The hypothesis behind the scenario design relies on the fact that CAP liberalization as counter-factual scenario, provides an insight into the influence of the current policy on farmer's decision (Giannoccaro and Berbel, 2014). It helps us to prove whether the current decoupled schemes would affect farmers' decisions on livestock number reared. CAP liberalization should imply the abolishment of policy support (monetary) as well as policy regulation affecting the farmer's decision. Indeed, current limits imposed on the LSU extent, or on the amount of milk produced under the quota-milk scheme will be also removed. In this way the extent of cross-compliance influence on the number of animals kept on-farm will be also assessed. Moreover, we expect under some extent, that CAP removing would influence farmer's decision differently according to the livestock typology. For instance, this is the case of dairying specialist currently constrained by quota-milk capping.

2. Methodology

2.1. Data collection and survey description

This paper is developed in the scope of the CAP-IRE¹ project that established a scenario hypothesis with two extreme states of the CAP policy by 2020: i) a baseline scenario of the CAP framework in year 2009, that includes the latest *Health check* agreements, and ii) a scenario assuming a complete abolition of all CAP instruments. The benchmark scenario was defined assuming that prices, employment opportunities and other conditions remain stable at January 2009 level and CAP would continue as it is currently planned especially with Single Farm Scheme (SFS), Rural Development Policy (RDP) and other instruments such as milk quotas and cross-compliance. This first option was called "**Baseline scenario**". Secondly, farmers were asked to consider the hypothesis that all CAP payments received (including RDP), and all other CAP instruments (e.g. milk quotas, cross-compliance) with constraints imposed on the LSU would be removed starting in 2014. Except for CAP, all other conditions (prices, labour market, etc) would remain the same as in the first scenario. This second hypothesis was called "**NO-CAP scenario**".

In 2009 a survey to 2,363 farm-households across 9 member states of the EU was carried out (detail on the survey has been already provided in Giannoccaro and Berbel, 2014). With respect to previous studies accounting for the same survey, this research focuses exclusively on livestock sector. Indeed, a sample of 1,301 specialized livestock farm is analyzed (Table 1).

1. Assessing the Multiple Impacts of the Common Agricultural Policies on Rural Economies (www.cap-ire.eu).



Table 1- Main features of sample-only farm with livestock (N=1,301)

	Case study	Sample size	Age (year)		Land owned (ha)		SFP/SAPS* (EUR)	
			Mean	S.D.	Mean	S.D.	Mean	S.D.
South	Emilia-Romagna (Italy)	32	54.93	13.72	26.67	47.83	7,848	10,978
	Macedonia and Thrace (Greece)	154	47.20	5.99	6.67	6.00	11,720	14,004
East	Andalusia (Spain)	27	48.88	12.18	286.79	589.66	39,298	68,153
	South-East Planning Region (Bulgaria)	149	48.32	11.39	4.21	13.03	6,380	16,298
	Podlaskie (Poland)	190	35.5	7.49	21.71	14.93	3,035	2,127
Centre-North	North East of Scotland (UK)	147	55.28	11.83	165.93	207.21	38,643	56,063
	Noord-Holland (Netherlands)	210	51.67	10.89	30.37	23.14	16,877	18,961
	Centre (France)	73	35.73	11.45	58.85	67.33	40,417	33,590
	Midi-Pyrénées (France)	120	42.46	10.99	72.48	66.02	19,137	15,617
	Lahn-Dill-District (Germany)	91	49.56	10.35	9.20	15.68	8,960	12,110
	Ostprignitz-Ruppin (Germany)	108	51.58	10.98	120.69	250.33	94,432	179,780
	TOTAL	1,301	46.86	12.20	54.66	146.28	21,919	59,783

*SFP: Single Farm Payment; SAPS: Single Area Payment System

The sample reports an average of 22,000 EUR of payment via SFP/SAPS with a farmland size of approximately 55.000 ha. The average farmer's age in the survey is 46.8 years and variability is found with the Polish being the youngest farmers with an average age of 35 years while Italian and Scottish farmers are the oldest with 55 years being the average. Farm livestock features are reported in Table 2.

Table 2: Farm livestock features

Livestock typology	Frequency	Number of animal reared		
		mean	min	max
Specialist dairying	321	72	3	1,600
Specialist dairying & fattening	202	50	0	500
Specialist sheep & goat	112	193	0	1,200
Mixed, mainly grazing	114	100	0	1,400
Mixed, mainly poultry	51	2,316	0	30,100
Crops & grazing	173	141	0	1,500
Mixed crops & livestock	328	118	0	2,232

The main farm specialization covered by the sample is Dairying livestock and mixed crop & livestock accounting both for 25%. The group of crops and grazing reaches 13% while mixed livestock with poultry covers only 4%. The question about preferences towards the on-farm animal units was formulated as a close qualitative question, where each household was asked, under each scenario, if they expected to increase, no-change or decrease the (numebr) units reared at the survey time. In addition, farmers whose responses were not stated (i.e. they did not answer and they did not know what they would do) and 'other' explicit responses were also collected. The analysis of the policy effects implies two steps: firstly it must be determined who is affected by the policy and secondly, the changes due to policy implementation must be assessed. In light of this, intended behaviour was defined in terms of a dichotomous outcome: (i) farmers who would modify their decision (i.e. those who are influenced by CAP removal) were labelled 'Dependent behaviour'. Inside this label, there are two groups, depending on the direction of change either 'change-decreasing' or 'change-increasing' when farmer's choice moves respectively to a lower or upper level of livestock number; and (ii) those farmers whose intended behaviour is not affected by CAP scenarios, therefore farmers would not modify their decision and, they would carry on with the same decision. This category was labelled 'Independent behav-

aviour'. The first category, the Dependent Behaviour, makes sense of the influence of the current CAP normative on the farmers' decision. Indeed, farmer's decision would change if the CAP support was removed. On the other hand, Invariant Behaviour concerns the indifference of farmers towards the abolishment of the current normative. In fact, farmer's decision is independent of the CAP scenarios (i.e. with or without current CAP support). Table 3 shows the survey results of farmers' stated preferences with reference to the number of livestock under each CAP scenarios.

Table 3- Definition of farmers' behaviours (N=793)

Farmers' behaviours	% of respondents	CAP scenarios	
		Baseline	NO-CAP
Invariant	59.5%	Increase	Increase
		Constant	Constant
		Decrease	Decrease
Change-decreasing	23.6%	Increase	Decrease
		Increase	Constant
		Constant	Decrease
Change-increasing	5.8%	Constant	Increase
		Decrease	Constant
		Decrease	Increase
Undecided	11.29%	Increase	Do not know
		Constant	Do not know
		Decrease	Do not know

Source: own elaboration

Results show that farmers who are influenced by CAP removal are 30%: they would modify their decision in a way of increasing, '**change-increasing**' (6%), or lowering, namely '**change-decreasing**' (24%). The percentage of farmers whose intended behaviour is not affected by CAP scenarios, called '**invariant**' reaches 60%.

2.2. Econometric modeling of farmer's response

The economic theory underlying stated preferences assumes that the most preferred option yields the highest utility for the respondent. According to the questionnaire here there is a single decision among more unordered alternatives. Assuming that farmer's utility is a linear function that contains the set of the individual explanatory variables (x) and β their coefficients, it is possible to define the probability for the i -th farmer to choose among the alternatives given, namely (1) keep invariant behavior, (2) change-decreasing or (3) change increasing. The method to determine statistical relevant factors was a multinomial logistic regression formula (see Giannoccaro and Berbel, (2013) for major details). The positive/negative sign of β coefficient, when significant, can be interpreted as the increment/decrement of the probability of a farm being in the specific group. Note that a non significant coefficient implies that the regressors do not affect the utility or the probability of being in a certain group. The variables considered as determinants are all of those derived from the questionnaire and are fully available in Viaggi et al. (2009) in which the stated reaction to the CAP scenarios was also collected. The full list of variables used, and the way each variable was measured, is available in Giannoccaro and Berbel, (2013).

3. Results

According to the econometric model (Table 4), major likelihood of decrease in number of animal reared would be related to farm structural features such as size of land owned and farm with rented land. We introduced a metric variable for farmland size taking into account the tenure of land. We refer to the land owned by the farmer at the time of interview. At the same time, the



renting-in activity is rather common among specialist in livestock. The model findings points out that the larger the land, the higher is the likelihood of having a decreasing behaviour. Similarly, the land rent-in variables set as a dummy variable implies that those farms renting-in land would have higher probability to sizing the unit numbers.

Mostly relevant, the change is not spatially neutral indeed across hilly and mountainous areas the reduction strategy would be more likely with respect to flat zone. To the same extent, differences has been found across the EU regions, with the new accessed members showing the biggest change. In fact, comparing the farmers' behaviour of the latest accessed members (in the sample: Poland and Bulgaria) to the EU-15 (grouped as Centre-North and South) findings reports a minor likelihood of being in the class of change-decreasing for EU-15 cases study. A number of studies are already stressed the dependency of farmers' decision belong to last accessed members on the CAP payment. Although the total amount of payment received is lower than that of EU-15 farmers, the relevance with respect to the total income is pretty higher (Gorton et al. 2008). Finally, livestock rearing under organic production systems would be also more likelihood in decreasing strategy. Without compensatory payments for the major cost that organic livestock implies, this type of production process more environmentally sustainable turns to be economically unsustainable.

On the other hand, the increasing behaviour has been found for farms with renting (in) land. Among the livestock typology, as expected, dairying is the specialist with major probability, while across EU region the Northern members would have the biggest likelihood. Finally, farmer's age also has been found being significant with inverse relationship with increasing intention. The older the farmers the lower is the likelihood of raising the livestock number reared.

While for renting-in the rationale of farmer's stated reactions might be the same, namely rent-in land provides a more flexible size of livestock activities that can be promptly adjusted downwards or upwards depending on the economic efficiency of each farm, the fact that the amount of payment is not significant is relevant. The SFP/SAPS refers to the total amount received per ha and it differs across EU members as well as among the livestock typologies.

Generally, these results are in line with other study in which the influence of CAP support on the number of livestock unit has been investigated. For instance Neumann et al. (2011) analyzing the impact of different CAP and market scenario found a reduction trend in animals reared in the new EU member countries according to the CAP shift in paradigm from a higher degree of governmental regulation to low regulation levels and dominance of market forces.

Table 4: Logistic regression models: 'Changing behaviour' category (a)

	Factors	β	S.E.	Z	Sig.
changing-decreasing	Constant	-1.51	.6486	-2.34	.019**
	Farmer's age	-.001	.0109	-0.15	.884
	Land owned (ha)	.005	.001	2.28	.023**
	Land rent IN	.831	.320	2.59	.010**
	Specialist				
	dairying	.547	.4515	1.21	.225
	dairying&fattening	.595	.4013	1.48	.138
	sheeps&goats	.372	.5956	.63	.531
	mixed, grazing	.344	.5048	.68	.495
	mixed, granivores	-.734	.7779	-.94	.345
	crops &grazing	-.213	.4346	-.49	.623
	mixed, crops&livestock (reference)				
	Region				
	Centre-North	-1.49	.3171	-4.71	.000***
	South	-2.09	.5402	-3.87	.000***
	East (reference)				
	Altitude				
	Hill	.732	.2601	2.82	.005**
	Mountain	1.124	.4119	2.73	.006**
	Plain (reference)				
Organic production	.721	.4103	1.76	.079*	
SFP/SAPS per ha	.000	.000	1.05	.294	
changing-increasing	Constant	-6.62	1.720	-3.85	.000***
	Farmer's age	-.041	.0177	-2.34	.019**
	Land owned (ha)	.004	.0035	1.26	.208
	Land rent IN	1.85	.7911	2.35	.019**
	Specialist				
	dairying	2.143	.921	2.31	.020**
	dairying&fattening	-.4347	1.26	-.34	.731
	sheeps&goats	1.221	.983	1.24	.214
	mixed, grazing	-23.94	260	-.00	1.00
	mixed, granivores	-16.12	121	-.00	1.00
	crops &grazing	1.641	.871	1.88	.060*
	mixed, crops&livestock (reference)				
	Region				
	Centre-North	3.52	1.072	3.29	.001***
	South	-26.04	1325	-.00	1.00
	East (reference)				
	Altitude				
Hill	.501	.6149	.82	.415	
Mountain	.981	.9548	1.03	.304	
Plain (reference)					
Organic production	-.128	.7230	-.18	.858	
SFP/SAPS per ha	.000	.0004	1.14	.225	

Source: own elaboration; (a) Reference class: Invariant. Rate of -2 Log likelihood= 350.885; Pseudo R2= .2297

* Statistically significant at 90% level; ** at 95%; *** at 99%

4. Conclusions

In this study farmers' intended behaviour towards numbers of livestock reared were analyzed under the hypothesis of a plenty CAP liberalization since 2014. As underlined in Barnes et al 2014, like all surveys of future intent, the responses may have some built in bias which is reflective of present agricultural conditions that could influence the responses.

In general, removal of the CAP would not induce strong changes in farmers decisions (60% are 'invariant', 11% 'undecided'), and results show that 30% of farmers would modify their decisions (6% 'change increasing', 24% 'change decreasing'). Basically, results have found that farm structural variables, such as size of land, rented land and organic rearing, would influence the decreasing in numbers of animal reared. In addition the increasing behaviour would be influ-

enced by other features, such as renting (in) land and dairy livestock typology. This might be related to the quota-milk abolishment that would lead to increase the on-farm animal reared. However, heterogeneous behaviour between the New Member States and the others (EU-15) has been found, as new members are more likelihood to decrease the number of livestock unit without CAP support.

CAP liberalization, with the total removal of the current limits of LSU and milk quotas would implies different farmers' strategy according to the livestock typology. In particular for the Italian case, where coupled payments for the livestock sector will account for about 210 million EUR/year, specific measures should be addressed to farms which support higher production costs such as organic farms or farms located on hilly and mountainous areas. Finally, the survey used for this study did not allow to separate the effects of monetary effects and environmental constraints on farmers decision. This point could be taken into account for future development of the research.

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SESSION TWO
CAP 2014-2020 and market



Assessing the impacts of Reg. (EU) No. 1307-2013 on Italian farms. A comparison between three alternative convergence models

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Abstract:

Regulation (EU) No.1307/2013 has introduced a relevant change of the architecture for direct payments, both imposing an internal convergence process and establishing a strong mandate for each Member State, in order to improve the effectiveness of the 1st Pillar. As the choice of a specific convergence model is going to influence profitability of many farms, it represents one of the most relevant decisions Italy has to make. The article aims at analysing and comparing how the three convergence models that the Reg. (EU) no.1307/2013 establishes might differently impact on NFIs. To this end, 6th Agricultural Census and FADN database are utilized and appropriate simulations for representative farms of the most important Italian economic technical trends (ETT) are carried out.

JEL Codes: Q12, Q18

Keywords: CAP, direct payments, net farm income

Introduction

Despite the Common Agricultural Policy (CAP) having shifted from CMOs¹ to direct payments in the last two decades, leaving its early productivistic approach to embrace a more competitive, environmental friendly and market oriented one, the need to enhance the net farm income (NFI) has remained one of its cornerstones (Henke, Coronas, 2011; Lowe *et al.*, 2010; Tranter *et al.*, 2007). Even more so, in a time of turbulence, the CAP cannot leave European farmers and their activities alone, as it again decisively influences farms' strategic choices, indirectly orienting the management of natural input, production dynamics and the nature of buyer-supplier relationships (Bartolini, Viaggi, 2013; Kazukauskas *et al.*, 2013; Raggi *et al.*, 2013). In November 2010, the European Commission firmly stated that in the future, the CAP would remain a fundamental common policy structured around two complementary pillars², functional and strategic aims in the changeable and challenging world of the 21st century (Huang *et al.*, 2010; Rizov *et al.*, 2013). At the same time, CAP Reform 2014-2020 has introduced new important elements into the architecture of direct payments³ (Westhoek *et al.*, 2013). Indeed, starting from January 2015, the current SPS⁴ has definitely been replaced by an innovative system of direct payments with eight components⁵ (three mandatory and five optional). This new target-oriented approach aims

1. Common market organisations.

2. Communication (COM) no 672(final) from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 18 November 2010 "The CAP towards 2020: meeting the food, natural resources and territorial challenges of the future".

3. Regulation (EU) No. 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No. 637/2008 and Council Regulation (EC) No. 73/2009.

4. Single Payment Scheme.

5. These components are the basic payment scheme (mandatory), the payment for agricultural practices beneficial for the climate and the environment (mandatory), the payment for young farmers (mandatory), the redistributive payment (optional), the coupled support (optional), the payment for areas with natural

at better linking every payment with a specific political objective (Grant, 2010; van Ittersum *et al.*, 2008).

Regulation (EU) No. 1307/2013 has recognised a strong mandate for each Member State (MS) to manage many aspects related to direct payments. The so-called “national flexibility” offers the opportunity to improve consistency between national targets and political decisions to allow a greater effectiveness of public resources spending (Erjavec *et al.*, 2011; Grant, 2010; van Ittersum *et al.*, 2008; Westhoek *et al.*, 2013). These tasks may be particularly intricate for the Italian Government, which will have to face the consequences of the overall reduction of ceilings for direct payments and of the process of internal convergence. It follows that Italy shall reconcile the need to balance the level of payments per hectare between administrative regions and agricultural sectors with increased requests for enhancement of the NFIs, in a sector where prices, incomes volatility and natural risks are marked and profitability levels are, on average, below those in the rest of the economy (Severini, Tantari, 2013). As the choice of a specific internal convergence model – that strives for a reduction of the gap between the value of payments per hectare – will affect the profitability of many farms, it represents one of the most relevant decisions Italy has to make. The present article aims at analysing and comparing how the convergence models that Reg. (EU) No. 1307/2013 establishes might differently impact NFIs.

Methods

A plausible and realistic evaluation of economic impacts due to the new reform of direct payments requires a strict application of the technical mechanisms provided by the above-mentioned Regulation. It has introduced three alternative convergence models (art. 25):

- 1) a flat rate basic payment (FRBP) by 2015, without convergence in steps;
- 2) a FRBP by 2019, with convergence in steps during the “transition period” of 2015-2019⁶;
- 3) a partial convergence, also called the “Irish model” (IrM), that raises basic payment below 90% of the national average by 1/3 of the difference between their current payment and 90% of the national average by 2019 due to a proportional decrease in payments above the average. Moreover, this model introduces a “stop loss mechanism” that reduces losses (no more than 30% of their initial value in 2015) for high payment entitlements.

While the calculation of both FRBP models is not particularly complex, conversely, the mechanism of the IrM depends on two main parameters: the initial unit value of payment entitlements (IUV) and the national unit value (NUV). In 2019, the latter amounts to approximately 180 €/ha⁷ in Italy and can be simply determined by the following formula:

$$(X / Y) * (P / R)$$

where X is the national ceiling for the basic payment scheme for the year 2015, Y is the national ceiling for 2019, P is the national ceiling for the basic payment scheme for calendar year 2019 and R is the number of allocated payment entitlements in 2015, excluding those allocated from the national reserve.

constraints (optional) and the small farmers scheme (optional). The eighth component is the crop-specific payment for cotton, which is available only for Spain, Portugal, Greece and Bulgaria.

6. Because this model will produce the same effects as the previous one in 2020, henceforth, FRBP by 2015 and FRBP by 2019 are considered as a unique model of internal convergence.

7. This value is obtained considering that the national ceiling amounts to 3.902 Mio € in 2015 and to 3.704 Mio € in 2019. Moreover, the basic payment is 58% of the national ceiling.

The value of payment entitlements the farmers hold during 2015-2019 will depend on the IUUV⁸, which can be set up as follows:

$$(x / y) * (A / B)$$

where x is the national ceiling for the basic payment scheme for the year 2015, y is the amount of the payments for 2014 under the single payment scheme in the MS, A is the payments the farmer received for 2014 and B is the number of payment entitlements he is allocated in 2015, excluding those allocated from the national reserve.

In addition, the greening payment is a flat rate payment in 1) and 2), but MSs may calculate it as a percentage of each individual farmer's payment if 3) is chosen⁹. The coupled support (art. 52) depends on production (hectares, yields, number of heads). On such a legal and technical basis, a simulation model was implemented in Excel to determine the effects of the internal convergence models. The units of analysis are some representatives' agricultural holdings by main *type of farming* (TF¹⁰) (Cafiero *et al.*, 2005). Some of these represent sectors that have usually received payment entitlements higher than the regional (and national) average payment per hectare (e.g., dairy cattle livestock and rice in Northern Italy, sugar beets in Central Italy and olive oil in Southern Italy), while some others are sectors with no payment entitlements or entitlements lower than the regional (and national) average payment per hectare (e.g., the wine, fruit and sheep sectors) (Severini, Tantari, 2013).

To identify the main features of the representative farms, the 6th Agricultural Census and FADN¹¹ databases (years 2010-2012) were employed (European Commission, 2012; Moro, Sckokai, 2013; Rizov *et al.*, 2013; Sckokai, Moro, 2009; Severini, Tantari, 2013). First, for each TF, the representative region (stratified for altimetric areas) was identified as the one with the highest percentage of Standard Output. Second, analysing the FADN samples of the representative regions, the average UAA of representative farms was calculated, as were all the main variables of interest (AWU¹², SPS payments, coupled payments and NFI). Third, descriptive statistics of each variable were determined with SPSS, and the average characteristics of the representative farm were identified. In the end, these data were inserted into a simulator that considers all the Italian Government decisions on direct payments¹³. The final output shows how direct payments vary during 2015-2020 and offers the possibility to analyse how *ceteris paribus* the internal convergence models differently affect 1) NFI, 2) NFI/UAA and 3) NFI/AWU.

8. Indeed, it represents a sort of reference value that allows for calculating payment. If the IUUV is less than the NUV, then the direct payments shall increase progressively, while they shall decrease if the IUUV is greater than the NUV.

9. As a consequence, farmers that hold high value entitlements shall receive a higher greening payment.

10. A classification of farms based on determining the percentage of the production standards of the various productive activities of the company with respect to its total standard output.

11. Farm Accountancy Data Network.

12. Annual Work Unit.

13. The basic payments are 58% of the national ceiling, young farmers payment takes approximately 1%, and greening receives a fixed percentage (30%). Concerning optional payments, coupled support is 11% (of which 50% is for animal husbandry, 26% for arable crops, 8% for protein crops and 16% for olive), while the redistributive and the payment for areas with natural constraints are not considered. The small farmers scheme is also not considered because, to finance it, MSs shall deduct the amounts to which the small farmers would be entitled from the other direct payment funds anyway.

Table 1 - Type of farming, representative regions and main features of representative farms

Type of farming	Representative region	Average UAA [ha]	Average SPS payments [€/ha]	Total SPS payments [€]	Coupled payment (art. 68) [€/ha]	Average NFI [€/ha]	Total NFI [€]	Average AWU [n.]	(Direct payments)/NFI (%)
152 - Specialist rice farms	Piemonte (plain)	71.1	584	41.534	:	952	67.665	2.1	61.4
162 - Specialist cereals, oilseeds and protein crops and root crop farms	Emilia-Romagna (plain)	30.2	731	22.081	3.946	745	22.491	1.7	115.7
351 - Specialist quality wine farms	Piemonte (hill)	6.1	183	1.115	:	4.256	25.961	1.9	4.3
352 - Specialist wine other than quality wine farms	Sicilia (hill)	5.3	109	580	:	888	4.708	1.5	12.3
361 - Specialist fruit (other than citrus, tropical fruits and nuts) farms	Emilia-Romagna (plain)	8.5	258	2.196	:	2.746	23.343	2.2	9.4
362 - Specialist citrus fruit farms	Sicilia (hill)	3.1	491	1.522	:	2.369	7.345	1.6	20.7
370 - Specialist olive farms	Calabria (hill)	2.2	1.021	2.247	:	2.963	6.518	1.8	34.5
450 - Specialist dairy farms	Lombardia (plain)	46.1	716	32.994	4.600	5.155	237.639	3.0	15.8
450 - Specialist dairy farms (only mountain)	Trentino Alto Adige (mountain)	13.6	230	3.126	1.611	1.424	19.372	2.2	24.5
460 - Specialist cattle (rearing and fattening) farms	Veneto (plain)	15.9	735	11.687	39.152	4.470	71.067	3.5	71.5
460 - Specialist cattle (rearing and fattening) farms (only mountain)	Sicilia (mountain)	43.0	145	6.246	:	414	17.787	1.4	35.1
481 - Specialist sheep farms	Sardegna (plain)	42.5	206	8.770	:	849	36.087	1.9	24.3

Results

The analysis of the 6th Agricultural Census database allowed the identification of eight regions where representative farms' features should be investigated (table 1). These are four Northern Italy regions (Piemonte, Lombardia, Trentino Alto Adige and Veneto), two Central Italy regions (Emilia Romagna and Sardegna) and, finally, two Southern Italy regions (Calabria and Sicilia¹⁴). As for altimetric areas, plain was selected six times, while hill and mountain were, respectively, selected twice and once. Afterwards, based on the FADN database, selected variables (UAA, SPS payments, NFI, AWU and – where necessary – the coupled support of art. 68) of each representative region were calculated. All these data represent the average features of the representative farms to be inserted as input into the simulator. Special attention must be paid to the various weights of direct payment with respect to NFI in the observed TF. There are TFs with a high ratio of direct payments/NFI – above all, TF 162 (115.7%), TF 460 (71,5%) and TF 152 (61,4%) – that are definitely more responsive to a decrease in direct aid and TFs that conversely show a low ratio of direct payments/NFI – above all, ET 351 (4.3%), ET 361 (9.4%) and ET 352 (12.3%) – and are consequently less affected by any change in the level of the CAP direct support (table 1). In detail, TFs with a high weight of direct payment on NFI are usually those that received SPS payments greater than the national average payment per hectare (almost 300 €/ha) and, in many cases, those that benefit from coupled support (art. 68); conversely, TFs with a low weight of direct payment on NFI (<20%) received SPS payments lower than the national average payment per hectare without even receiving any coupled support.

The results show how differently NFIs and related indicators vary depending on the internal convergence models implemented. Because the simulation aims at comparing NFI variation during 2010-12¹⁵/2020 and the two FRBP models will produce the same effects on direct payments by 2020, these latter were jointly analysed (table 2). The output of the simulations notes a wide difference between sectors, both taking into consideration the effects of each single convergence model and comparing the differences between the models.

The first approach underlines that representative farms of sectors that historically hold high value entitlements will face *ceteris paribus* a drop in NFI, in particular where direct payments are a relevant component of NFI. This effect is particularly evident in TF 162 (-28.4% due to IrM and -51.8% to FRBP), TF 370 (-15.7% due to IrM and -37.3% to FRBP) and TF 152 (-9% due to IrM and -14.2% to FRBP) and less marked in TF 362 (-7.2% due to IrM and FRBP) and 450 (-3.5% due to IrM and -3.7% to FRBP). However, representative farms of sectors that commonly hold low value entitlements will experience *ceteris paribus* an increase of the NFI, with the lower the value, the larger the growth. This is the case of TF 352 (+7.3% due to IrM and +19.5% to FRBP), while less evident effects are exhibited for TF 450 (+2.3% due to IrM and +6.3% to FRBP), TF 481 (+0.5% due to IrM and +10.1% to FRBP) and TF 351 (+0.3% due to IrM and +2.5% to FRBP). Apparently counterintuitive is the result of TF 460 where, although the SPS payment is higher than the national average payment per hectare in Italy, the simulation carried out shows that the NFI of the representative farm is expected to increase by 2020 (+5.7% due to IrM and +1.7% to FRBP). This outcome is because both convergence models of direct payment will affect only the decoupled component of payment received (735 €/ha) and not the coupled part that represents instead a large part of the direct support received from TF 460 (2.462 €/ha). In this case, the NFI is expected to increase by 2020 just because the negative effects due to the convergence models will be sufficiently contrasted by a further increase of the coupled support for cattle beef during 2015-2020¹⁶.

14. The latter, Lombardia and Emilia Romagna, were selected for more than one TF, as shown in table 1.

15. FADN observation period.

16. The coupled payment per head increases from 42.1€ (average 2010-2012) to 46€ with the new

Table 2 - NFI variation: a comparison between alternative internal convergence models

Type of farming	Internal convergence model	NFI [€]		NFI/UAA [€/ha]		NFI/UWA [€/UWA]		Variation 2010/12-2020	
		2010/12	2020	2010/12	2020	2010/12	2020	Δ	Δ %
TF 152	<i>IrM</i>	67.665	61.590	-6.075	866	-85	29.348	-2.895	-9.0
	<i>FRBP(*)</i>	67.665	58.047	-9.618	952	-135	32.243	-4.583	-14.2
TF 162	<i>IrM</i>	22.491	16.093	-6.397	745	-212	9.232	-3.670	-28.4
	<i>FRBP(*)</i>	22.491	10.830	-11.661	745	-386	12.902	-6.689	-51.8
TF 351	<i>IrM</i>	25.961	26.039	78	4.256	13	13.974	42	0.3
	<i>FRBP(*)</i>	25.961	26.614	653	4.363	107	14.283	350	2.5
TF 352	<i>IrM</i>	4.708	5.052	344	953	65	3.377	230	7.3
	<i>FRBP(*)</i>	4.708	5.626	918	1.062	173	3.761	614	19.5
TF 361	<i>IrM</i>	23.343	23.208	-135	2.746	-16	10.476	-61	-0.6
	<i>FRBP(*)</i>	23.343	23.672	330	2.785	39	10.685	149	1.4
TF 362	<i>IrM</i>	7.345	6.816	-528	2.369	-170	4.384	-340	-7.2
	<i>FRBP(*)</i>	7.345	6.814	-531	2.198	-171	4.382	-341	-7.2
TF 370	<i>IrM</i>	2.963	2.498	-465	1.347	-211	1.414	-263	-15.7
	<i>FRBP(*)</i>	2.963	1.859	-1.104	845	-502	1.052	-625	-37.3
TF 450	<i>IrM</i>	237.639	229.445	-8.194	5.155	-178	77.632	-2.772	-3.5
	<i>FRBP(*)</i>	237.639	221.846	-15.793	4.812	-343	75.061	-5.344	-6.7
TF 450 (only mountain)	<i>IrM</i>	19.372	19.827	454	1.424	33	8.878	203	2.3
	<i>FRBP(*)</i>	19.372	20.596	1.224	1.514	90	9.222	548	6.3
TF 460	<i>IrM</i>	71.067	75.092	4.025	4.470	253	21.166	1.134	5.7
	<i>FRBP(*)</i>	71.067	72.284	1.216	4.546	76	20.374	343	1.7
TF 460 (only mountain)	<i>IrM</i>	17.787	19.185	1.398	414	33	14.182	1.034	7.9
	<i>FRBP(*)</i>	17.787	23.845	6.058	555	141	17.627	4.479	34.1
TF 481	<i>IrM</i>	36.087	36.249	163	849	4	19.162	86	0.5
	<i>FRBP(*)</i>	36.087	39.731	3.644	935	86	21.003	1.926	10.1

(*) Flat rate basic payment by 2015 or 2019

The comparison between the simulated models of convergence allows for distinguishing the two different typologies of farms as well: the ones that would benefit from the IrM models limiting the losses caused by FRBP models and the ones that, due to IrM models, would conversely lose a relevant part of the advantage derived from FRBP models (table 2). The first group is composed of all the TFs with high value entitlements during the period 2010-12 and, in most cases, a high weight of direct payments with respect to NFI (i.e., TF 162 and TF 152); indeed, due to the stop-loss mechanism, the IrM offers a sort of protection to those categories of CAP beneficiaries (above all, specialist cereals, oilseeds, protein crops, root crops and specialist olive farms).

However, belonging to the second group are all the TFs that benefit from IrM anyway but that could take more advantage of FRBP models; this is the direct consequence of the above mentioned stop-loss mechanism, that to limit losses for the biggest CAP beneficiaries hinders the increase of the smallest ones. Most of these TFs present, furthermore, a low weight of direct payment to NFI (above all, TF 351, TF 361 and TF 352). Such a negative impact is particularly evident for TF 460m (+7.9% due to IrM instead of +34.1% due to FRBP), TF 352 (+7.3% due to IrM and +19.5% to FRBP) and TF 481 (+0.5% due to IrM and +10.1% to FRBP) because, in the past, these sectors have not usually benefited from high value entitlements. In addition, there are two cases that are beyond the above highlighted connections. The first is TF 362 (citrus), whose NFI does not vary depending on the internal convergence model adopted (-7.2% both with IrM and FRBP); the other is TF 361 (fruit, with some arable crops¹⁷) that goes from a negative NFI variation (-0.6 due to IrM) to a positive one (+1.4%) due to the FRBP models.

In summary, the methodology allowed analysis of whether the representative farms of each TF benefit from the internal convergence models and which is the most convenient model for each of them. A relationship between the way the IrM affects NFI variation and the differences between the effects on the NFIs of the different models clearly emerged, as shown in graph 1. This graph highlights two main groups of TFs, IrM fans and IrM opponents. The first group (over the x-axis) includes all the representative farms that, due to the IrM, increase their NFI (subgroup F1) or experience a decline in NFI absolutely less significant compared with the FRBP models (subgroup F2). This group contains many “CAP dependent” EFs that present a high weight of direct payments (coupled support included) with respect to NFI. The second group (under the x-axis) contains, conversely, EFs that are “CAP independent” (low weight of direct payments with respect to NFI and low or no coupled support) and that, due to the IrM, enhance NFI, but less than they could with the FRBP models (subgroup O1), or the farms that, due to the IrM, face a drop in NFI instead of the increase produced through the other models (subgroup O2). All these subgroups may contribute to explaining the purposes of the IrM that was introduced during the Interinstitutional debate on CAP reform (the so-called CAP Trilogue to weaken the drastic effects of FRBP models on “CAP dependent” farms with high value entitlements, reducing economic resource transfer toward the TFs that historically hold low value entitlements).

In conclusion, graph 1 shows that the IrM fans are mainly TFs with high levels of SPS payments, where these latter are a relevant component of NFIs as well (above all, TF 152 and TF 162). These TFs reduce their losses – or even increase their NFIs (i.e., TF 460) – benefitting, in many cases (i.e., cattle beef, rice, olive oil, durum wheat, sugar beet and dairy milk), from the new Italian coupled payments system¹⁸. However, the IrM opponents are all sectors that did not profit

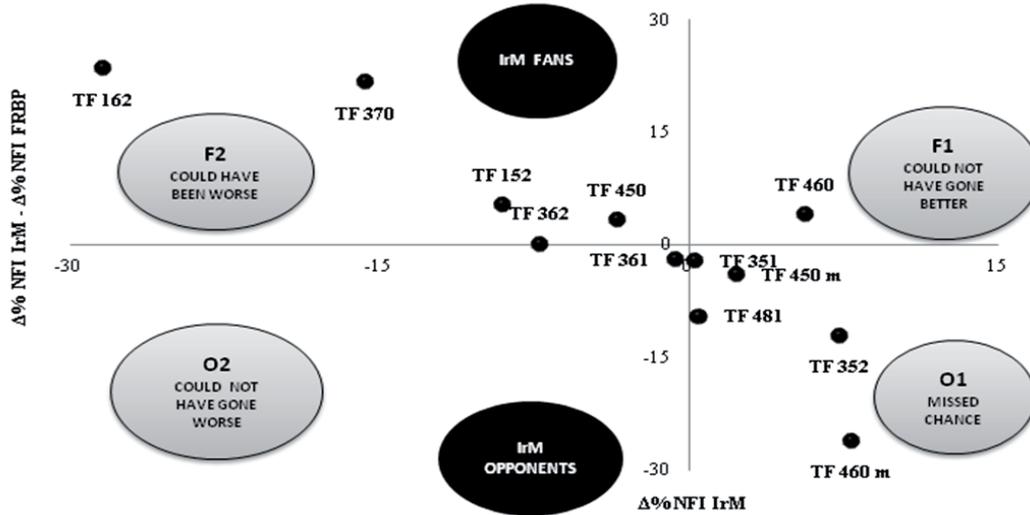
coupled payment system.

17. Arable crops such as wheat, maize and soybean augment the amount of direct payments that the representative farm of TF 361 received in the past. Such a detail explains the level of title entitlements observed (258 €/ha), higher than that of fruit farms without arable crops.

18. Established in July 2014 by the document “The new CAP: national choice on Reg. (EU) no. 1307/2013” (available in Italian).

from the 2003 Fischler Reform (above all, mountain animal husbandry) and that – although improving their NFIs – miss a great chance to decisively enhance the weight of direct payments on their NFIs and, at the same time, to improve their economic results.

Graph 1 – The impact of the IrM on NFI (Italian main TFs)



Conclusions

Regulation (EU) No. 1307/2013 has introduced a relevant change in the architecture for direct payments, both imposing an internal convergence process and establishing a strong mandate for each MS, to improve the effectiveness of the 1st Pillar of the CAP. Simulations undertaken by employing the FADN database demonstrated that all the internal convergence models worsen the profitability of some specific “CAP-dependent” TFs (above all, root crops, olive oil, rice and dairy milk) in some Italian regions with high level entitlements (above all, Calabria and Lombardia), while internal convergence simultaneously contributes positively to the NFIs of some traditional “CAP-independent” production (wine) and environmental-friendly activities (mountain animal husbandry). Nevertheless, the present paper verified that losses or gains for each TF will consistently vary depending on the adopted convergence model and that the IrM, more than the FRBP models, protects the NFIs of the biggest CAP beneficiaries (where NFI is deeply affected by SPS and coupled support) and, at the same time, limits the NFI increases of the smallest ones (where, conversely, direct payments represent a small component of the NFI).

In conclusion, while on the one hand, the IrM maintains a sort of enduring relationship with the old SPS, which is too far from the future challenges of the CAP, on the other hand, the analyses conducted in the present work clearly show that the partial convergence – together with some specific measures of the new coupled payment system adopted in Italy – is the only solution for reducing the negative effects that FRBP models could have on the NFIs of many strategic agricultural sectors in Italy (here called “CAP-dependent” sectors), where direct payments have indeed traditionally played a strong role of income support. All these facts considered, the political decision to apply the IrM and to provide most of the new coupled payments to these “CAP-dependent” sectors, to address the reduction in the CAP budget and the main consequences of a redistribution of scarce financial resources between farmers during the period of 2015-2020, might turn out to be reasonable and justifiable, provided that instruments will be used as a type

of (temporary) accompanying measure towards 2020, when the application of a flat rate model of income support should be inevitable for each MS, Italy included.

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Effects of cap green Payments in Lombardy: a Comparison of proposed and approved Measures based on Census Data

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Abstract

The paper aims to estimate potential impacts of compliance to CAP greening measures, in terms of crop mix, crop regional supply and income change, using 2010 Agricultural Census survey microdata on 54.333 Lombardy farms. Estimated impacts of greening practices as contained in Commission proposal, Parliament amendments and Reg. 1307/2013 are compared. Changes on greening during the EU decision-making process have notably reduced its negative impacts. Farms subject to greening would decrease from 59% to 33% while hectares fall from 95% to 72%. Crop diversification would impact significantly on 4.000 farms, while EFAs adoption will probably induce a crop mix change on 13.500 hectares only. The crop mix change would affect 30.000 arable land hectares, with an increase of nitrogen-fixing crops area (soy and alfalfa) to the detriment of cereals (con in particular). In farm income terms we estimate a gross margin loss of 9,2 millions of Euros, extremely lower than those estimated for greening Commission proposal (78 million of Euros).

keywords: Ecological Focus Areas (EFAs), Common Agricultural Policy, crop mix change, farm income

1. The concept of “greening” and its implementation

The Common Agricultural Policy (CAP) reform approved in 2013 in force over the period 2015-2020 presents an innovation in first pillar payments that will be splitted in seven components. At country member level some of these will be compulsory while other will be optional. Among mandatory measures are included “payments for agricultural practices beneficial for the climate and the environment” (*greening* or *green payments* henceforth) for which member countries have to devote 30% of national ceiling.

The EU Commission’s explanatory memorandum reported before the 12/10/2011 Regulation proposal (European Commission, 2011b) stated: “At the same time, agriculture and rural areas are being called upon to step up their efforts to meet the ambitious climate and energy targets and biodiversity strategy that are part of the Europe 2020 agenda. Farmers, who are together with foresters the main land managers, will need to be supported in adopting and maintaining farming systems and practices that are particularly favourable to environmental and climate objectives because market prices do not reflect the provision of such public goods.”

And furthermore: “This reform accelerates the process of integration of environmental requirements. It introduces a strong greening component into the first pillar of the CAP for the first time thus ensuring that all EU farmers in receipt of support go beyond the requirements of cross compliance and deliver environmental and climate benefits as part of their everyday activities.” In order to achieve such targets, the memorandum ties thirty percent of direct payments on *greening* practices. In the subsequent Regulation proposal (*considerandum* 26), the Commission specified that the mandatory greening component of direct payments should had been “simple, generalised, non-contractual and annual” going beyond cross-compliance.

In this way EU has tried to translate in support measures the concept of public goods provision (far stronger than cross-compliance) assured by agricultural activities, that has not been explic-

itly rewarded so far by Pillar I direct payments. The concept of rewarding agriculture for public goods provision, has been proposed and developed by many Authors (AA.VV., 2009; AA.VV., 2011; Cooper et al., 2009; Hart e Little, 2012; Matthews, 2012; Vanni, 2011) has been implemented into the Pillar I Cap reform not as an additional subsidy to farms but as component of the foreseen (direct payments) budget. From another viewpoint green payments may be considered as a 30% reduction in direct payments, that is restored as a contribution for public goods not rewarded by market mechanism. Considering the EU budget-cutting debate, an increase in Common Agricultural Policy resources was out of discussion and in this view green payments have been probably introduced as a justification for farm support rather than as a true remuneration for public goods provision.

According to the Regulation proposal (Com (2011) 625 def) green payments should had been provided to those farmers that adopt the following practices:

- a) maintain existing permanent grassland;
- b) crop diversification on arable land;
- c) at least 7% of eligible hectares (permanent grassland excluded) devoted to ecological focus areas.

Such measures have been criticized by many stakeholders, in particular by COPA-COGECA, as they may had a strong impact on farm production and income. Such kind of impact have been appraised in the impact assessment carried out by Commission staff (EC 2011a).

According to the impact assessment:

“At EU level, the change in farm income due to the greening ranges between - 3.2% and - 1.4%, depending on the option adopted and the detailed requirements of the measures. In addition to increases in cost and/or loss of income, greening could also affect the price level of agricultural products”.

2. Modification of green payments'practices

The decision process that yielded the approved CAP reform Regulations has been longer than before (as a result of the Treaty of Lisbon) because the European Parliament has been involved into the process itself playing a key role. During such process the green payments practices have been remarkably simplified with respect to the Commission proposal, taking into account their potential impacts on European agriculture.



Table 1 reports in short the greening practices, comparing, for each one, the Commission proposal, the subsequent version amended by European Parliament and the final decision approved the 26th June 2013 as a result of trilogue among Commission, Parliament and the Agricultural Council.

Table 1 – Comparison among proposed and approved greening practices			
Kind of Practice	Commission Proposal	Negotiating mandate of European Parliament	June 2013 agreement within the trilogue (Reg. 1307/2013)
Maintaining PG*	Mandatory	Mandatory	Mandatory
Areas interested by crop diversification and EFAs	All crops except PG	All except PG and PC*	All except PG and PC
Size threshold for crop diversification	More than 3 hectares	More than 10 hectares	More than 10 hectares
Number of crops for diversification	3 crops for all farms; 1st crop max. 70%; 3rd crop min. 5%	2 crops in farms <30 ha; 3 crops in farms >30 ha; 1st crop max. 75%	2 crops in farms <30 ha; 3 crops in farms >30 ha; 1st crop max. 75%
Cases of exemption in crop diversification	Organic farms or farms with 100% rice or 100% SA* or 100% PG	Organic farms or farms min 75% rice and/or PG or equivalent measures	Organic farms or Min.75% Rice + SA or with Min.75% PG + SA or equivalent measures
EFAs	farms > 3 ha: 7% UAA* except PG	farms with AL* > 10 ha 3% AL; from 2016 5%	farms with AL > 15 ha 5% AL; 7%
Uses of EFAs	Nothing but landscape features (included terraces, buffer strips and afforested areas)	Landscape features and Nitrogen-Fixing Crops	Landscape features and Nitrogen-Fixing Crops

* PG = Permanent Grassland; PC= Permanent Crops; SA= Set-Aside; AL= Arable Land; UAA= Utilized Agricultural Area

Greening practices proposed by Commission have been kept in subsequent versions with some modifications: increase of threshold from 3 to 10 hectares, exclusion of permanent crops from Ecological Focus Areas (EFAs henceforth) destination, diff differentiated greening practices according to arable land surface, some exemptions and equivalent practices have been adopted, extension of surfaces considered as EFAs.

In the final version almost all Parliament's requests have been granted, enlarging, in some cases, exemption causes. A higher share of agricultural area has be devoted to EFAs but, at the same time, minimum threshold has been raised from 10 to 15 hectares

3. Data and computation methodologies

The aim of the paper is to assess the effects of greening on farms in the Lombardy region. Such effects are measured in terms of change in crop mix and farm income as a consequence of adaptation to greening practices, like crop diversification and ecological focus areas. Both of such impacts (crop mix and farm income) will be assessed under different policy scenarios: Commission Regulation Proposal, negotiating mandate of European Parliament and final decisions reported in Regulation (EU) 1307/2013 and subsequent delegated acts. To assess greening effects on crop mix we use microdata from VI Agricultural Census survey 2010 covering 54.333 Lombardy farms¹. The knowledge of land use at farm level allowed to observe which farms were

1. Data have been provided by Direzione Generale Agricoltura della Regione Lombardia within the commissioned research "Supporto scientifico alla negoziazione della nuova politica agricola comunitaria 2014 – 2020".

compliant with greening in 2010 (taken as a reference year) and how many will have to adapt (and to what extent) to receive green payments.

For each greening practice farms have been grouped according to exclusion criteria and kind of obligations to be observed, in particular:

- a) Maintenance of permanent grasslands has been quantified based on current situation (2010) excluding the conversion option.
- b) For crop diversification, we have first take out farms fulfilling exclusion criteria : < 10 hectares of arable land, organic farms, >75% of arable land covered by water, or used for the production herbaceous forage or lying fallow. The remaining farms have been classified according to land use (single crop, two crops etc.) and with respect to minimum and maximum share of land covered by each crop according to the Regulation. Such classification yields different levels of farms adaptation: from those already accomplishing crop diversification to those needing to introduce one or two crops.
- c) Results obtained are based on the assumptions that farmers will try to minimize crop mix adaptation and that arable land areas are perfectly divisible. The estimation of crop mix adaptation is based on a caution criterion: for each non-complying farm we have assumed a first crop reduction at exactly 75% of arable land and/or an increase of third crop at 5%. Furthermore a conservative land allocation approach has been applied to highly profitable crops (horticulture and flowers) and to non-permanent grassland. In reality annual crop mix will be based not only on greening rules (external constraint) but also accounting for internal farm constraints like non-perfect divisibility of arable land area, water availability for irrigated crops and so on. d) To model the allocation of 5% arable land to ecological focus areas (permanent crops and grassland excluded) we have firstly quantified area already devoted to EFAs like: land lying fallow, areas with short rotation coppice and nitrogen-fixing crops (applying equivalent coefficients established by delegate Regulation). Available Census data did not allow to quantify surfaces covered by terraces, buffer strips, landscape features and eligible afforested areas; It is however plausible to consider such areas quite limited. Farms subject to EFAs according to Reg. 1370/2013 (more than 15 hectares of arable land except farms with at least 75% of non-perennial grassland, legumes and land lying fallow) have been classified (4 groups) according to the presence/absence of land already covered by EFAs: 1= no EFAs, 2=EFAs less than 5% of arable land (AL) 3= EFAs between 3% and 5% of AL 4= EFAs more than 7% of AL. In case 1 we assume farms will adapt covering no more than 5% of AL using nitrogen-fixing crops (with 0,7 hectares of crop for 1 hectare of equivalent area, the share is 7,1%); In case 2 nitrogen-fixing or lying fallow areas have been raised up to 5%. In other cases we have assumed no changes. Also for this practice we have avoided changes in high-income crops and grassland areas.

It has not been possible to quantify equivalent practices according to Reg. 1307/2013 article 43 because they are not yet specified at national level and for lack of information in the Census database. Crop mix change has been estimated using dedicated algorithms (table 2) accounting for crop diversification and EFAs jointly. Being 10.696 farms subject to crop diversification and EFAs, 8.112 farms have to comply with both practices. 2.666 farms are subject to crop diversification and maintenance of permanent pastures (5% of total farms), while more (8.112 equal to 15%) are subject to diversification and EFAs. Almost half of Lombardy farms subject to greening are already complying; 16% are monoculture farms that will have to introduce two crops while the remaining 34% will have adapt partially reducing first crop, introducing or increasing third crop, adopting an eligible-EFAs crop.

Table 2- Assumptions of greening-adapting algorithms

	Number of farms	Current situation (2010)	Hypothetical situation	Adaptation
Crop diversification only	2.566			
Monoculture	613	100% C1	75% C1; 25% free	Introduction of a new crop (non specified)
Reduction 1st crop (C1)	420	>75% C1	75% C1; 25% C2	Proportional increase of 2nd and 3rd crop
Already complying	1.533	<75% C1	<75% C1	No change
15-30 HA diversification + EFAs	3.692			
Monoculture	654	100% C1	75% C1; 7.1% NFC on EFAs; 17.9% free	Introduction of a new crop (non specified) and of NFC for EFAs
Reduction 1st crop	705	>75% C1	75% C1; 7.1% NFC on EFAs; 17.9% C2, C3, Cn	Proportional increase of existing crops and introduction of NFC on EFAs
Adaptations for EFAs only	144	<75% C1, EFAs absent or not enough represented	<75% C1; 7.1% NFC on EFAs; >17.9% C2, C3, Cn	Introduction of NFC and proportional reduction of existing crops
Already complying	2.189	<75% C1, EFAs enough represented	<75% C1, EFAs enough represented	No change
>30 HA diversification + EFAs	4.420			
Monoculture	429	100% C1	75% C1; 12.1% NFC on EFAs+C3; 12.9% free	Introduction of a new crop (non specified)
Reduction 1st crop + introduction 3rd crop	702	>75% C1; <25% C2	75% C1; 12.1% NFC on EFAs+C3; C2 >12.9%	Proportional variation of existing second crop, NFC third crop
Introduction 3rd crop (C3)	377	<75% C1; >25% C2	75% C1; 12.1% NFC on EFAs+C3; C2 =12.9%	Proportional variation of existing second crop, NFC third crop
Reduction 1st crop (C1)	459	>75% C1; <25% C2	75% C1; 7.1% NFC on EFAs; C2+C3+Cn=12.9%	Proportional variation of existing crops, introduction of NFC
Adaptations for EFAs only	788	<75% C1, >5% C3; EFAs absent or not enough represented	<75% C1; 7.1% NFC on EFAs; >17.9% C2, C3, Cn	Proportional variation of existing crops, introduction of NFC
Already complying	1.665	<75% C1, >5% C3, EFAs enough represented	<75% C1, >5% C3, EFAs enough represented	Proportional variation of existing crops, introduction of NFC
>30 HA EFAs only	18	>75% TGC+SA or rice+SA, exceeding AC >30 ha	>75% TGC+SA or rice+SA, 7.1% of exceeding AL	Proportional variation of exceeding arable land

AC= Arable crops C1 = first crop, C2= Second crop, C3= third crop, Cn= non specified crop, EFAs= Ecological Focus Areas, NFC= nitrogen-fixing crop, SA= set aside, TGC = total grassland crops

Crop mix change analysis has been carried out both at regional level and by groups of farms clustered according to different criteria like: sub-regional areas, type of farming, economic and UAA size. Farm income impacts are estimated using crops gross margins from RICA-INEA database. Such sample data (2010) are extended to Census data to estimate a farm-level gross margin recovering, for each census farm, the gross income level in 2010, before the CAP reform. We estimate farm income impact of greening (under the three above mentioned policy scenarios) starting from such baseline. Finally, as a consequence of crop mix adaptation and ecological focus areas constraints change in crop products supply at regional level are estimated.

4. Results

In a first step we compare number of farms subject to greening practices according to Commission proposal, Parliament amendments and Reg. 1307/2013. The characteristics of such farms have been then examined in detail and crop mix change effects, due to greening, are quantified in physical and economic terms.

A relaxation in greening obligations during the legislative process may be appreciated in Table 3.

Table 3 - Lombardy farms subject to greening practices - comparison among Regulation proposals					
	Greening			Absolute differences	% Differ.
	Commission proposal	Parliament amendments	Regulation 1307		
Number of farm subject to greening practices	32.091	20.814	17.716	-14.375	-45%
<i>% on total farms of the Region</i>	59%	38%	33%		
Eligible area subjecto greening	952.957	876.450	723.597	-229.360	-24%
<i>% on eligible area for direct payments</i>	95%	87%	72%		
Gross Standard Output (Meuro)	6.611	5.853	4.976	-1.635	-25%
<i>% on total of the Region</i>	89%	79%	67%		
Farms non subject to greening (number)	22.242	33.519	36.617	14.375	65%
- of which without UAA	647	653	653	6	1%
- of which organic farming	829	829	829	0	0%
- of which simplified scheme	20.766	26.328	26.328	5.562	27%
- of which arable land < 10 ha	0	5.709	5.709	5.709	n.s.
- of which more than 75% crops eligible	0	0	3.098	3.098	n.s.
Farms subject to greening (number)	32.091	20.814	17.716	-14.375	-45%
- of which only diversification	0	0	2.085	2.085	n.s.
- of which only maintainance permanent grassland	3.845	5.910	7.020	3.175	83%
- of which only EFAs maintainance	4.672	1.567	18	-4.654	-100%
- of which maintain. gressland + divesification	0	0	481	481	n.s.
- of which maintain. gressland + EFAs	3.488	559	0	-3.488	-100%
- of which divesification + EFAs	16.073	10.145	6.516	-9.557	-59%
- of which maint.grassland + EFAs + divesificat.	4.013	2.633	1.596	-2.417	-60%

Applying Commission proposal, greening practices would had involved 32.000 Lombardy farms (59%) and the 95% of hectares eligible to direct payments, and using Parliament amendments such shares would be 38% and 87% respectively while rules laid down in Reg. 1307 bring a further reduction: 33% of farms and 72% of eligible hectares. Such reduction of farms involved is due to the extension of greening-excluded cases: at first only organic farms or with less than three eligible hectares would had been excluded; in the Parliament proposal also farms with less 10 hectares of arable land have been exempted from greening, while Reg. 1307 has extended the exclusion from crop diversification and EFAs to farms where more than 75% of eligible hectares is used for crops under water, for forage production or lying fallow.

Also a partial change in obligations has reduced greening impact: farms subject to EFAs (or EFAs + permanent grassland maintenance) are almost disappeared while those under crop diversification and EFAs has fallen by 12.000 (-60%) with respect to initial proposal. Also hectares subject to greening are remarkably lower and has decreased by 24% with a reduction (-47%) of those in farms obliged to EFAs. The exclusion from greening practice has interested in particular small and medium farms for which adaptation would had been more difficult; this lead to a bureaucratic simplification in rules-complying check.

4.1 – Number and characteristics of farms subject to greening (Reg.1307/1013)

Such farms are less than one third of total Lombardy farms, but covers more than 70% of hectares eligible to direct payments. Average eligible area of farms subject to greening is more than 40 hectares, more than double compared to regional average dimension. Farms subject to greening cover 69% of arable land (more than 80% of wheat, corn and oilseeds) and 91% of permanent grassland. Farms subject to different greening practice show remarkable differences (Table 4).

	Type of greening practice					
	Crop diversificati on only	Permanent grassland only	EFAs only	Diversific.+ Perman. Grassland	Diversific.+ EFAs	Diversific.+ Perman. Grassland + EFAs
Number of farms	2.085	7.020	18	481	6.516	1.596
Eligible hectares/farm	14,46	36,07	291,00	19,01	50,00	62,66
Arable land/farm	13,61	7,45	265,60	13,65	48,64	51,57
Eligible hectares	30.141	253.236	5.238	9.146	325.830	100.006
-Arable land	28.368	52.306	4.781	6.565	316.940	82.313
-Fruit perennial crops	708	3.821	2	89	2.390	396
-Permanent grassland	0	195.394	0	2.429	0	15.595
-Woody perennial crops	1.064	1.715	455	63	6.500	1.061

Farms subject only to crop diversification are, on average, smaller than 15 ha, while average dimension in farms subject to permanent grassland maintenance is 36 hectares. Farm obliged to crop diversification and EFAs have, on average, 50 arable land hectares, that allows for obtain EFAs of about 2,5 ha if land is left fallow and of 3,5 if using nitrogen-fixing crops. Effects in terms of environmental compatibility of agricultural activity should be then significant.

a) Crop diversification

Crop diversification (table 5) involves 10.678 farms (20% of total) and about 60% of regional arable hectares (434.000) of which 70% used for cereals and 18% for non-permanent grassland. 60% of farms is already complying with crop diversification (two crops up to 30 hectares and three or more crops over 30 arable hectares, with first crop lower than 75% and firs two under 95%); 16 % of farms obliged to diversification is currently under monoculture (corn mainly) and will have to change deeply their crop mix; less severe even if relevant adaptations will involve other groups, representing 25% of farms subject to diversification.

	Adaptations to crop diversification					
	Total subject to crop diversification	Monoculture	Reduction 1st crop	Reduction 1st crop + introduct. 3rd crop	Introduction 3rd crop	Already diversified
Number of farms	10.678	1.696	1.572	714	377	6.319
Eligible hectares/farm	40,66	28,48	38,04	66,41	59,12	40,57
Eligible hectares	465.123	53.364	64.255	50.551	23.466	273.487
-arable land	434.187	48.308	59.797	47.417	22.289	256.375

b) EFAs

8.130 Lombardy farms are obliged to devote at least 5% of eligible hectares (permanent crops and grassland excluded) to EFAs (table 6), that are 15% of total, including 43% of regional hectares eligible to direct payments and 56% of arable land.

	Degree of EFAs coverage				
	Totale Obbligo	Absence of EFAs	EFAs partial compliance	Complying at 5%	Complying at 7%
Number of farms	8.130	3.680	819	295	3.336
Eligible hectares/farm	53,02	46,37	70,64	64,52	55,02
Eligible hectares	431.075	170.642	57.856	19.032	183.545
Hectares subject to EFAs practice	412.049	160.822	55.713	18.442	177.071
Existing EFAs	40.416	0	1.328	1.112	37.976
EFAs obligation at 5%	20.602	8.041	2.786	922	8.854
New EFAs at 5%	9.499	8.041	1.458	0	0
EFAs 5% Nitrogen-fixing crops equiv.	13.569	11.487	2.082	0	0

45% of farms subject to EFAs have already enough hectares to fulfil the obligation (land left fallow, to short rotation coppice and to nitrogen-fixing crops) while 10% of farms subject does not have enough EFAs and in the remaining 45% of farms there are not hectares adapt to be devoted to ecological areas. According to our computation, if applying exactly 5% for EFAs, these should cover 20.602 hectares, while if using 7% the areas would increase to 28.843 hectares. By subtracting such areas from those in farms already complying with EFAs obligations, new actual ecological areas would be 9500 and 14000 hectares respectively. Finally assuming EFAs were covered of nitrogen-fixing crops (accounting for an 0,7 EFAs/NFC equivalence coefficient established by delegate Regulation) 13.569 hectares would be devoted to such crops, equal to 1,4% of Lombardy areas eligible to direct payments.

c) Effects in complex

As explained in the methodology paragraph, crop diversification and EFAs obligations impacts have been jointly estimated in terms of crop mix change using current arable land allocation as a baseline. Estimated crop mix changes (Table 7) are obtained applying greening adaptations algorithms to each farm previously grouped by obligations.

Table 7 - Estimated changes in arable land allocation among crops					
	TOTAL	Greening obligation		Changes	
		Current	Reg.1307	Hectares	Crop GM* (.000 €)
ARABLE LAND TOTAL	715.263	438.967	438.967	0	-9.208
NEW CROPS	0	0	3.422	3.422	2.784
CEREALS	450.038	310.411	290.181	-20.230	-21.121
Soft wheat	57.420	45.106	43.656	-1.450	-1.196
Durum wheat	18.933	16.215	15.417	-797	-647
Corn	234.294	198.767	182.184	-16.583	-17.802
Rice	106.656	24.465	23.680	-785	-1.112
Other cereals	32.736	25.859	25.244	-614	-364
PROTEIN CROPS	1.560	1.139	1.227	89	108
OIL CROPS	27.340	22.637	40.230	17.592	14.772
Rape and cole	4.618	4.074	3.875	-199	-101
Sunflower	1.050	793	765	-28	-15
Soy	21.526	17.638	35.466	17.828	14.894
Other oil seeds	146	133	124	-9	-6
OTHERIndustr. CROPS	8.792	7.093	6.867	-225	-313
VEGETABLES AND FLOWERS	19.402	16.436	15.873	-562	-4.396
NON PERMANENT GRASSLAND	201.124	77.914	77.577	-337	-838
Alfalfa	62.835	29.196	31.411	2.215	2.155
Other non-permanent grassland	19.329	7.757	7.761	3	3
Fodder corn	105.115	35.203	32.624	-2.580	-3.010
Other herbaceous forages	13.845	5.758	5.782	25	14
LANDS SET-ASIDE	6.775	3.338	3.589	252	-205
*GM= Gross Margin					

It is worth remembering that we have assumed perfect divisibility of land plots allocation among crops: as in reality that is not the case, true effects may be stronger and our computation could be underestimated, representing a minimum impact scenario. The table reports current and estimated arable land allocation in farms subject to greening.

Along with changes in crops allocation is computed the associated variation in farm gross margin. The latter calculation is based on elaborations based on RICA-INEA database. For each arable land crop have been computed a 2008-2012 average gross margin. In case of crops not contained in the database, cereals and oilseeds average gross margin has been used (813 euro/ hectare) and the same, negative value have been associated to lands currently lying fallow. Land use changes involve 26442 hectares, equal to 6% of arable land of farms interested and to 3,7 % of regional arable land.

These would represent little variations, smaller than those occurring each year for crop mix change choices. However bigger share of estimated variation would interest cereals, that would lose 20.000 hectares of which 16.500 covered in corn; also fodder corn would lose 2.600 hectares. Significant changes are expected for soy (17.800 hectares, + 83% than current area) and alfalfa (+ 2.200 hectares) while only little increases are estimated for protein crops. Areas devoted to new indefinite crops are 3.422 hectares. By multiplying such area by respective gross margin we have computed a loss in arable land gross margin of 9,2 millions of euros, equal to 1% of regional farm gross margin coming from such areas.

4.2 – Greening application in Lombardy: crop mix and income effects

Table 9 shows the outcomes derived from characteristics of farms subject to greening and interacted with farms partial adaptation behaviors adopted to comply with obligations. Data

are on farms and areas involved and on economic impact of greening, measured in terms of gross margin.

Table 9 - Estimated effects of greening practices in Lombardy - Income and production effects					
	Greening			Absolute differences	% Differ.
	Commission proposal	Parliament amendments	Regulation 1307		
Farms subject to crop diversification	20.086	12.778	10.678	-9.408	-47%
Eligible hectares in farms subject to crop diversification	647.028	589.473	465.123	-181.905	-28%
- of which hectares subject to crop diversification	596.714	544.516	434.187	-162.527	-27%
- of which hectares in non-complying farms	323.985	244.121	177.811	-146.173	-45%
Farm gross margin losses for crop diversification	-11.201.477	-7.135.079	-5.197.002	6.004.475	-54%
Farms subject to maintain permanent grassland (PG)	11.349	9.102	9.102	-2.247	-20%
Eligible hectares in Farms obliged to maintain PG	372.546	363.652	363.652	-8.894	-2%
- of which hectares under permanent grassland	221.831	215.065	215.065	-6.766	-3%
Farms subject to Ecological Focus Areas (EFAs)	28.246	14.904	8.130	-20.116	-71%
Eligible hectares in Farms subject to EFAs	818.859	685.199	431.075	-387.784	-47%
- of which eligible hectares subject to EFAs	731.187	639.236	412.049	-319.137	-44%
Hectares of EFAs	51.179	31.749	20.602	-30.576	-60%
- Of which currently used for crops	44.078	22.505	9.499	-34.579	-78%
Average farm gross margin per hectare under greening	1.520	1.285	1.285		
Farm gross margin losses on EFAs without crops	-66.994.256	-28.916.254	-12.204.588	54.789.668	-82%
Farm gross margin attainable from nitrogen-fixing crops	0	0	8.193.530		
Net farm gross margin loss caused by EFAs	-66.994.256	-28.916.254	-4.011.058	62.983.198	-94%
FARM GROSS MARGIN LOSS DUE TO GREENING	-78.195.733	-36.051.334	-9.208.060	68.987.673	-88%
FARM GROSS MARGIN LOSS / CROP PRODUCTS GROSS MARGIN (%)	-8,6%	-4,0%	-1,0%		

Greening rules modification (inclusion and exemption criteria) has reduced the number of farms involved. 20% of farms and 3% of hectares are subject to permanent pasture maintenance; such practice is relatively easy to comply with and does not cause income loss. As a consequence of change in greening rules number of farms obliged to crop diversification has fallen by 47% and eligible hectares by 28% with a notable decrease of hectares in non-complying farms; estimated income loss are about 5,2 millions of euros, 54% lower than those would be occurred with initial proposals.

Relaxation of greening rules have been particularly important in EFAs obligation: the reduction from 7% to 5% of areas and the increase of 15 arable land hectares threshold have reduced by 71% farms subject to EFAs and by 47% their eligible hectares. Arable hectares to be devoted to EFAs have been reduced from 44.000 to 9.500 and while the income loss caused by Commission proposal would had been of 67 million of euros its amount is now of 4 million, considering the possibility of using nitrogen-fixing crops on EFAs (not contemplated by Commission proposal). The effect of greening as a whole on Lombardy farm income appears, now, quite limited, equal to 9,2 million of euros that is 1% of gross margin from arable land in 2010. Such impacts would had been far higher if greening rules would had been based on Commission proposal: estimated farm income loss would had been higher than 78 million of euros, equal to 8,6% of gross income from Lombardy arable land. If Parliament amendments have limited such loss, they have been even more reduced in the final version to acceptable levels.

5. Concluding comments

The subdivision of CAP direct payments in different components has been criticized but has also

received many appreciations. The debate among both researchers and stakeholders has concentrated in particular on the “greening” component; the application of its three obligations has appeared too complex and costly for farmers while seeming not sufficient nor adequate to environmentalists. Main objections have been done on formulation of rules for governing crop diversification and EFAs. Limited or insignificant environmental benefits have been claimed for crop diversification (De Filippis, Frascarelli, 2012) as opposed to its rigidity in defining thresholds and shares and to the complexity in carrying out an effective compliance monitoring. The latter concerns are, in part, confirmed by the present research carried out on Lombardy farms that highlights, however, the improvements along the legislative process resulted in reduced adaptations required to farms to comply. Furthermore crop diversification brings not only agronomical and environmental benefits, but represents also an effective strategy to face risk associated to commodity price volatility. About the EFAs obligation, the more “environmental-friendly” among the three practices, has been pointed out that withdrawing a consistent share of arable land from may be seen as a reintroduction of set-aside, in force over the period 1993-2008 as a production control measure; however EFAs practice has been proposed in a world market context deeply changed that pushed to suspend setaside itself. In contrast to an increasing food demand worldwide the decision of the Commission to reduce by 5-6% arable land and, consequently agricultural production, has been criticized by many parts. Significant modifications to EFAs obligation during the legislative process, such as the exclusion of permanent crops - the increase of minimum threshold from 3 to 15 of eligible hectares and the possibility of using nitrogen-fixing crops – have remarkably reduced its negative impact both in production and in income terms. Also in this case our estimations confirm a limited impact of this practice on Lombardy farms. Modifications to greening implementation during the decision making process, even without warping its native characteristics, have deeply reduced its negative impacts. Beyond ethical considerations on commodity production reduction and on environmental impact that will probably derive from adopted greening rules, our estimated impacts in Lombardy are globally limited and relatively acceptable for farms, while they could had been far more relevant without the emendation of initial proposal. While greening component of direct payments to be received by Lombardy farms is about 135 million of euros per year over the period 2015-2020 (estimated values based on national implementation choices of partial payments convergence – so called Irish model – and on farm-level computed green payments) the application of Commission proposal would had imply a farm gross income loss equal to 58% of such component; on the other hand, such loss is estimated in 7% only of Lombardy greening budget under approved rules. It’s our opinion that, without deep pressures for changing Commission proposal, the greening would had been hardly criticized by farmers. In this view, taking into account that green payments are justified as a reward for public goods provision currently not remunerated, they should had been given to farmers in addition to direct payments (whose declared aim is income support); in actual facts such additional rewarding is missing and included in new first pillar payments that are lower than in the past, furthermore forcing farms to face an opportunity cost (income foregone) to receive the greening component. Under such conditions the application of Commission proposal rules would had been seen as unacceptable by beneficiaries. On the other hand, if greening rules, beyond their farm-constraining nature, will be able to push entrepreneurs to modify and adapt their established production practices, then the political objective of an increasing environmental compatibility of agricultural activities will be easier to reach. Some questions, calling for a deeper research, remain unanswered: can current greening practiced be modified and integrated in the future? What is the degree of rigidity of the operational application rules and what their adaptability to different European regions? To what extent the subdivision in components of direct payments will increase CAP implementation and its related



monitoring activities? Is the approved CAP reform adequate to face global challenges and fast changes calling for an answer by the agricultural sector?

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Price Transmission mechanism in local market for table grape in south-eastern Bari using fuzzy cognitive maps

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Abstract:

The paper aims to estimate potential impacts of compliance to CAP greening measures, in terms of crop mix, crop regional supply and income change, using 2010 Agricultural Census survey microdata on 54.333 Lombardy farms. Estimated impacts of greening practices as contained in Commission proposal, Parliament amendments and Reg. 1307/2013 are compared. Changes on greening during the EU decision-making process have notably reduced its negative impacts. Farms subject to greening would decrease from 59% to 33% while hectares fall from 95% to 72%. Crop diversification would impact significantly on 4.000 farms, while EFAs adoption will probably induce a crop mix change on 13.500 hectares only. The crop mix change would affect 30.000 arable land hectares, with an increase of nitrogen-fixing crops area (soy and alfalfa) to the detriment of cereals (con in particular). In farm income terms we estimate a gross margin loss of 9,2 millions of Euros, extremely lower than those estimated for greening Commission proposal (78 million of Euros).

keywords: Ecological Focus Areas (EFAs), Common Agricultural Policy, crop mix change, farm income

1. Introduction

Price fluctuations and unpredictability considerably hinder a firm's profits. Remarkably, fresh food markets are also affected by asymmetric price transmission along the value chain, from retail to producers and vice versa. Fresh table grape (TG) market is thus characterized by strong asymmetric price transmission: any change in TG price at farm level has no effect on consumer prices. Also a decrease in consumer and retail prices rebounds faster down to producers than a positive variation. Revealing market dynamics can help understanding price transfer and identifying those market agents more affected by asymmetry. According to Rapsomanikis (Rapsomanikis et al., 2006) the degree of price transmission can provide a broad valuation of markets' predictability, and how price signals pass-through consistently between different markets. Price transmission depends on a variegated set of factors, among the others are product homogeneity, differentiation and quality; border and domestic policies; market and bargaining power; logistic and transaction costs; market structure and supply chain integration. Literature provides several insights for example about the differences between horizontal and vertical price transmission (Frey and Manera, 2007). As for the food markets research mainly explained the effects of import prices on domestic prices (Aguiar and Santana, 2002), price transfers evaluation from farm to retail and vice versa (Campa and Goldberg, 2005; Ghosh and Rajan, 2007; von Braun, 2008). Most of these studies make use of quantitative econometric methods while few attempts the use of innovative analytical models. The following paper explores the price generation mechanisms in TG local market in Southeastern area of the province of Bari (SE-Bari; Southern Italy) to disclose asymmetric price transmission in one of the largest markets for TG worldwide. The paper is organized in four paragraphs. After introducing the adopted methods in the second paragraph,

results are presented in the third paragraph illustrating the Fuzzy Logic Cognitive Map (FCM) and the corresponding local market mechanisms, discussing the occurrence of three plausible scenarios for the short-run, and presenting the main boundaries of this research. Finally, conclusions are drawn in the fourth paragraph.

2. Methods.

This research adopts an empirical approach to investigate the factors affecting the local market for TG and the relationships between them. At the base of our study is an interest in exploring expert and locally based market knowledge on price generation dynamics. Local knowledge originates knowledge systems and it is typically drawn systematically from personal experiences or generational knowledge (Halbrendt et al., 2014) based on the operators' experience. First introduced by Craik (1943), today the notion of mental models and their use for understanding individual and group decision-making is a widely accepted construct in the social sciences (Jones et al., 2011; Gray et al., 2014). Mental models are the internal construct that provide interpretation and structure of an external environment and therefore help to investigate how individuals take decisions. Individuals build their internal representations along time and experience, modifying their understanding of the surrounding world, filtered by culture and influenced by environmental conditions and new experiences. Moving to agricultural decision-making processes, these are complex, and it has been suggested that decisions in this domain cannot be unilaterally explained solely from a scientific perspective (Soleri et al., 2000). To better understand the structural and functional aspects of our knowledge system, we collected a Fuzzy Logic Cognitive Map (FCM) from a group of stakeholders representing the local market for table grape (TG) in which they operate. "FCMs have been called simplified mathematical models of belief systems (Wei et al., 2008) and have been used to represent individual (Axelrod, 1976) and group (Özesmi and Özesmi, 2004) knowledge systems". Further, "Cognitive maps have been used in a number of disciplines to indicate relationships among the selected representative variables as well as to understand system dynamics" (Gray et al., 2012), but few times FCMs were adopted in economics.

Here we use the FCM method to develop a common representation of the concepts and causal relationships behind price formation in the local market system for TG, modeling how this system operates based on defined components and the causal links between them. Components can be quantifiable constructs (eg. profit) or abstract constructs (such as trust). The individuals participating in developing a FCM indicate the components that comprise the system in question (circles in fig. 1) and then draws causal relationships among the components weighting them with numbers between -1 and $+1$, indicating the amount of positive or negative influence one component has on another.

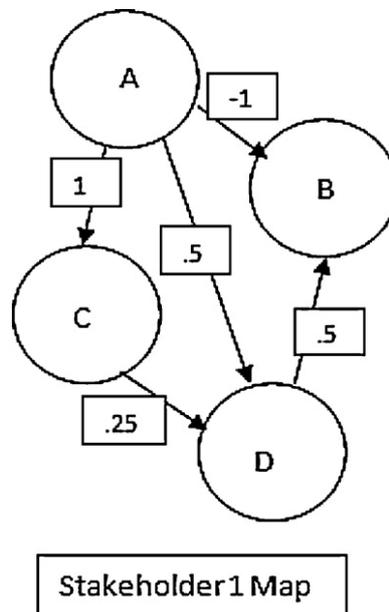


fig. 1 Example of FCM. (Gray et al. 2012). The numbers indicate the relationship's weights

As compared to other qualitative techniques the FCMs have a higher analytical power when applied to complex systems, since they allow to root the market operations strictly to the context. The added value of using FCMs compared to other qualitative techniques is well illustrated in van Vliet et al. (2010). The main assumption behind our model resides on the belief that individual decisions are bounded by incomplete information. It stems that the agents move mainly on a spot market, and they behave within a bounded rationality field, rooting their decision on personal experiences and expectations, unable to completely evaluate risks and opportunities as well to plan actions on a time frame longer than one season. Incomplete and asymmetric information flows are mainly due to: *i*) lack of cooperative behavior, vertical and, above all, horizontal integration especially among farmers; *ii*) low generalized level of human capital and uneven distribution among agents; *iii*) generalized distrust and segregating cultural identities; *iv*) hierarchy-like organization of the relational net behind the supply chain with supermarket chains and retail corporations (GDO) and traders on top; *v*) scarce propensity for change and innovation and low levels of experience out of the local context.

Using the FCMs helps to add information moving from the stakeholders' knowledge, assuming the common goal of surviving the market conditions over-imposed by the operators external to the local context. Prejudices, free riders, skepticism, suspicion, closure, are factors hostile to the achievement of common goals thus increasing uncertainty and asymmetric information. Noteworthy FCMs provide participants to get a complete and objective knowledge of the subject under investigation (Coban and Secme, 2005) helping them to build cooperative actions even among competing subjects. We used the collected information to make inference and to evaluate the effects of external disturbances or events affecting the component's weight so to compare the effects on the rest of the components. Scenarios were drawn by changing the weights of a set of components of our FCM on scale from -1 to +1, based on the researchers' belief, or following the indications from the stakeholders' panel.

In practice, the use of FCMs required:

- a) drawing the map and extracting the correspondent adjacency matrix;

- b) analyzing the structure of the FCM using *social network analysis*;
- c) simulating the effects of external disturbances or changes over a set of selected components.
- In order to draw the map concepts were extracted by individuals and condensed and modeled collectively using an aggregation technique. Concept were brain-stormed and then condensed, helping the group to create the model together (Cannon-Bowers and Salas 2001; Gray et al, 2014). Stakeholders were selected according to the role they cover. Once identified all the plausible types of stakeholders, the two leading farm consultants in the surveyed area provided help to draw a list of names. These names were called at the phone to participate in a brainstorming session, that finally resembled 8 people: a trader; two people from the management of the two largest local Producers' Organization (PO) for TG; one representative of a local producers' cooperative; one of the largest TG producers (see table 3); one of the largest producers that also trade TG (own and third party's TG); two leading consultants in TG production working locally and abroad; one specialist in product quality certification working locally and abroad.

Tab 1: TG specialized farms distribution in the province of Bari; year: 2010.

Economic size	nr. of farms	UAA	average UAA
0.01 – 1,999.9 €	51	18.6	0.37
2.000 – 3,999.9 €	219	124.2	0.57
4.000 – 7,999.9 €	541	517.7	0.96
8.000 – 14,999.9 €	631	1,062.6	1.68
15,000 – 24,999.9 €	476	1,341.7	2.82
25,000 – 49,999.9 €	498	2,395.6	4.81
50,000 – 99,999.99 €	208	1,957.3	9.41
100,000 – 249,999.99 €	106	2,050.5	19.34
250,000 – 499,999.99 €	15	638.5	42.57
over 500,000 €	8	678	84.75

source: our elaboration on National Census data, (ISTAT, 2010).

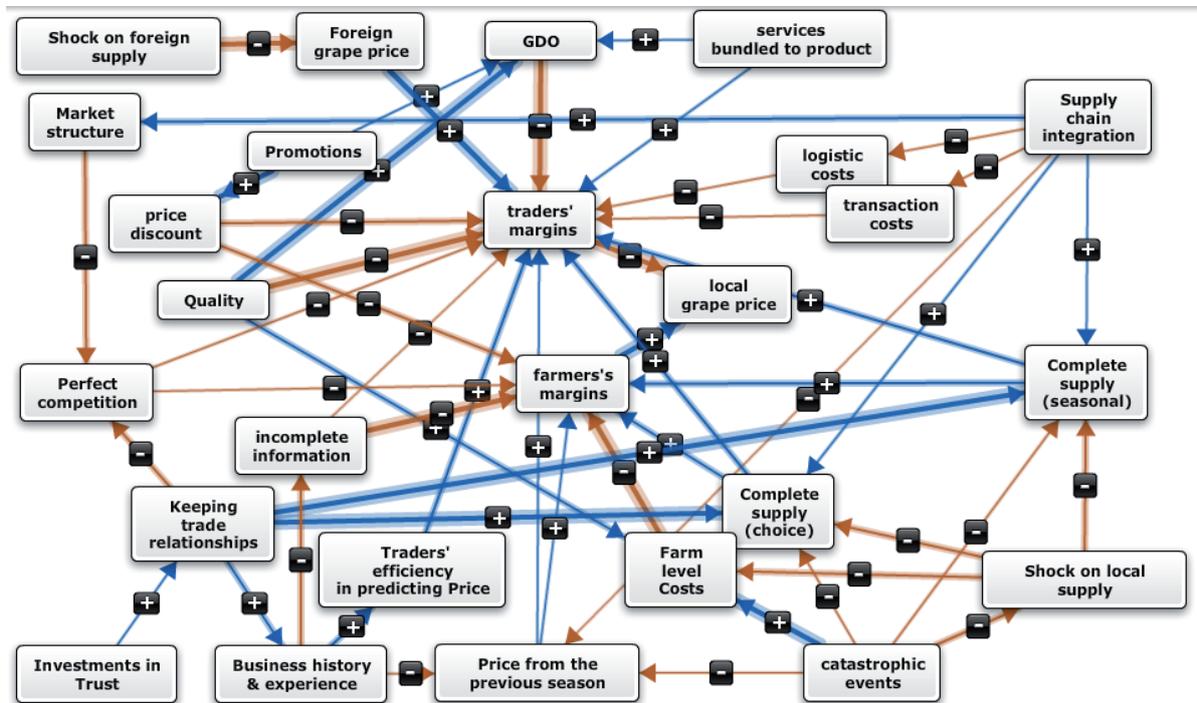
After this first meeting results were discussed and organized once again retrieving information including two more subjects: one representative from a third PO; one of the leading marketing expert for TG and fresh fruit in Italy. Two researchers followed the meetings. Before each meeting, the invited participants were provided with a document explaining the research objectives; they were trained at the phone and finally surveyed using a web tool. The survey was designed to grasp the participants' personal opinion about the TG market at the moment and in the very next future, which factors provide competitiveness and the personal perception about their use. These information were also used as a starting point for the brainstorming.

3 Results

3.1 The price generation mechanism in the local market for TG in South-Eastern Bari

The path along which TG price reaches its equilibrium in the local market of the South-Eastern area of Bari is determined by a variegated and interconnected set of factors. These factors can change their influencing power due to their interactions or because of the occurrence of shocks or events (mostly exogenous).

Fig. 2: the FCM for the TG price generation in South-Eastern Bari.



source: our elaboration.

Actually, the price originates in two different stages. Early before the harvesting season starts, the local operators interact maximizing their own utility: prices move similarly to a *word-of-mouth* model until a local prize is set. This first stage is the subject of our investigation. Once a local price is set, the external buyers (mainly from GDOs) start meeting the local agents (generally traders, most of times *price takers*) and closing contracts. The model is then organized in a central “spine” where GDOs, local traders and farmers’ profit margins are hierarchically connected to the local grape price (fig. 2). The GDOs exert a (negative) pressure to pay traders the lowest possible price thus reducing their margins; traders try to rise their profit using their bargaining power over the local farmers, while farmers push for higher prices. Around this main structure all the other components (tab. 2) find their place as indicated by the local stakeholders.

Tab. 2: Components of the FCM.

n.	Components
1	Quality of supply
2	Promotion schedules by GDOs
3	GDOs
4	Structure of the local market
5	Investments to rise trust
6	Presence of perfect competition
7	Price discounts practiced by traders or farmers
8	Incomplete information
9	Business history and experience

10	Price level from the previous season
11	Foreign TG price
12	Price of TG on the local market
13	Services added to product
14	Realization of supply chain integration strategies
15	Transaction costs
16	Farm level costs
17	Logistic costs
18	Shocks on the local supply
19	Shocks on the foreign supply
20	Occurrence of catastrophic events
21	Traders' profit margins
22	Farmers' profit margins
23	Traders' efficiency in predicting price/ expectations
24	Providing a complete supply along the whole season
25	Providing a complete supply of all grape varieties
26	Keeping trade relationships year by year

Incomplete information mainly affects farmers that play in almost perfect competition conditions, while traders can take some advantage of their position. This uneven distribution of perfect competition is mainly due to the market structure. Traders set their price planning their profits and based on price expectations that, in turn, stem from prices from the previous seasons, market knowledge and experience. Traders' competitiveness resides also in their ability in providing a complete supply that covers the main consumers' requests along the whole harvesting season. Consumers' demand for TG, in fact, is unspecific toward geographic origin and grape varieties (except for some niche markets), whereas a premium price is paid for seedless grapes, red grapes, and for earlier and late fresh products. Sometimes, this ability is mentioned to be the minimum requirement to access the GDO market. To achieve this goal traders need to keep trade relationships ongoing from one year to another investing in trust. Also, GDOs over-impose a schedule of promotions that corresponds to price discounts along the whole season. Quality is generally a standard required from GDOs for whose attainment the whole supply chain is involved, affecting both traders and farmers. Finally, services bundled to the product (eg. packaging) may lead to higher sales and profits. Farmers, traders, or both may condition the market by affecting its structure investing in supply chain integration strategies (horizontally, vertically or both). Strategies like these also provide chances to reduce logistic costs and transaction costs and ameliorate the ability in providing a complete supply. Finally, the local market may suffer of unpredicted events and shocks mainly represented by drastic changes in the foreign supply or the occurrence of catastrophic events, such as storms, hailstorm, phytopathological epidemics.

3.2 Descriptive statistics of the FCM for the TG local market in SE Bari

The above described system stems from an FCM made-up of 26 components (N; table 3) and 51 connections (C). Density and complexity values were calculated at map level whereas individual indexes were calculated following Graya et al. 2012, as $D = C/[N(N - 1)]$ since none of the components have a causal effect on itself. Computation was executed using the library lgraph ver. 0.7.1 within the statistical software R ver. 3.0.3. The low density indicates hierarchy

and then some components are perceived to have more influence than others (Özesmi and Özesmi, 2004). Next, centrality for the stakeholder group maps was calculated as the ratio of receiver variables to transmitter variables, where the more the receivers, the more complex a map is considered since it may lead to many possible system's outcomes. Conversely, a larger number of transmitters has been said to indicate thinking in more top-down manner.

Tab. 3: FCM's descriptive statistics.

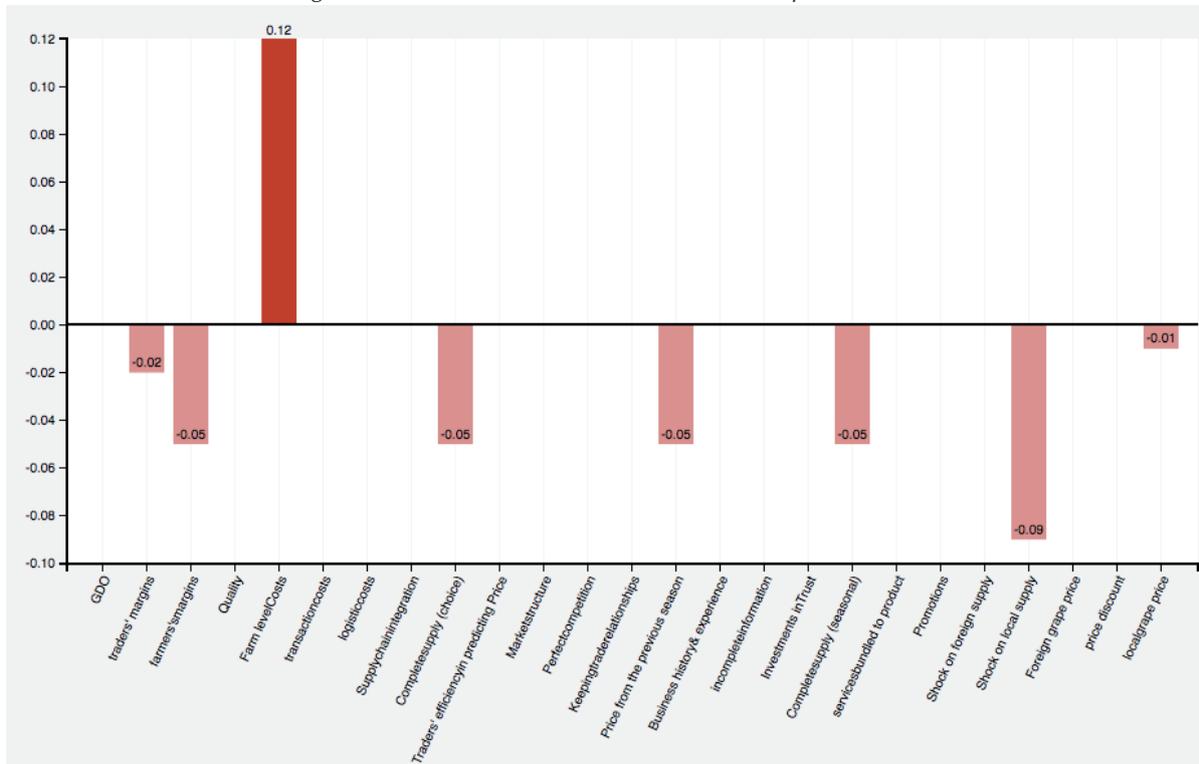
Indexes	Statistics	notes
Number of components (N)	26	
Number of transmitters (T)	25	
Number of receiver (R)	19	
Number of ordinary	8	
Number of connections (C)	51	
Graph density	0.078	The higher the density, the more potential management polices exist.
Centrality (C/N)	1.96	The lower the C/N score, the higher the degree of connectedness.
Complexity (R/T)	0.76	

source: our elaboration using Igraph.

3.3 Scenario Analyses

The FCM here represented was used to simulate three possible scenarios that could occur in the very next future. By changing the influence of one selected component, in fact, it is possible to estimate how the system might react to plausible changes. Results should be read comparing effects among component as opposed to absolute terms. Further, based on the outcomes of these scenarios, stakeholders can then develop hypothesized management plans for further evaluation (Gray at al. 2013). Scenario analyses were run using the MentalModeler software. The first scenario (fig. 3) shows how the occurrence of a catastrophic event increases drastically farm level costs, affecting the farmers' profit margins. By the transmission of the shock effect along the whole systems, even the traders would suffer although less than farmers.

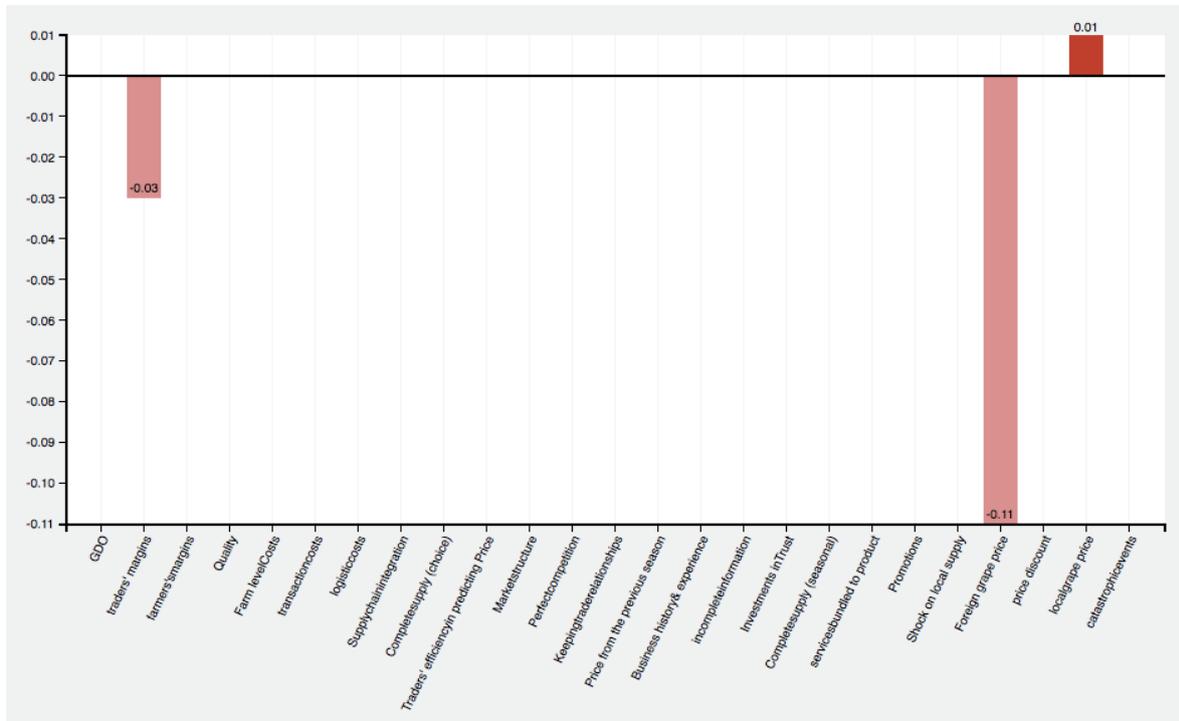
Fig. 3. Scenario 1: Occurrence of a catastrophic event.



source: our estimation; note: the y-axis expresses the distribution of the perturbation's effect.

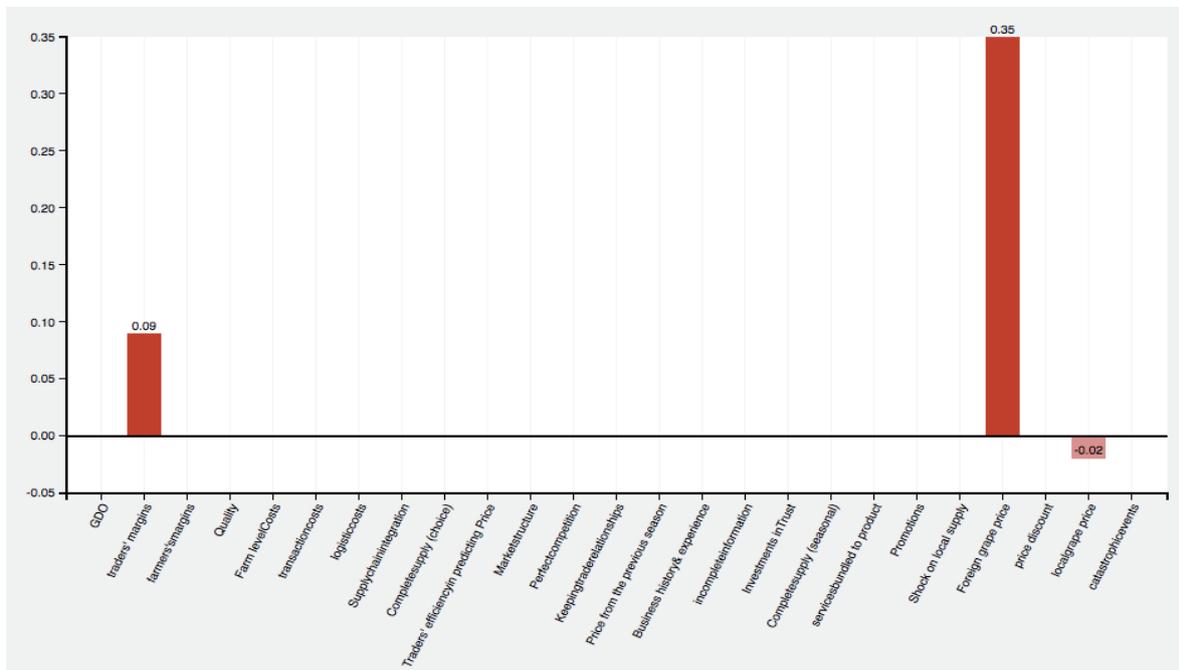
Subsequently, we simulated the variation of foreign supply of TG. Effects of the two variations are symmetric: in case of a positive variation (fig. 4) the only affected agents are traders while, although a small positive effect on the local price for TG, farmers do not gain any profit neither suffer any loss. Vice versa, negative variation in the foreign TG supply provides traders larger profits. It is noteworthy to underline as this positive effect is way larger than the loss due to larger foreign supply. These results show as traders take a fair amount of risk in this first stage of the price generation mechanism, risk subsequently charged over farmers once prices from GDOs are known in the second stage of the market.

Fig. 4. Scenario 2_a: positive variation in the foreign supply of TG.



source: our estimation.

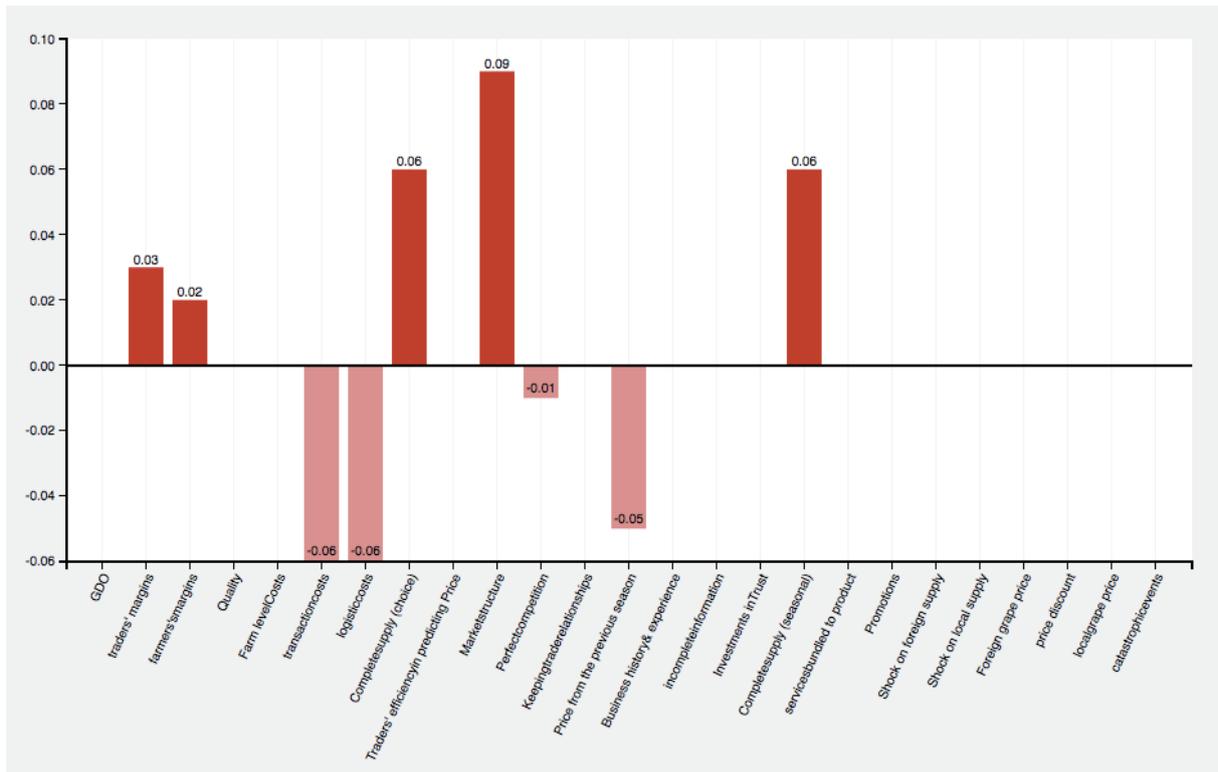
Fig. 5: Scenario 2_b: negative variation in the foreign supply of TG.



source: our estimation.

Finally, the third scenario shows the effects of pursuing supply chain integration strategies. Again, according to the local agents' shared knowledge, traders benefit more than farmers. Local TG price would not be affected at all.

Fig. 6: Scenario 3: realization of supply chain integration strategies.



source: our estimation.

3.4 Boundaries of the proposed model

As previously explained no information about the mechanism determining the TG price on the GDOs' shelves is provided. It still remains unclear how GDO behaves, if it is a pure *price maker* establishing *spot* or seasonal contracts, or if it builds formal or informal agreements with the local agents thus intervening also in the first stage of the price generation mechanism. Our model do not explore GDO's profit margin generation neither it explores the fresh markets, farmers' markets, ore wholesale trading centers for fresh products markets that, although less representative than GDO, still cover a considerable market share. Finally, further research should explore the role of other agents such as breeders' companies that seem to partially condition the market. Breeders, in fact, may establish royalties on the traded volumes of the grape varieties they own, or they even may bargain with GDOs to induce a demand for their registered products.

4. Conclusions

The use of FCM helps representing knowledge systems behind local market organizations. FCMs, then, can be used to explain price generation mechanisms helping to disclose market dynamics that otherwise, especially in market hierarchically structured, horizontally disaggregated and featured by asymmetric bargaining power and information flows, would hinder any

form of intervention and change. Applying FCMs to the local SE-Bari market for TG to simulate the effects of the most plausible short-run scenarios in its first stage of price generating mechanism, showed as traders and farmers are both affected by exogenous or endogenous shocks. Nonetheless, the distribution of the effects is unevenly distributed between these two agents. In fact, catastrophic events affect mostly farmers especially if compared to the resulting fall in local prices for TG. Farmers are not affected by increasing foreign supply variation in this first stage of the market, neither they take advantage of the resulting rise in local prices, while traders results to be risk-takers since they lose a share of their profit. Nonetheless, traders may gain the most from lower foreign supply. Supply integration has no effect on the end-price since the local price generation process distributes effects only between farmers' and traders' margins of profit, with traders considerably favored. Finally, the practice of using FCM method considerably helped local stakeholders to share knowledge pointing towards value generation strategies along a cooperative path. Further analysis should include stakeholders from the GDO that invokes working deeper to manage the typical problems related to the management of groups.

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Survival strategies of mountain dairy farmers: the case study of local milk production system in the Mugello area

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Abstract

The mountain areas experienced an important loss in the number of active farms due to their natural disadvantage, with relevant negative environmental and social effects. This paper aims at investigating the required development strategies of the Mugello milk production system. Different source of qualitative and quantitative data such as the 2010 Agricultural Census, the ARTEA database and narrative interviews with local producers and stakeholders are used. Through the methodological approach of Grounded theory different styles of farming related to the concepts of multifunctional diversification and propensity to invest by means of Multicriteria Analysis are defined. Results show the coexistence of conventional and alternative food supply systems within the local production system. However other factors need to be identified to recognize an additional price premium to the Mugello milk and guarantee the survival of dairy farms.

JEL classification: Q01, Q13, Q18.

Keywords:

Food supply chain, local production system, dairy farms, mountain areas, qualitative analysis.

1. Introduction

In the last decade the agricultural sector has experienced a strong structural change. A decline in number of farms and a steady increase in average farm size is an unquestionable trend (Breustedt and Glauben 2007). In particular, the mountain areas which are characterized by a high share of permanent grassland and small scale farming have experienced an important loss in the number of active farms, due to their physical and structural disadvantages, with relevant negative environmental and social effects (Pinter and Kirner, 2013, Zimmermann and Heckeley, 2012, Du Puis and Block 2008).

In addition in the dairy sector farmers are abandoning their activities as they increasingly face a cost/prize squeeze and an unfavorable market position. At the farm level, to tackle this cost-price squeeze cattle farmers can either reduce the production costs in the framework of the economy of scale strategy or pursue a «rural development strategy». According to Van der Ploeg et al (2012) a «rural development strategy» is organized around three processes: a) *deepening* agricultural production by focusing on product quality valorization along the food supply or by re-internalizing processing and distribution within the farm; b) *broadening* the farms functions by exploiting entrepreneurial activities in a rural context wider than strictly agricultural (rural tourism, landscape management, therapy farms, and c) *re-grounding* the farm processes that involves self-provisioning, that is reduction of dependence on external resources and increased emphasis on internally resources. These processes drive the farm to a «multifunctional diversification» (Renting et al, 2009).

At the farm level, rural development strategies are strictly connected to the entrepreneurial capacity of the farmers which can be investigated by exploring the farm-holder attitude to invest-

ment, his management practices, the marketing channels. At meso level a key element of rural development strategies aiming at responding to the *cost-price squeeze*, is that they are unfolding through the construction of new “nested markets”, defined as “places where specific transactions take place between specific suppliers and specific consumers” (Van der Ploeg, 2012). In contrast with the still dominant anonymous mass food markets, nested markets are the result of a process of re-territorialisation of food and farming regimes relying on the notions of ‘quality’, ‘place’ and ‘nature’. The construction of nested markets is driven by a collective action involving all the stakeholders of the local production system.

This paper aims at investigating structural dynamics in the dairy sector in Mugello (a small mountainous area of Italy located in the north of Tuscany) and the strategies at farm and collective level to improve the competitiveness of the dairy local system in front of the agricultural decline and the cost-price squeeze.

The Mugello farming system is characterized by the presence of dairy and cattle livestock farms higher than the regional average. The animal husbandry showed a decline in the number of farms (-20% over the last ten years), associated to a lower loss of utilized agricultural area (-12%). In the 9 municipalities of Mugello, there are 45 dairy farms that are now active, many of them (27 farms) sell all their milk to a regional processing firm located in the town of Firenze. This firm, controlled by some Tuscan Municipalities external to Mugello, was created in 50s with the goal of ensuring access to fresh milk to the population of the city of Florence.

The paper is structured as follows: section 2 presents the methodology, section 3 presents the main findings and section 4 concludes.

2. Methodology

Both qualitative and quantitative methods are adopted to collect and analyze data.

As a first step the 2010 Agricultural Census microdata of the farms operating in Mugello were analyzed in order to have an overall picture of the farms operating in the area. The analysis allows to detect the main structural data of farms (such as the UAA, the total agricultural area, the standard output) and socio-economic information on the households (such as the age of the farm operator, his education, the number of family members working in the farm). Afterwards, interviews with 27 dairy farms selling their milk to the regional processing firm and with other local stakeholders (farmers associations, municipalities and other collective actors) were conducted in the last quarter of 2013. The surveys touched upon several issues, such as farm revenues and costs, current production activities, investments, future perceptions of farming activities and dairy livestock. These data were crossed with data on the access of firms to the CAP measures, both Direct payments (1st CAP Pillar) and Rural Development financial supports (2nd CAP Pillar).

Through the methodological approach of Grounded theory – an inductive method of analysis aiming at generating theories from empirical data (Charmaz, 2006) – and by means of a triangulation process (Olsen, 2004) all the qualitative data have been reshaped and codified. Then farms have been classified by means of the Analytic Hierarchy Process (AHP), a multicriteria technique based on three main steps: a) hierarchical decomposition of the selected issue; b) pairwise comparison c) validation d) hierarchical composition (Saaty, 2004). Different farm styles have been identified on the basis of the concepts of *multifunctional diversification* and *propensity to invest*. The *propensity to invest* has been conceptualized in a continuum that goes from *immobility* to *dynamicity*. Similarly the other criterion goes from *high specialization* to *high diversification*.

Then through a pairwise comparison farms have been evaluated by researchers according to these criteria and this evaluation is converted in a score within a specific range. As result n

matrices related to n criteria have been created, where each firm is located both on rows and columns and is compared to all the others. Finally scores are summed and the classification is made. More specifically, in our study two different 27×27 squared and symmetric matrices are generated. The classification has been done following these questions: 1) Is farm i on the row more multifunctional than farm j on the column?; 2) Is farm i on the row own more propensity to invest than farm j on the column?. In both cases the score are the following: yes=1, no=0, equal=0.5. Once the classification has been made four different farm styles related to structural and economic variables are identified (see figure 1).

3. Results

The analysis of the 2010 Agricultural Census microdata allowed to define the characteristics of the sample with respect to the universe of the farms operating in Mugello. The 27 dairy farms are characterized by higher Utilized Agricultural Area (UAA) (56,63 ha) and total area (75,46 ha) if compared to the farms specialized in livestock and to all the farms operating in the Mugello area (table 1). Similarly the standard output shows high values even if standardized by the UAA the livestock and the labor unit.

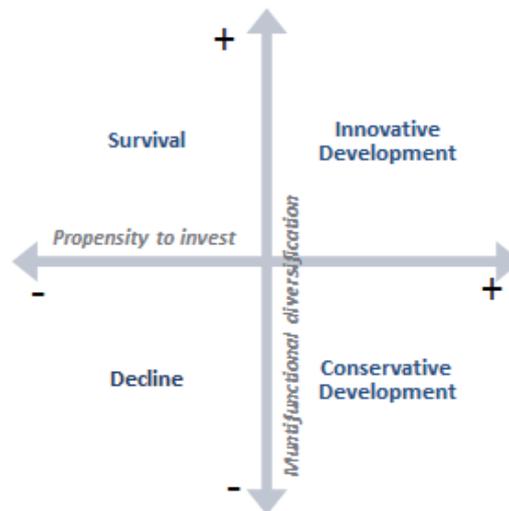
Table 1. Comparison between the dairy cattle farms and all the farms operating in Mugello

	Dairy cattle farms (27 obs.)	Farms specialized in livestock (250 obs.)	All farms (1462 obs.)
UAA	56,63	29,73	18,66
Total area	75,46	51,68	42,31
Standard Output / UAA	2.900	3.091	2.500
Standard Output / livestock units	2.499	1.768	701
Standard Output / labor units	54.077	42.074	70.247

Source: our processing on Italian Census data, 2010

The farms included in the sample supply the milk to the regional dairy factory which has launched a re-localization strategy, based on both product quality and origin labelling. Mugello milk is sold as “high quality fresh milk” (according to Italian law) branded as “Latte Mugello” in order to recall the territorial identity of the product. Indeed, the Mugello area enjoys a good reputation among Tuscan people, due to its environmental characteristics. The Mugello milk get a premium price compared to other fresh milk: in 2012 on average the price of Mugello milk was approximately 1.62 €/liter, compared to € 1.50 of the “generic” milk of the same regional dairy factor, and to 1.05 €/liter of milk sold with a supermarket chains private labels. The analysis highlights two main positive effects of that valorization system: a long-term supply agreement between farmers and the regional dairy factory and a premium price for the farmers who allows them to partly compensate their higher production costs. A new nested market has been created.

Figure 1. Farm's styles according to the propensity to invest and diversification



Source: own elaboration

Despite this fact, many dairy farms are in crisis and are not able to fulfill the requests imposed by the local production system. Following the methodology depicted in section 2 four different farm styles are identified: *Decline*, *Survival*, *Conservative Development* and *Innovative Development* (figure 1) where the x axis represents the propensity to invest whilst the y axis represent the multifunctional diversification.

The *Decline* farm style includes 8 small farms with old farmers inclined to keep the focus on traditional milk production as they are not willing to invest in new technology or develop new activities, hence in the long run they are likely to exit (also due to lacking of generational change). The *Survival* farm style includes 10 small farms trying to enlarge the scope of their activities towards crops typical of the area (einkorn, chestnuts) and to meat production, and in some cases developing simple forms of direct sales or agri-tourism, but with a low amount of investments (also in the milk production).

The last two farm styles include farms with higher level of investments. The difference between these two styles stems from the production focus of the farm operator: the milk production (*Conservative development*) and the multifunctional diversification (*Innovative development*). The first style aims to increase the economy of scale related to the milk production. The latter try to invest in different activities beyond the agricultural production, such as agri-tourism, direct sales and renewable energy production.

Table 2. Farms, UUA, head of cattle and working days according to the farm's style: average values per farm

Farm's style					
	decline	survival	conservative development	innovative development	total
farms (n.)	8	10	4	5	27
UUA total	393,75	361,29	352,24	505,67	1.612,95
UUA mean	49,22	36,13	88,06	101,13	59,74
heads of dairy cow (mean)	26,38	29,80	131,25	153,40	66,70
head of cattle (mean)	48,38	45,40	260,25	304,80	126,15
working days (mean)	557,75	480,70	1.516,75	2.157,60	967,56

Source: own elaboration on 2010 census data

Table 3. Receipts, cost and investments according to the farm's style: average values per farm

	Decline	Survival	Conservative development	Innovative development
Receipts/UAA	2.338	1.790	8.416	6.625
Costs/UAA	1.715	1.948	6.609	4.706
Investments/UAA	98	713	1.058	874

Source: direct survey

These four farm styles can be characterized in order to illustrate their key points (tables 2 and 3). As expected, farms included in the *Decline* and *Survival* register the lower values whilst the farms included in the *Innovative* and *Conservative development* show the highest values. Table 4 shows that farms included in the *Conservative development* account for 94% of their receipts from the milk production, whilst this percentage is lower for the *Survival* farm style.

This percentage for the *Innovative development* is not much lower than for the *Conservative development*. The propensity of *Innovative development* to diversify and the related investments has not yet led to a corresponding level of receipts. This raises the question about the actual economic viability of this strategy.

Table 4. Type of receipts according to farm's style

	Decline	Survival	Conservative development	Innovative development
Milk receipts (€)	558.121	397.340	2.351.167	2.101.851
% milk receipts	88%	70%	94%	91%
Total receipts (€)	637.209	568.583	2.508.470	2.289.286

Source: direct survey

Regarding the future perspectives of milk production, according to qualitative interviews we registered a relevant divergence among the 4 styles in the Mugello area. Actually according to the farms located in the *Decline* style the milk production is likely to die in the Mugello area due to the high production costs and to the lack of young people working in the farms, whilst the farms included in the *Innovative development* style argue that the future of the milk sector is related to the farm's diversification (despite their strong economic dependence on milk). According to these latter groups, in order to maintain its competitiveness the farms should realize small quantity of a niche product (milk) associated to a wider range of activities such as, for example, the inclusion of agri-tourism, direct sales, the production of energy from renewable sources. The role of the Common Agricultural Policy can be decisive for the sustainability of the Mugello milk production system both thanks to Direct payments (1st CAP Pillar) and to financial supports to adaptation and conversion paths at firm level in Rural development policy (RDP, 2nd CAP Pillar). Comparing the amount of CAP payments received by farms of each style we note that the higher payments have been received by farms included in the *Conservative* and *Innovative development* styles with respectively 706 and 650 €/hectare of Direct payments and 382 and 430 €/hectare on the RDP payments per year (table 5). CAP payments benefit primarily firms pursuing *Conservative development* also in relative terms, both per head of cattle and as incidence on the standard output.

Finally, we have analyzed the distribution of the RDP payments between axis 1 and axis 2 in 2007-2012 (Figure 2) using an *index numbers* calculated for each specific indicator as the ratio between the value of each farms style and the corresponding maximum value.

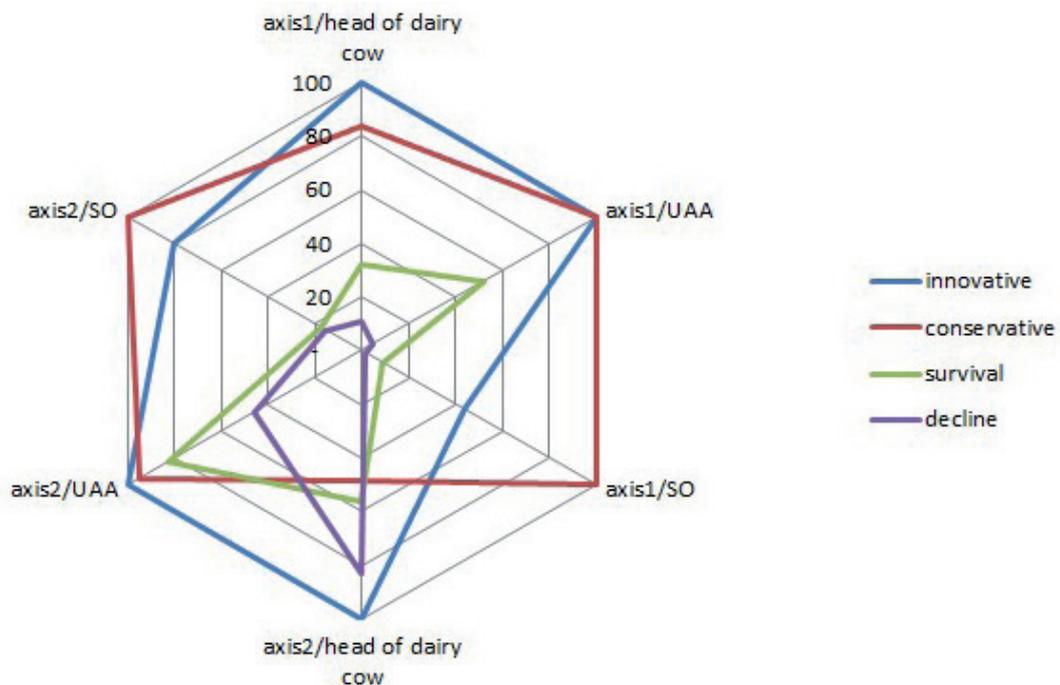
The *Innovative development* and *Conservative development* farm styles collect the majority of payments from axis 2 which is associated to diversification and agri-environmental schemes, but also from axis 1 to increase the economies of scale. However the *Conservative development* seems to be more dependent on the RDP payments. *Decline* and *Survival* farms are more oriented to axis 2 payments, however this dependence is much lower if compared to the other farm styles. A deeper analysis may indicate whether the public payments represent the cause or the effect of the entrepreneurship attitude of the farm operator, and which are the causes of smaller farms difficult access to incentives (especially Regional Rural Development Plan).

Table 5.- Average Direct payments and RDP Payments according to the farm's style (euros)

	Decline	Survival	Conservative development	Innovative development Average
Direct payments	3.461	2.357	28.844	43.822
Direct payments/ UAA	218	432	706	650
Direct payments/ Standard Output	0,09	0,11	0,69	0,23
Average RDP pay- ments	3.461	2.358	26.843	43.822
RDP payments/ UAA	73	240	382	430
RDP payments/ Standard Output	0,03	0,05	0,47	0,28

Source: elaboration on ARTEA data

Figure 2. RDP payments of the different farms styles (index numbers)



Source: elaboration on ARTEA data

4. Conclusions

The dairy production in Mugello plays many different positive roles, both in socio-economic and in environmental terms, but the production system is now menaced by both internal and external factors. At the internal level aging of farmers, lack of generational change and the small size of holdings are the main critical pressures to the pursue of milk husbandry in many farms. Our results show that the milk supply chain of Mugello is characterized by the existence of different styles of farming: next to some farms with no prospects of survival, we found farms focused to increase the economy of scale stemming from the milk production with efficient technologies, and farms aiming to put in place a multifunctional agriculture which associate the production of niche products to other activities such as agri-tourism. Hence, within the milk supply chain of Mugello the conventional and the alternative food supply systems coexist (Ilbery and Maye 2005).

The price premium paid by the regional dairy firm to Mugello farmers, thanks to the label as “Mugello milk”, helped for long time the survival of milk production in the area, but it is now menaced by the increasing competitive pressure in the consumption market. Today the reference to the territorial origin of the milk is no longer sufficient to guarantee a competitive advantage by itself, but it is needed to identify other factors in order to motivate the consumer to pay a price premium to the Mugello milk. For this reason, the regional dairy firm is developing a “territorial quality protocol” initiative, which will engage farmers to improve their social and environmental sustainability performance in order to guarantee consumers about the overall quality of the Mugello milk.

On the other side, the regional dairy firm created a “Mugello milk route”, that is an itinerary inside the Mugello area along which tourists can visit the dairy farms and possibly enjoy hospitality services. In this way the image of Latte Mugello milk increases, and firms are supported in their efforts towards multifunctional diversification.

These initiatives require innovation and investment by farmers, but many of these farms do not show these capabilities. It is clear that the milk qualification strategy may lead to a further productive re-organization of farms within the supply chain. This calls into question the role of public policy that should take appropriate actions of support in view of the positive effects that sustainable dairy farms can have in the mountainous area of Mugello.

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Analysis of the consumptions of functional foods in the main countries of the European Union

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Abstract:

In last decade, numerous studies of literature have shown that there has been a considerable change in the field of food production. The attention of consumers is directed to the qualitative aspects of food related not only to their nutritional properties but also to the health. There is much awareness in the consumer about relationships between food and reduction of diseases risk, the demand is oriented towards a particular food category can generate a contribution to the state of health. This trend has encouraged the food industry to the development and marketing of great number of food products, are the “functional foods” in which on the label are reported: health and functional claims.

The objective of this work is to analyze the market size of functional food, in the last period (2008-2013), belonging to the category “Health and Wellness” in the main European countries: Italy, France, Spain, Germany and United Kingdom.

Keywords: Functional foods, market size, Health and Wellness, consumptions

Introduction

In last decade, numerous studies of literature have shown that there has been a considerable change in the field of food production. The attention of consumers is directed to the qualitative aspects of food related not only to their nutritional properties but also to the health properties (Bonina, 2008; Annunziata *et al.*, 2010).

Foods are not intended only to provide necessary nutritional compounds but also to prevent some food-related diseases and improve physical and mental wellbeing (Menrad, 2003; Robertfroid 2000).

The demand is oriented towards a particular food category able to generate a contribution to the state of health because there is more consciousness in the consumer about relationships between food and reduction of diseases risk. (Mollet, Rowland, 2002).

This trend has encouraged the food industry to develop and commercialize a great number of food products, some of which are named “functional foods” such as reported on the label: health and functional claims (Katan, De Roos, 2004).

In 1999 firstly, was introduced the definition of functional food in the British Journal of Nutrition (Diplock *et al.*, 1999), in the document “*Consensus Document on Scientific Concepts of Functional Foods in Europe.*”

According to this document “A food can be regarded ‘functional’ if it is satisfactorily demonstrated to effect beneficially one or more target functions in the body, beyond adequate nutritional effects, in a way that is relevant to either an improved state of health and well-being and/ or reduction of risk of disease. Functional foods must remain foods and they must demonstrate their effects in amounts that can normally be expected to be consumed in the diet: they are not pills or capsules, but part of a normal food patten”.

A functional food can be a natural food, a food to which a component has been added, or a food from which a component has been removed by technological or biotechnological means.

It can also be a food where the nature of one or more components has been modified, or a food in which the bioavailability of one or more components has been modified, or any combination of these possibilities. (Diplock *et al.*, 1999; Ashwell, 2003; Doyon M., Labrecque, 2008).

The European Commission's proposal and adoption the Regulation (EC) No 1924/2006, concerning the use of nutrition and health claims made on foods, try to ensure that the information on food labels are clear and substantiated by scientific evidence in order to protect the health of consumers.

The incidence of diseases, called "diseases of affluence" (obesity, diabetes, hypertension, cardiovascular disease, etc..), originated from a bad lifestyle and diet, combined with the increasing costs of healthcare, is one of the important reason that influence to buy functional foods (Hilliam, 1998; Sirò *et al.*, 2008; Bonanno, 2012).

The evolution of demand, although heterogeneous, has encouraged producers to offer and differentiate food products which could belong to this segment. The heterogeneity of demand depends, in fact, not only regional differences, socio-demographic characteristics, eating habits, but also by the various national policies for the promotion of public health. (Castellini *et al.*, 2002, van Trijp *et al.*, 2007; Annunziata, Vecchio, 2011).

For food industry is very important the analysis of the functional food market, paying attention to the influence of social variables, cultural and economic buying these products.

The objective of this work is to analyse the market size of functional food, in the last period (2008-2013), belonging to the category "Health and Wellness" in the main European countries. The analysis was conducted using data available from Euromonitor data, for the 5 European countries such as: Italy, France, Spain, Germany and United Kingdom. These countries are selected on high demographic rate. The Eurostat data revealed that population in these European countries is 63% compared with total european population (Eurostat, 2013).

This paper presents the results of a research project funded by Sicilian Region¹, which aims to carry out a part of the economic assessments of production processes involving the production of food supplements and nutraceuticals.

Data acquisition methods

The Regulation (EC) No 1924/2006 on nutrition and health claims made on food products, has laid the foundations for a correct statement of the health claims on the label.

Besides the protection of human health, the aim is also the proper functioning of the internal market, a guarantee of fair competition in the sector of food products, the promotion and protection of innovation in the field of food products.

European legislation concerning health claim recognizes the European Food Safety Authority (EFSA) as authority that checks and verifies the reliability of the statements about health benefits of functional foods, before placing it on the market.

European Food Safety Authority guarantees the scientific validity of health claims; those authorized health claims are listed on the *EU Register of nutrition and health claims made on foods* periodically updated by the European Commission. (<http://ec.europa.eu/nuhclaims/>).

However, not being universal definition of "functional food and beverages", because all types of food and beverages are functional in the most basic sense that they help the body to function, many types of foods that may belong to this category of products are subject to separate regulations.

1. European Regional Development Fund (ERDF) (2007-2013). Measure 4.1.1.1 of Operational Programme of Sicily Region, Research project: ALIFUIDEA.

Regulation list
Regulation (EC) No 1924/2006 on nutrition and health claims made on foods
Regulation (EC) No 1925/2006 on the addition of vitamins and minerals and of certain other substances to foods
Regulation (EU) No 1169/2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006
Regulation (EU) No 1047/2012 amending Regulation (EC) No 1924/2006 with regard to the list of nutrition claim
Regulation (EU) No 1018/2013 amending Regulation (EU) No 432/2012 establishing a list of permitted health claims made on foods other than those referring to the reduction of disease risk and to children’s development and health

The analysis of the consumption of functional foods has been conducted through the acquisition of data from Euromonitor, which has classified functional foods belonging to the category “health and wellness” as shown in Figure 1.

Figure 1 – Classification Euromonitor of food belonging to the category “Health and Wellness”



According to the above classification “Fortified/Functional” are products in which health ingredients have been added. Fortified/functional food and beverages provide health benefits beyond their nutritional value and/or the level of added ingredients wouldn’t normally be found in that product. To merit inclusion in this category, the defining criterion here is that the product must have been actively fortified/enhanced during production.

Results

In the last six years, the market size of functional foods had recorded in the main countries of the European Union a growing trend of evolution in quantitative terms, except the United Kingdom, which however, has remained basically unchanged (Table 1).

Spain is the country with a greater increase of its market size, in quantitative terms, from 11,128.30 to 12,008.20 thousand tonnes. Italy follows with an increase of 7%, the France and Germany respectively, with 6%.

In absolute terms, in 2013, Germany is the country that has the highest market size, followed in order by France (14,450.80 thousand tonnes), Italy (13,209.90 thousand tonnes), Spain (12,008.20 thousand tonnes) and United Kingdom (11,451.80 thousand tonnes).

In terms of value (constant value 2013), (the evolution/increasing) it changes second the products price variation. In fact, France, Germany and United Kingdom show a stable trend between 2008 and 2013, while in the same period, Italy has a drop of 3% from € 13,878.10 to € 13,456.00 million euro, the market size of Spain decreases by 8%, from € 13,830,00 to 12,738,60 million of euro. (Table 2).

Table 1 - Trend of market size in terms of quantity of functional foods in EU countries selected

Country	2008 000 t	2009 000 t	2010 000 t	2011 000 t	2012 000 t	2013 000 t
France	13,598.40 100	13,675.20 101	13,890.60 102	14,056.20 103	14,280.90 105	14,450.80 106
Germany	16,745.10 100	16,989.00 101	17,082.10 102	17,590.50 105	17,658.90 105	17,783.00 106
Italy	12,361.10 100	12,600.20 102	12,756.70 103	12,934.70 105	13,083.10 106	13,209.90 107
Spain	11,128.30 100	11,228.50 101	11,401.00 102	11,662.60 105	11,853.10 107	12,008.20 108
United Kingdom	11,289.00 100	11,204.10 99	11,350.80 101	11,357.50 101	11,367.60 101	11,451.80 101

(Source: Euromonitor).

Table 2 - Trend of market size in terms of value of functional foods in EU countries selected

Country	2008 mln €	2009 mln €	2010 mln €	2011 mln €	2012 mln €	2013 mln €
France	17,667.60 100	17,951.00 102	17,908.40 101	18,069.90 102	18,033.10 102	18,036.00 102
Germany	21,437.70 100	21,701.70 101	21,856.00 102	22,125.00 103	22,003.10 103	21,960.60 102
Italy	13,878.10 100	13,919.10 100	13,873.50 100	13,878.10 100	13,650.60 98	13,456.00 97
Spain	13,830.00 100	13,534.80 98	13,200.50 95	12,905.20 93	12,807.20 93	12,738.60 92
United Kingdom	23,548.30 100	23,642.20 100	23,661.50 100	23,342.70 99	23,565.50 100	24,010.00 102

(Source: Euromonitor).

Contrary to quantitative terms reported, United Kingdom is the country that has a significant increasing in terms of value. This country is characterized by an increase of 2% between 2008 and 2013 for a value of 24,010.00 million euro.

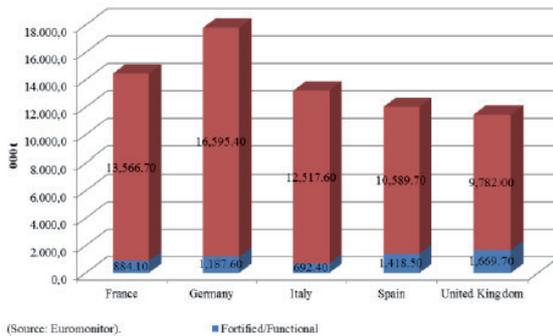
Probably the high values depend to higher unit prices of this country compared to others, such as Spain and Italy in particular.

The trend reported in the various countries selected, in this period, highlights the steady decline in unit prices due to increased competition and the economic crisis of recent years which has seen a decline in the level of consumption in general and the production of private label goods. According to the analysis on the "Fortified/Functional" belonging to the category "Health and Wellness", there is a blockage of the rates that do not exceed 15% of total foods.

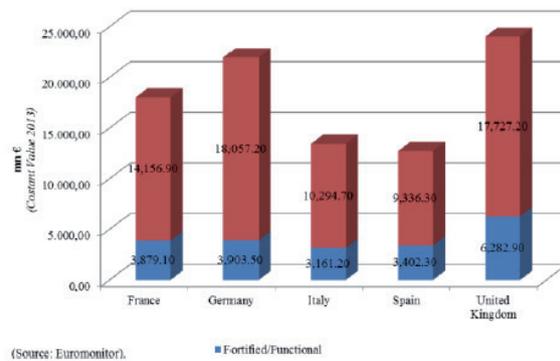
In practice, France with market size of 14,450.00 thousand tonnes of food, "Fortified/Functional" amount of 884.10 thousand tonnes, in Germany the "Fortified/Functional" have a market size of 1,187.60 thousand tonnes, in Italy the FF amount of 692.40000 tonnes, 1,418.50 thousand tonnes in Spain and in United Kingdom 1,669.70 thousand tonnes (Graph 1).

In terms of value (constant value 2013), the analysis of data in Graph 2 highlights the increased importance of "Fortified / Functional" due to the promotion of these products in selling on the market.

Graph 1 - Market size of food typology the "Health and Wellness" by Type (2013)



Graph 2 - Market size of the "Health and Wellness" by Type (2013)



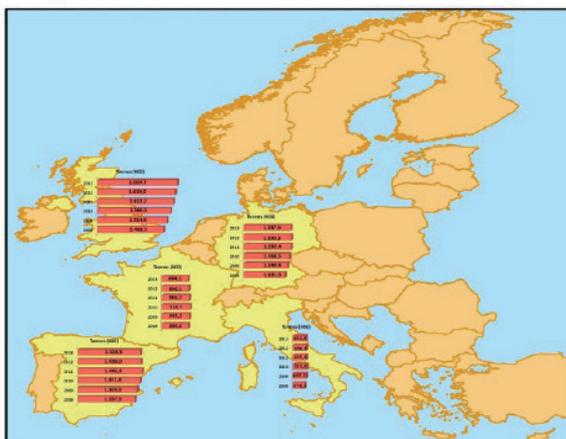
According to analysis of data, "Fortified/Functional" have a great importance in the United Kingdom, as shown by the calculations carried out and summarized in Graph 1 and 2.

Regarding the evolution of "Fortified/Functional", in the period considered, among EU selected countries, in United Kingdom the quantities of "Fortified/Functional" are increased from year to year rising from 1,468.30 thousand tonnes in 2008 to 1,669.70 thousand tonnes in 2013, with a rate of increase of 14% (Graph 3).

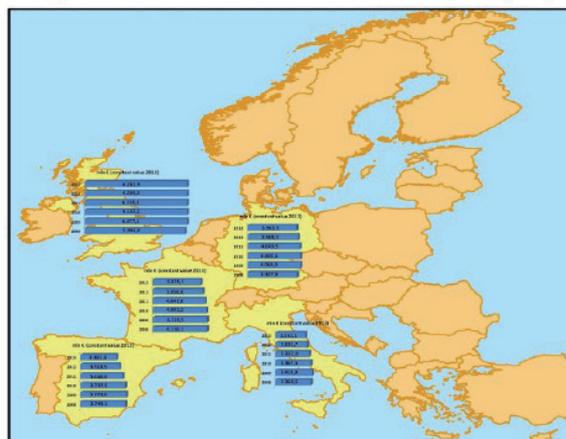
The other countries are placed in a lower position, in particular Germany with approximately 1,200.00 thousand tonnes, during several years there is an index of increase of 8%. Spain with approximately 1,400.00 thousand tonnes, increasing its market size by 6%, Italy with the 700.00 thousand tonnes, increasing its market size by 2%, while France with annual quantities of about 900.00 thousand tonnes lost during the period 1 % approximately.

In value terms (constant 2013 value), the only country keeping significant volumes with indices increase of 6%, from 5,906,00 million euro in 2008 to 6,282.90 million euro to 2013 is United Kingdom. All other countries, instead, show a progressive decline of its market size as shown Graph.4.

Graph 3 - Trend of market size of "Fortified/Functional" in EU countries selected (000 t)

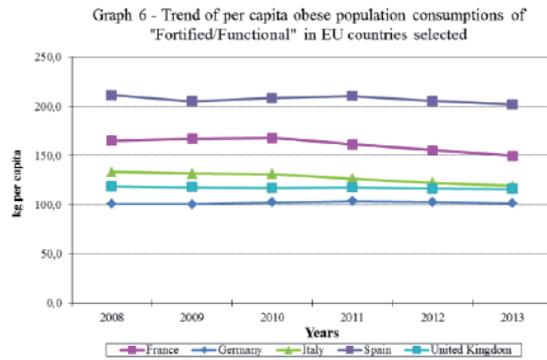
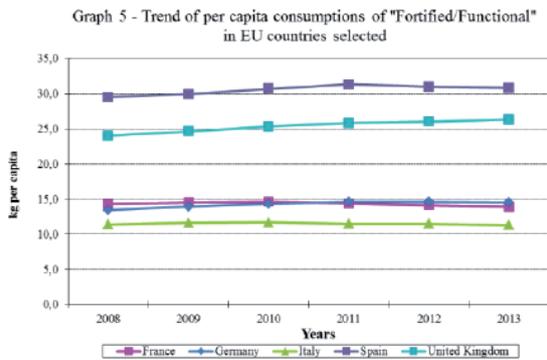


Graph 4 - Trend of market size of "Fortified/Functional" in EU countries selected (mln €)



In order to verify the quantities per-capita of "Fortified/Functional" consumed by the population, from calculations carried out Spain seems to be the country in which the amount of these foods consumed are higher, of the order of 30.00 kg per capita, followed by the UK with 26.00 kg,

both Germany and France with 14.00 kg per capita and Italy with 11.00 kg per capita (Graph 5). Regarding to the obese population, the data show that Spain, also in this case, appears to be the country with the highest per capita consumption of “Fortified/Functional” with approximately 200.00 kg, followed by France with 150.00 kg, Italy with 120.00 kg, the United Kingdom with 115.00 kg, and finally Germany with approximately 100.00 kg (Graph 6).



Conclusion

In recent decades, new socio-demographic trends of modern society have made the functional foods an important category in the food market (Bech-Larsen & Scholderer, 2007; Jones and Jew, 2007; van Kleef *et al.*, 2002). This type of foods is sold at a higher price, then contain a higher profit margin than the conventional foods, and, obviously, make the sector attractive for food industry players (Kotilainen *et al.*, 2006). In contrast, the develop and commercializing of these products is rather complex, expensive and risky, because it is necessary to prove that they have specific requirements (van Kleef *et al.*, 2002, 2005).

In practice, the develop and commercializing of these products require significant research efforts. This involves the identification of functional compounds and the evaluation of their physiological effects, the development of an adequate food matrix, taking into account the bioavailability and potential changes during processing and food preparation, work out clinical trials on the efficacy of the product in order to obtain validation of the claim on improving health required for commercialization (Kotilainen *et al.*, 2006).

Before the exit of a new functional food, companies must also examine the regulatory framework for the approval of products, both the types of nutritional information's for labelling either for the types of functional and health claims authorized (Bech-Larsen & Scholderer, 2007).

Functional foods have been developed in almost all categories of foods, even if they are not homogeneously distributed in all segments of the food industry.

Initially, functional foods launched in the market have been mainly dairy products, soft drinks and juices, bakery product and foods of infancy (Kotilainen *et al.*, 2006;. Menrad, 2003).

The research carried out has allowed us to analyse the market size of “Fortified/Functional” foods in some countries selected of the European Union in terms of quantity and value.

Such foods besides being sold at higher prices they are consumed, in particular, by obese population that is more sensitive to the consumption of such foods by recorded high levels of product consumed.

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Health and Green consciousness in consumer behavior of food products: a case study in Italy.

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Abstract:

This study investigated the antecedent determinants of purchase intentions of fresh cut products. We developed a field study that involved consumers of minimally processed fresh cut vegetables. Questionnaires were gathered in Italy on intentions to purchase fresh cut lamb's lettuce with an Eco-label and the proposed model, with the approach that sets out two different types of antecedent determinants: health and green consciousness, is analyzed using Structural Equation Modelling. Managerial implications are proposed to assess how much the consumer's green consciousness affects the attitude and the consumer behavior, and highlight the opportunity to take advantage via the potential adoption of an Eco-label.

JEL classification: M31 – D12 – Q56

Keywords: consumer behavior; environmental sustainability; fresh-cut products; Eco-label; Linear Structural Relationship.

Introduction

According with Lancaster's (1991) approach, what is creating utility to consumers is not a good *per se*, but a mix of characteristics existing in the product, which are responding to the expectations of consumer. In this study, between the large set of possible attributes generating utility, attention has been focused on the attitude to food product in order to meet to the "health consciousness" (HC) and to the "green consciousness" (GC), e.g. consumers' behavior impact on environment. In several studies, the concept of Health and Green Consciousness has been frequently mentioned as a factor strongly influential on subsequent consumer behavior and consumption in relation to organic food. According to Hamm and Gronefeld (2004), food safety consciousness is the most important buying determinant in most European nations. Moreover, Zanoli and Naspetti (2002), Lockie et al. (2002), Magnusson et al. (2003) and Ureña et al. (2008) all find health to be the most important antecedent determinant in purchase.

Abundant literature on consumer's needs for convenience are correlated with food choice (Grunert et al., 2001; Verbeke, 2001; Verlegh and Candel, 1999). In term of these needs, time saving as first "aspect", an increasing assortment of minimally processed vegetables and fruits has been developed (Ahvenainen, 1996). The term "minimally processing" has been defined in various detailed rules, e.g. as "the least possible treatment to achieve a purpose" (Manvell, 1997).

Numerous studies about the food category of minimally processed vegetables and packaged fruits focus on microbiological quality, safety, processing and packaging issues (Foley et al., 2002; Luna-Guzmán and Barrett, 2000; Allende and Artés, 2003; Alves de Azeredo et al., 2011). Consequently, more and more companies are trying to adjust their offerings to the new demands. These new demands include the requirement to have information about traceability through the agro-food chains, the origin of the product and its method of processing, its safety as well as the environmental impact of the production. For this reason, an increasing interest is developing in the production and the consumption of environmentally sustainable food. The demand for these environmentally sustainable food products and related services is continually

growing. In relation to these changes that affect modern society, it is evident that, for example, if it is possible to communicate that a producer is also “environmentally sustainable”, the final consumer may be more sensitive to this product attribute. In this way the European Union Eco-labelling Board commissioned a feasibility study to establishing reliable criteria covering environmental performance during the whole life cycle of food products (Couturier and Thaimai, 2013; DG environment EU, 2011).

Consequently, with these premise, the aims of this work were to test the capacity of HC and GC to influence the consumer’s attitude and his willingness to pay for a minimally processed food products, with a simulated Eco-label, just because a label that summarize this kind and a wide range of information could alter consumers’ purchasing decision. To accomplish this aim, the research was performed on a convenient sample of consumers who were aware of the term “Eco-label”.

Research methodology

Starting from these premises, relating to health consciousness (HC), green consciousness (GC), attitude (ATT) and willingness to pay (WTP) for minimally processed Eco-labelled food products, in this study was proposed a theoretical model, referring to the Theory of Planned Behavior (Ajzen, 1991), that imposed the relationships between these constructs in consumer’s behavioral intention.

The theoretical framework is summarized in figure 1, showing the imposed causal relationships between health consciousness (HC), green consciousness (GC), attitude (ATT), and willingness to pay (WTP) for minimally processed Eco-labelled products.

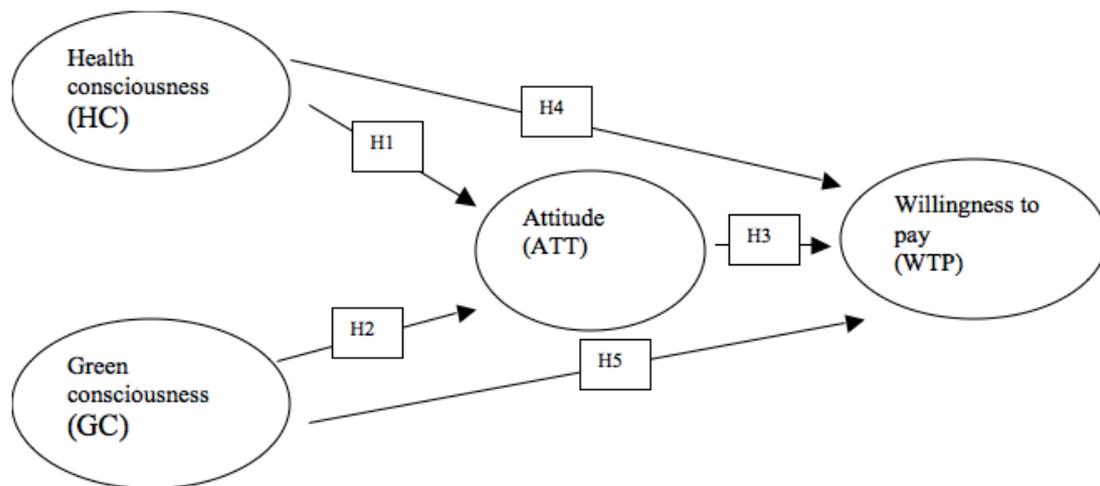


Figure 1: the proposed model.

According to the model the imposed hypotheses were as follows:

Hypothesis 1 (H1): Health Consciousness of consumer (HC) has a significant impact on consumer attitude towards minimally processed Eco-labelled food product (ATT).

Hypothesis 2 (H2): Green consciousness (GC) has a significant impact on consumer attitude towards minimally processed Eco-labelled food product (ATT).

Hypothesis 3 (H3): Attitude towards minimally processed food product (ATT) affects positively the willingness to pay for minimally processed Eco-labelled food product (WTP).

Following these considerations, the following additional assumptions were proposed:

Hypothesis 4 (H4): Health Consciousness (HC) has a positive impact on willingness to pay for minimally processed Eco-labelled food product (WTP).

Hypothesis 5 (H5): Green Consciousness (GC) has a positive impact on willingness to pay for minimally processed Eco-labelled food product (WTP).

The survey was developed interviewing a convenience sample of consumers at the exit of two supermarkets located in the North East of Italy in July of 2013 (Tab.1). The valid collected questionnaires were 425 and data were gathered on a Likert scale. Questions were focused on intentions to purchase minimally processed fresh cut lamb's lettuce from environmentally sustainable farms, simulating a minimally processed fresh cut product with an Eco-label.

Tab.1. Characteristics of the sample (n=425).

		%
Females		70,3
Age	< 30	25,8
	30 - 50	55,7
	> 50	18,5
Graduates		34,5
Number of people in household	1	8,5
	2	28,1
	>2	63,4
Household with children		41,5
Household with elderly		6,8
Food purchases	Supermarkets / hard discount	98,1
	Small retailer	40,5
	City market	29,6
	Local producers	46,8
	Home sellers	5,6
Consumers of lamb's lettuce		83,3
Consumers of fresh-cut products		73,6

The majority of respondents were females, aged between 30 and 50 years (55,7%), consumers of fresh cut lamb's lettuce (83,3%) and of minimally processed vegetables (73,6%), and generally food purchases are effected at supermarkets and hard discount (98,1%).

From a methodological point of view, data analysis has been done using Factor Analysis (FA) and Structural Equation Modelling (SEM). The exploratory factor analysis, with the Varimax oblique rotation approach, has been used to identify the four latent constructs of the model (HC, GC, ATT, WTP). This is useful to obtain a reduction of the original variables in four latent factors, obtained as a linear combination with minimum loss of information. The reliability of each factor was analyzed by the Cronbach's α coefficient and presented in table 2.

Tab.2. Constructs and measurement items.

CONSTRUCTS AND ITEMS	labels	factor loadings	α
Health Consciousness (HC)			0,90
I often think about my health	v2.30	0,782	
I think I'm a person who is attentive to healthy foods	v2.31	0,778	
Be healthy is very important for me	v2.29	0,773	
I am very attentive to the effects on my health derived from what I eat	v2.32	0,758	
Green Consciousness (GC) on products from companies with high environmental sustainability			0,73
Improve the lifestyle of myself and my family	v3.2	0,773	
Improve the way of life of future generations	v3.1	0,714	
(CONSTRUCTS AND ITEMS)	(labels)	(factor loadings)	(α)
Could solve the problems of environmental impact	v3.5	0,704	
Recycle is important to conserve natural resources	v4.9	0,786	
Attitude (ATT) towards minimally processed Eco-labelled food product			0,79
I expect to consume them as soon as possible	v3.12	0,710	
I'm going to buy them as soon as possible	v3.13	0,700	
I could easily recognize them	v3.11	0,657	
Willing to pay (WTP) for minimally processed Eco-labelled food product			0,91
I am willing to pay 10% more for products from companies with high environmental sustainability	v4.11	0,918	
I am willing to pay 10% more for products with Ecolabel	v4.10	0,900	
I am willing to increase purchases of products from companies with high environmental sustainability.	v4.12	0,758	

The Structural Equation Model (SEM) was implemented with the Linear Structural Relationship (LISREL) method, using the LISREL 9.1 software (Joreskog and Sorbom, 2013). The analysis conducted with LISREL allowed testing the hypothesis imposed in the proposed causal model. It was evaluated via several fit measures, which suggest a reasonably good model fitting according to the quoted literature.

Results

According to the results of data analysis via FA, the four tested constructs have a good reliability, tested by Cronbach's α coefficients, which values are in two constructs, HC and WTP, more than 0,9 and for two constructs, ATT and GC, more than 0,7.



The fit indexes of the model are produced in order to verify how well the hypothesized model reproduces the observed covariance matrix, using the χ^2 test, Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI), the incremental fit indexes (Normed Fit Index (NFI)), the Non-normed Fit Index (NNFI), the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA).

The fit indexes summarized in table 3, proposed by SEM analysis, confirmed the existence of the direct causal effects between the latent variables HC, GC, ATT, WTP. These relations support the hypotheses H2, H3, H4 and H5, and the same with the indirect effect of GC on WTP mediated through ATT.

Tab.3. Main indexes of model fitting.

Global fit indexes	Value	gdl
GFI	0.90	
AGFI	0.85	
NFI	0.93	
NNFI	0.92	
CFI	0.94	
RMSEA (Test of Close Fit)	0.076	
χ^2	348.06	71
χ^2 /GDL	4.90	

The results indicated a good fit between the model and the observed data and allowed analyzing the assumptions of the hypothesis presented in table 4.

Tab.4. Direct and indirect effects between the constructs.

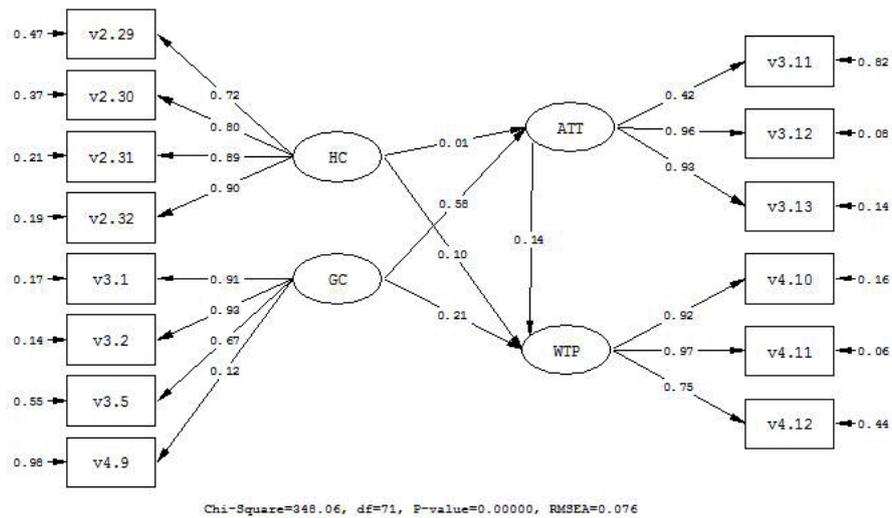
Hypothesis	Estimate (Standardized)	s.e.	t
Direct effects			
(H1) HC → ATT	0.01	0.04	0.23
(H2) GC → ATT	0.58	0.04	7.46
(H3) ATT → WTP	0.14	0.14	2.22
(H4) HC → WTP	0.10	0.09	2.02
(H5) GC → WTP	0.21	0.06	3.28
Indirect effects			
HC → WTP	0.10		
GC → WTP	0.29		

Analyzing the estimates of the causal imposed relationships, the results are the following:

- GC has a positive impact on WTP directly and indirectly through ATT construct;
- GC is a solid preliminary perception of ATT towards products;
- HC construct has less directly and indirectly impacts on WTP;
- GC has a positive impact on WTP, stronger than HC.

Figure 2 presents the path analysis with its standardized estimates of causal relationships between variables.

Fig. 2. The generated LISREL model (for the meaning of variables see tab.2).



Conclusions, managerial implications and limitations.

The minimally processed fresh cut products, from companies with high environmental sustainability and proposed with an Eco-label, are perceived more as products reducing the environmental impacts of cultivation than products affecting positively on health of consumers.

This implies important managerial implications for new marketing strategies for minimally processed food products, as:

- a. the adoption of an Ecolabel, as tool for supporting the perception of lower environmental impact of fresh cut products, which characterize the evolution of consumer needs of minimally processed food products, could be a positive element of a strategy to strength the WTP.
- b. The additional positive impacts of fresh cut products, as the lower contain of nitrates, are perceived by consumers minimally and they affect marginally the attitude towards products and the willingness to pay. This kind of benefits must be more stressed in the communication to the consumers.

Retailers of this kind of food product could plan their marketing strategy accordingly to the reactivity of the consumers not only for aspects related to attributes of environmental sustainability expressed by an Eco-label, but also on the communication focusing on the healthiness of the product.

Limitations and some weaknesses of this study are mainly regarding the sample characteristics, in terms of need to expand the sample in different countries of European Union.

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An analysis of food safety private investments drivers in the Italian meat sector

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Abstract

The objective of this study is to investigate how the law inducement influence the drivers of private investments aimed at sustaining food safety systems. In the empirical investigation we consider the influence of the law and economic drivers separately for the following food safety systems: HACCP, certification, geographical indication, brands and traceability. The knowledge of such an influence could provide a better comprehension of the micro-level motivations of food safety strategies adopted in Agri-Food chains. It could help to understand specific characteristics of the Agri-food governance modes and could also favour the elaboration of policy interventions and the design of private-public arrangements. The main results achieved are:

- a) a complex picture emerges, in which the selection hypothesis holds for some of the safety systems and the investments;
- b) the investments drivers have a variable influences: beyond the law pressure, both the free search of economic gains from competition and the allocation of decision rights along the chains are influential.

Keywords: food safety, regulation, investments, decision rights

1. Introduction

The general focus of this study is to investigate the decision to invest in food safety as a field of connection between public and private strategies. The basic idea is to conceptualize the allocation of the decision right to invest among the transaction party, counterparty and regulator as a source of drivers of investments.

Food companies and agricultural farms pay a great and necessary attention to technologies and economic relationships and arrangements aimed at enhancing and ensuring the due degree of products safety. In all the chain stages, adequate technologies are needed in order to carry out the productive process according to the best prerequisites identified by health and food sciences. Policy interventions intended to prevent food safety crisis have shaped the institutional environment of food systems channelling the companies strategies and have induced, with the technological requirements, the raise of complex organizational forms (Hobbs, 2002; Mènard and Valceschini, 2005). The food chain actors elaborate complex strategies in which technological and organizational choices and institutional commitments assure the food safety level demanded by public and private safety regulations and strategies.

The chain organization sustains the implementation of the most of food safety management systems: Haccp, Certification, Traceability, Brands, and Geographical Indications. Although designed to multiple purposes, each of these systems includes specific sets of activities aimed at food safety objectives. These systems require dedicated investments, in physical resources, human resources as well as in re-organizing the production processes and control activities.

Although the process depicted has been widely investigated under economic and organizational views, a lack of knowledge still remains about the determinants of the investment in food safety strategic choices. There are several drivers of food safety oriented investments. Induce-

ments arise because of existence of policy interventions and the law prescription related as well as because of companies' ethical and economic evaluations. For example, quality, labelling and brand policies rely on safety prerequisites, while traceability mechanism and procedures are adopted to channel the chain coordination process towards safety objectives (Lupien, 2005). A complex framework of law inducements and free choices triggers the technological and organizational choices about food safety.

In this study we aim to address the question on how much the legislation pressure influenced the food safety investments decisions. On the one side we consider the legislation as an innovation of the institutional environment, on the other side we consider how this innovation influenced the investment decisions. Under this view the agricultural policy Reform may impact on the safety by through the influence on the organizational decisions of Agribusiness firms.

The paper is organized as follows: in the second section we introduce the analytical framework. The data analysis approach and the empirical results are presented and discussed in the sections three and four. The last paragraph is dedicated to conclusions.

2. Analytical framework

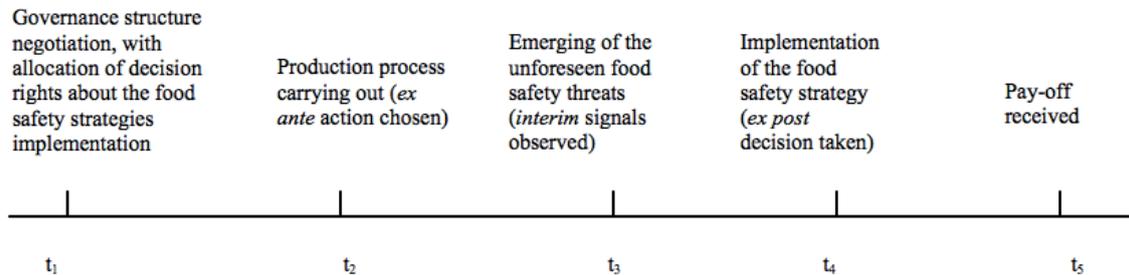
The choice of the efficient governance structure allows the agents to carry out the planned transaction (Williamson, 1985, 1991). Namely the transaction parties seek to align the attributes of the transaction – asset specificity, uncertainty and frequency – to the characteristics of the governance structure (Williamson, 1991, Masten, 2000; Mènard, 2005). Normally, quality and safety strategies in Agri-Food Chains require to make highly specific investments and to deal with uncertainty. Uncertainty exacerbates the effect of asset specificity in choosing more centralized governance structure (Williamson, 1991) and determine the necessity to adapt the governance mode (Mènard, 2004) to unforeseen contingencies (Williamson, 1991, Gibbons, 2005). As a consequence hybrid governance modes became largely diffused (Mènard, Valceschini, 2005; Martino, Perugini, 2006).

On the one hand effective food safety provision systems (Haccp, Certification, Traceability, Certification etc) are based upon or provide organizational solutions of both coordination and information issues (Martino, Perugini, 2006); on the other hand, technological and behavioural uncertainty require the agents to allocate resources to food safety systems intended to channel information along the chain and to favour the coordination among the agents (Hobbs, 2004; Mènard, Valceschini, 2005;). We then consider the investments in food safety systems both as economic instruments to implement safety strategy and as elements related to organizational choices. In the following we elaborate on these points by focusing on the allocation of decision rights as critical step in building up effective safety provision systems.

Theory states that in order to cope with uncertainty the parties negotiate *ex ante* the allocation of the critical decision rights to the party who is expected to maximize the total surplus (Gibbons, 2005; Gibbns *et al.* 2013). Although the parties could not anticipate at the time of the contract outset all the future specific necessities which may rise due to inherent uncertainty of food safety, they may decide how to face these necessities by allocating the critical decision rights at the time of the negotiation of the governance structure. Drawing from Gibbons (2005) we contend that the coordination pattern among two parties in the chain may follow the following timing:



Figure 1: Allocation of decision rights about food safety private strategy and timing of implementation

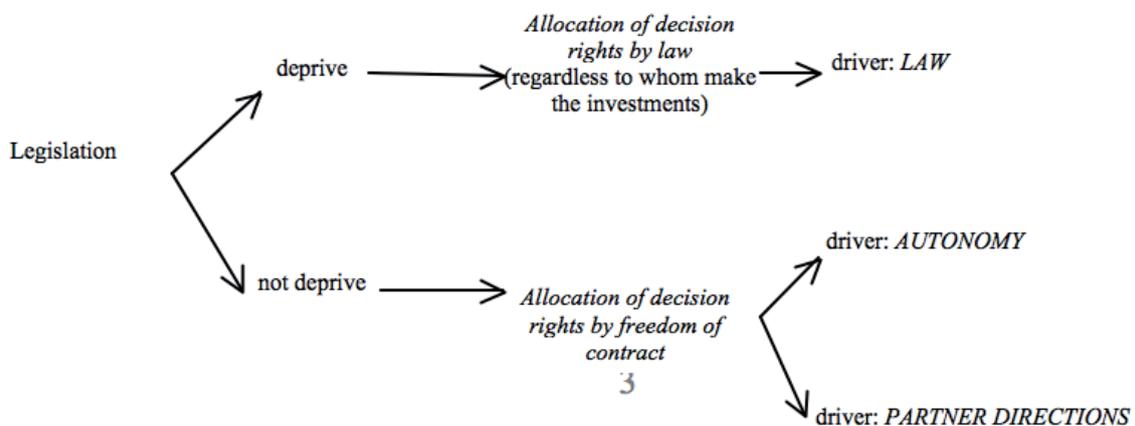


The figure 1 indicates that the choice of the governance mode allows the parties to coordinate themselves to the purpose of safety provision. The allocation of the decision rights is aimed at allowing the parties to achieve the largest surplus, provided the uncertainty influence (Gibbons, 2005; Williamson, 1991). We contend that the relevant rights set includes also the right to decide the investments required to design and implement the investments needed to set up the safety provision systems.

To the purposes of our analysis, we distinguish the *right to decide the allocation of the decision right to invest* from the *decision right to invest*. If the public regulation prohibits to carry out a given productive operation, then none of the parties to a transaction can carry out that operation: none of the party will invest to the purpose of that operation. If the public regulation constrains a party to carry out the given operation, then the party has to invest and none can decide how to allocate the decision right to carry out the operation. Therefore it seems that public prohibitions and prescriptions share a common general trait, actually both of them deprive the parties of the right to decide the allocation of decision rights related to the objective of the public intervention.

In terms of decision rights, then, the first effect of the public intervention we consider is to deprive or not the private agents to decide the allocation of decision rights. The figure 2 illustrates the investments drivers we identified.

Figure 2: Identification of the investments drivers



In the first case, the critical decision could be made by public officers or by private agents but strictly according to public prescriptions or prohibitions. As a consequence the investment decision would be made by the force of the law. The second case is that grounded upon the freedom of contract: the parties will behave according to the model depicted in Figure 1. The *autonomy* – that is the capacity and willingness to act by herself - is thus an additional investments driver often crucial in the implementation of marketing plan based on safety and quality (Martino, Perugini, 2006, Fulponi, 2006). Moreover, to deal with the coordination and information food safety management issue, a party may decide to allocate to the counterparty the right to invest, in such a case the investment will be made under the *directions of the partners* which is then the third driver we identify.

3. Empirical study

3.1 Data

We considered: *Haccp system; Certification; Geographic Indications; Brand; Traceability*. The empirical analysis was carried out gathering data by using the data base built on in 2005-2006 by through a postal questionnaire submitted to 2036 Italian companies. The postal address were achieved from Posteitaliane – the company managing mail services at national level – and the selection of the companies was carried out by the unique criterion of “Field of activity”. The companies selected were active in the field of animal products supply and were engaged in various stages of food chains (i.e., agricultural, processing and just trading activities). According to the characteristics of the database, the companies considered are not randomly selected from the universe. This gives raise to a selection problem and then we adopt a bivariate sample selection probit model. The variables utilized in the analysis are illustrated in Table 1.

The *Beliefs* variables capture the influence upon behaviours (decision to invest) that accounts for the general views of the respondents about the food safety strategies.

Each *source of information* has a specific effect. *Technicians* are here intended to be associated with the chain relationships (the connection between poultry companies and farmers under contract, for example, is normally guaranteed by the company's technicians network), therefore we expect that this variable strengthen the role of *Partnreq* in explaining the investments decisions. Analogously, we expect that *Asl* is associated with *Law*, being the public Health related to legislation. *Adv* is here intended as a free source of information, vehiculating a zero cost information. With *Other entrepreneur* we thus capture the horizontal exchange of information, mainly channelled in the networks relationships (Omta *et al.*, 2001). The information considered here concerns with the technology and the related risks. A positive effect of these variables would indicate that the source influences the probability to invest.

With *Control* variables we account for variable which may be supposed to influence the decision to invest, but that are not related to the decision to allocate the decision right to invest. Shaosheng *et al.* (2008), Yapp and Fairman (2006), Fulponi (2006) emphasize the importance of the experience of the entrepreneurs and managers to the end of adopting food safety systems. Both *Ndir* and *Experience* are intended to account for the capability – based upon tacit knowledge - to cope with technological uncertainty and then to invest.

Scholars underlines the role of the size of the business in adopting food safety systems. We therefore introduced the variable *Sales* in order to account for the influence of scale. The variable *Prod*, finally, is considered to account for the potentially different behaviour in units specialized in trade with respect to those engaged in production or also in production.



Table 1: Variables symbols and coding

Variable	Symbol	Code
<i>Investments</i>		
Physical Resources (Haccp, Certification, Geographical Indications, Private Brands, Traceability)	PR (Haccp, Cert, Gi, Brand, Trace)	0, 1
Human Resources (Haccp, Certification, Geographical Indications, Private Brands, Traceability)	HU (Haccp, Cert, Gi, Brand, Trace)	0, 1
Additional Costs (Haccp, Certification, Geographical Indications, Private Brands, Traceability)	CO (Haccp, Cert, Gi, Brand, Trace)	0,1
<i>Investment Drivers</i>		
Law	Law	0, 1
Autonomy	Auton	0, 1
Partner directions	Partndir	0,1
<i>Beliefs</i>		
To ensure food safety is a law duty	Law_duty	Likert scale
To ensure food safety increases the number of clients and the sales	Custom	Likert scale
To ensure food safety increases the prices of the products	Price	Likert scale
<i>Sources of information</i>		
Technicians	Tech	0, 1
Public Health officials	Asl	0, 1
Advertsing	Publ	0, 1
Other entrepreneurs	Enterpr	0, 1
<i>Control variables</i>		
Number of high level managers, as index of the capability to cope with technological uncertainty;	Ndir	Number
Year of experience of the top manager, as index of the capability to cope with technological uncertainty;	Exper	< 5 years 6 – 15 years 16-25 years < 25 years
Volume of sales as an index of the size of the firm;	Sales	Eur/Year
Dichotomous variable, indicating the stage of activity of the firm (production = 1; distribution = 0).	Prod	0, 1

Source: the Authors

3.4 Empirical results

177 questionnaires were filled and returned back (response rate: 8.89%). Among these questionnaires, 117 provided the data used in the present study. The remaining were incomplete and lacking some of the variables needed. The Table 2 illustrates the characteristics of the sample data.

The sample is characterized by a small presence of skilled workers and technicians. The age of the top managers is of medium or high level. There is a really small percentage of managers with an University degree. This fact could appear to be compensated by the prevalence of large

work experience. The 26.6% of the units investigated is specialized in production, the 18.6% in production and trade, whereas the 54% is specialized in trading activities.

Table 3: General characteristics of the sample

Variables	
Managers (n. units)	409
Technicians (n. units)	818
Employers (n. units)	77
Skilled workers (n. units)	1988
Generic workers (n. units)	9923
Age of top manager (years)	
≤ 30	9
31-50	81
> 50	89
Education of the top manager	
Elementary school	20
Junior High School	52
High School	93
University Degree	13
Job experience of the top manager (years)	
≤ 5	9
6-15	21
16-25	49
>25	99
Branch of activity (n.units)	
Production	47
Trade	97
Production and trade	33

Source: the Authors

The Table 3 summarizes the average marginal effects (AMEs) estimated for the drivers of the outcome equation: the AMEs indicate how change the probability to invest under the inducement of the driver considered. They are estimated for all the units of the sample and then the average value is calculated.

Haccp

In the model regarding the Haccp system the driver *Law* has a positive impact on the investment on Physical, Human resources and Additional costs. The probability of investing in physical resources supporting Haccp increases by 0.339, and the probability of investing in Human resources also increase but only by 0.254. The increasing is small than in the case of *CO_Haccp* (0.080). The *Partners directions* act as a drivers increasing the probability to invest in Physical resource by 0.552 and by 0.303 the probability in the case of Additional Costs, and reducing by -0.718 the probability of investing in Human resources. Therefore we point out that while *Law* has a similar influence on both physical and human resources, the *Partner direction* has a different influence on the investment in Physical resources, Human resources and Additional costs. The emerging picture indicates that no autonomous decisions drive the invest in Haccp system.

Certification

All the three drivers have an impact on all the types of investments in the case of the certification system. The *Law* increase the probability to invest in physical resources by 0.787 and by 0.301 in additional costs, but it reduces the probability to invest in the case of Human resource (-0.208). The impact of *Auton* on physical resources is positive and smaller than that of law and Partner directions for Physical resources and additional Costs, but larger for Human resources. The probability to invest in human resource is reduce by the *Law* (-0.208) whereas both the *Autonomy* and *Partners directions* increase it. The impact of *Law* on the investment in additional costs is larger of the autonomous decisions and about equal to that of the decisions made by the chain partners. Therefore the certification system involves a complex allocation of the decision rights along the chain. The first reason for that is the mandatory and voluntary certification schemes co-exist in the sector examined. The can also be explained by the evidence that certification requires a strict monitoring of the production process entailing then the combination of autonomous and partners decisions. Furthermore we note that, while the decisions of parties tend to increase the probabilities of all the types of investments, the *Law* does not promote the investment in human resources. This point is relevant because, while it reflects the policy inducement to increase costs (Henson, Reordan, 2000), it clearly contradicts the necessity of sustaining safety strategies with adequate skills and human competences (Yapp, Fairman, 2006; FUlponi, 2006; Gorris, 2005).

Table 3 (following page): Sample selection bivariate probit models - Average Marginal Effects by systems

	Drivers			HACCP			Certification			Geographical Indication			Brand			Traceability		
	PR_HACCP	HR_HACCP	CO_HACCP	PR_CERT	HR_CERT	CO_CERT	PR_GI	HR_GI	CO_GI	PR_BRAND	HR_BRAND	CO_BRAND	PR_TRACE	HR_TRACE	CO_TRACE			
Law	0.330841***	0.2580928***	0.2131738	0.1767617	-0.1486792	0.3007149***	-	-0.267*	0.4779064***	-	-0.490***	0.2333774***	0.2245932**	0.1505724	-0.1045008			
	(2.46)	(16.68)	(1.38)	(1.73)	(-0.02)	(5.73)	-	(-0.10)	(0.03)	-	(0.00)	(0.01)	(2.11)	(0.00)	(-0.68)			
Auton	0.0504859	0.0140626	0.054774	0.2667722*	0.1627836**	0.190323***	-	0.083***	0.2384853	-	0.189	0.1349967***	0.0501962	0.1459676	0.0157677			
	(0.39)	(0.10)	(0.40)	(1.13)	(1.94)	(3.34)	-	(0.00)	(1.91)	-	(0.12)	(0.01)	(0.43)	(0.00)	(0.11)			
Partindir	0.2030546	-0.7178617***	0.3062654***	0.1434112***	0.2714608***	-	-0.375	-0.5045451	-	-0.496	0.2165653***	0.3710026***	-0.6812865	-0.7645945***				
	(1.51)	(-8.92)	(2.28)	(18.40)	(3.43)	-	(-0.015)	(-0.16)	-	(0.00)	(0.01)	(21.31)	(0.00)	(-2.80)				

Geographical indications

The discussion of the case of Geographical indication can just concerns the model for invest in the Human resource (-0.552) and additional costs investments (0.601). Notably, we see that the driver *Law* reduces the probability to invest in Human resources but increases the probability if investing in additional costs. This would suggest that the legal framework tends to charge specific additional costs on the participants to the systems, confirming the existing evidence. On the other hand also the Autonomy decision has a similar effect on Additional costs even though it is weaker.

Brand

The probability to invest in Human resources increases under *Law* inducements but strongly decreases with *Partndir* in the case of Brand system, suggesting a prevalence of the legal framework which limits the importance of Brand opportunistic relations.

Traceability

The AME of *Law* is 0.235 in the case of traceability system. The allocation of the decision rights to the transaction counterparty also reduces the probability to invest in additional costs, indicating that the chain relationships may entail efficient approaches to that safety system.

4. Discussion

Our approach is based on the assumption that the decision rights allocation allows the parties to maximize the surplus of the transaction. Therefore, we interpreted our results on the basis of this assumption. The increase (decrease) of the probability to invest under the inducement of *Auton* and *Partndir* is intended as the consequence of the economic calculus of the parties. The increase (decrease) of the probability to invest under the inducement of *Law* is intended as the consequence of the public intervention on the freedom of contract of the parties.

The picture emerging about the selection hypothesis indicates that the institutional innovation of the recent years had a strong influence on the private investments for food safety. The objective of coping with the market failure caused by the asymmetric information about the characteristics of the food and beyond the implementation of a complex architecture of assessment and monitoring (Jove, 1998; Trienekens, Zuurbier, 2008; Szajkowska, 2009), the governance of the food safety appear achieved by the causation of the implementation of private strategies.

5. Final remarks

The study addressed the question of how much law compliance and economic and organizational goals determine food safety investments. We focus on inducements to invest due to the necessity to comply with the law, to the individual free economic convenience and particularly on the allocation of critical decision rights to the party who is expected to be able to maximize the relationship total surplus. The decision to allocate the decision rights appear to be able to influence the choice of the investments as well as the remaining two drivers. The evidence indicates that the decision rights perspective is meaningful in order to investigate how public and private activities combine themselves in food safety provision. Furthermore, the role of public regulation (law) is concentrated in terms of food systems and types of resources. The allocation of decision right to the counterparty is evident, thus there is also a confirm of this organizational solution, as predicted by theory, This evidence contributes to shed light on the strength of the coordination devices associated by safety strategies.

The study presents two main limits. First, the association among the drivers entails both substitution and complementarity among the investments, but our method does not allow for discrimi-

nating these facts. A specific approach should be carried out (REF). The second limit derives from the fact that our questionnaires did not provide any information about the allocation of decision rights to collective bodies, which instead play a role in many of the systems considered. The knowledge of the pattern of influence may contribute to design public and private policies aimed at increasing the degree of product safety.

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Sustainability performance of local and global supply chains: a comparative assessment on bread

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Abstract:

There is a growing recognition among consumers that what you chose to buy and where from can have different impacts in relation to different dimensions and scales. In parallel there is a growing interest in short(er) food supply chains as a valid response to the unsustainable practices of global/industrial food supply chains. The dichotomy between alternative and conventional food systems and the actual sustainability of local food chains has been questioned. How is sustainability performance connected, and to what extent, to the level of localness or globalness of food supply chains? The present work develops a comparative case study among three supply chains in the bread sector in Italy representing a local, regional, and global bread chain. We compare and discuss the relevance of a set of attributes related to different sustainability dimensions in order to identify critical aspects and provide a preliminary assessment.

JEL Q18 – Agricultural Policy; Food Policy; Q10 General

Keywords: sustainability dimensions, assessment, supply chain, local, global, bread

1. Introduction

There is a growing recognition among consumers that what you chose to buy and where from can have different impacts in relation to different dimensions and scales (Ilbery and Maye, 2005; Goodman et al. 2010). This concern goes in parallel with the interest in local foods and short food supply chains as a valid response to the unsustainable practices of global/industrial food supply chains. However, the dichotomy between “local” and “global” food systems and the actual sustainability of local food chains has been questioned (Hand and Martinez, 2010; Ilbery and Maye, 2005). How is sustainability performance connected, and to what extent, to the local or global character of a food supply chains?

The bread sector provides an interesting case in terms of local/global contrasts over the supply chain, from the production of raw material to consumption, via processing. Wheat is traded as a commodity, prices are typically set by a board of exchange. Moreover it represents an ingredient of a number of foodstuffs and a double processing is required to turn it into bread, pasta or confectionery. Wheat farming has an impact on land use and can affect the quality of the final product (Hills et al. 2013) but often, a traceability of over the whole wheat chain is missed (Barling et al. 2009). Bread is a staple food for most Europeans, thus raising issues related to affordability, food security, nutritional quality and healthy diets (Capacci et al. 2012). The scale of production differentiates artisan from industrial bakeries. Due to access to different technologies, artisan and industrial processors have different impacts on the environment (Espinoza-Orias et al., 2011; Andersson and Ohlsson, 1999; Mondal e Datta, 2008). In Italy, baking is a tradition embedded in local culture (Pagani et al., 2014). In the last two decades the

gap between staple crop producers, processors and consumers is gradually bridging across the EU. Such trend is confirmed by the emergence of Protected Designations of Origin (PDO) and Protected Geographical Designations (PGI) for bread as well as the proliferation of spontaneous initiatives promoting local milling and baking. The shift to high-yield and high-gluten breeds, the spread of mass retailing channels, as well as major technological innovations in baking have made less clear the boundaries between local and global bread chains.

The assessment of the bread supply chain's impacts is a recurring theme within the literature on sustainability performance of food supply chains. Comparing and contrasting the performance of short with long bread chains in terms of sustainability is an open issue (see Gava et al., 2014 for a review). Scientific literature misses a shared definition for "local" and "global" food supply chain, comprehensive assessment criteria and indicators, as well as an agreed robust methodology (with the exception of fairly standardized LCA methods and datasets available for environmental assessment).

The present paper aims at bridging that gap by means of a qualitative comparison of a "global", a "regional" and a "local" supply chain. The "global" chain is Barilla's Pan Bauletto soft bread, which leads the segment of the industrial pre-packaged bread in Italy. The "regional" chain is "Pane Toscano DOP" (Tuscan bread PDO), which is based on an Integrated Supply Chain Agreement (Patto Integrato di Filiera), involving farmers, millers and bakers. The "regional" chain is at an intermediate level between the local and the global case studies. The "local" chain is a privately owned enterprise located in central Tuscany, encompassing the farming, the milling and the baking processes. We systematically analyzed the scientific literature encompassing a set of 19 selected attributes, covering the social, environmental, health, economic and ethical dimensions of sustainability, and supplemented that review with direct observations, in depth interviews and documental analysis. Moving from the analysis of the three case studies, we provide a comparative assessment matrix, which can be useful in further sustainability assessment of food chains, helping to highlight the weaknesses, the tradeoffs and the opportunities for a sustainable development.

2. Methods

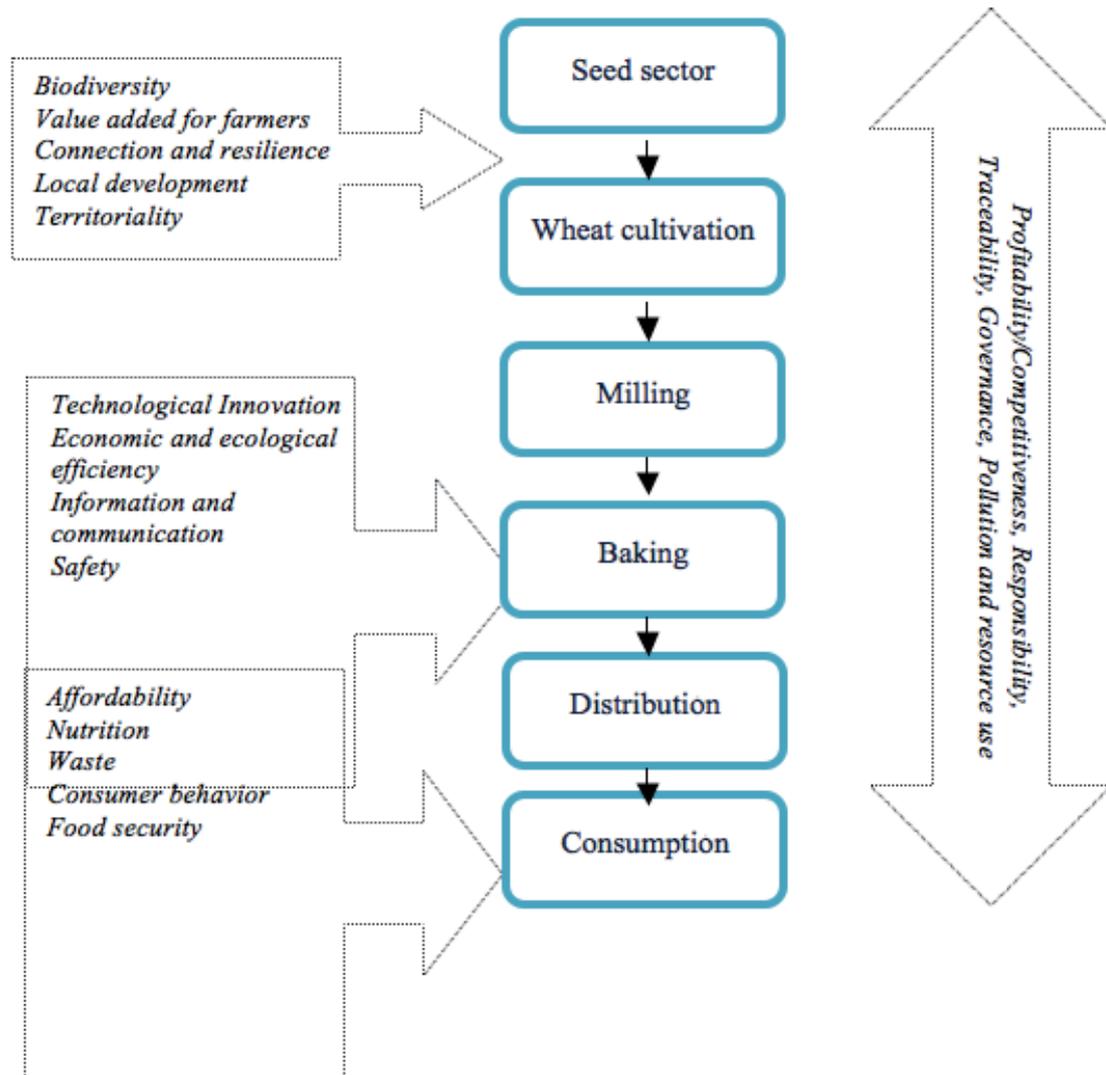
The applied methodology can be summarized in two main steps: i) identification of attributes of sustainability performance and definition of the bread supply chains in terms of their level of globalness/localness; ii) qualitative assessment of the supply chains with regard to sustainability attributes, based on available scientific literature and preliminary investigation on the cases.

In order to identify the attributes we refer to preliminary results of the Glamur¹ project (Kirwan et al. 2014). In particular we draw from a comparative analysis on sustainability performance of food chains across different spheres (i.e. market, scientific, policy, public) and dimensions of sustainability (i.e. economic, social, environmental, health, ethical dimensions). A range of criteria to evaluate sustainability performance is identified (i.e. 24 attributes²) and adapted to the wheat to bread supply chain (see Figure 1 for a visual summary with reference to the Italian wheat to bread chain).

1. Global and Local food chain Assessment: a Multidimensional performance-based approach (GLAMUR, 7th Framework Program, grant agreement no: 311778).

2. We have selected 19, by excluding some irrelevant attributes for the bread chain (i.e. animal welfare) and joining together some closely related ones (i.e. profitability and competitiveness).

Figure 1 – Sustainability attributes of the bread supply chain



We identified three supply chains of different lengths and qualified the different stages (par. 3.1). The supply chains were selected on the basis of four main key-dimensions, which differentiate local from global supply chains in general and in relation to the specificities of the wheat to bread chain: i) The physical / geographical distance between production and consumption. This first criteria is a primary criteria of distinction, with particular emphasis on place of cultivation of wheat with respect to milling and baking. ii) The type of governance and organization of the supply chain (degree of control of “local actors” vs “global actors”). This concerns the level of integration between millers and bakers with respect to farmers and consumers. iii) The kind of resources, knowledge and technologies employed, in particular the technology used for flour production and baking technique. Moreover the mix of ingredients used represents a crucial difference among the bread supply chains. iv) The way supply chain actors shape product identity with regard to territory of reference: quality attributes of bread vary in relation to territorial typologies.

Concerning the second step, the selection of relevant attributes was performed through a systematic review of academic literature referred to the wheat to bread chain, integrating Scopus,

Ageconsearch and Google Scholar databases. Each attribute was qualified in terms of ability to discriminate among chains of different lengths and indicated which chain(s) shows the best performance, according to preliminary information based on in depth interviews, document analysis, direct observation (par.3.2).

3. Results

3.1 Case Studies: Mapping the structure of bread supply chains

The global bread chain is led by Barilla company, a multinational group that stands as one of the top Italian food groups, leading company for pasta production, bakery products and processed sauce market of continental Europe, and the flatbread market in Scandinavia. Out of its various brands, Mulino Bianco is a leader in the sector of industrial pre packaged bread in Italy, Pan Bauletto. Such industrially produced bread is made of soft wheat flour (made from grains produced both in Italy and coming from abroad), water, salt yeast and vegetable oil. This soft bread is marketed exclusively in Italy.

The following figures is an elaboration on a framework by World Food System Center (WFSC) that can help placing information on a gradient along the food supply chain. It represents the main steps occurring through the chain (in columns), and places them on a local to global scale (in rows) for a visual interpretation, identifying the different flows going through the steps at different scales. The upstream stages of the Pan Bauletto bread chain, (i.e. imports of soft wheat, and other primary inputs) occur at continental level while the following stages occur at the national level. Fuel supply, machinery and energy represent the most global inputs throughout the chain, although not as specific as wheat. Barilla company sources wheat for internal milling (30%) and buys flour directly from other milling companies (70%). Wheat provisions are based on production contracts with cooperatives of producers according to specific quality specifications (or specific varieties that have desired characteristics). The price is set based on the commodity board of exchange or bargained at the beginning of the season based on the amount purchased, with a premium price according to the adoption of the disciplinary by the farmer. The requirements are strict because the industrial baking process cannot be adjusted “manually” (as the hand craft baker would do). Hence, the need for highly standardized raw material suitable for specific dough rising times and strength of flour. For flour, Barilla refers to three main millers with whom it makes contracts from 3 to 6 months. It is not possible to know the exact origin of the grain, except when there are very specific types (for other bakery products). The main suppliers of flour are Italian, because flour is highly perishable during transportation. Pan Bauletto Bianco, is produced in two Italian plants (Cremona and Melfi), where the bakery process takes place. Pan Bauletto Bianco is packed into 400 grams format. The product is then ready for consumption. Secondary processes include mixing of raw ingredients (flour, water, salt and yeast) to form a dough; bulk fermentation, division of dough into individual loaf-sized pieces, moulding, proofing; baking of pieces in gas oven; cooling and packaging; production of packaging material; delivery of products to distribution platforms. Distribution channels of packaged soft bread entail large scale distribution for most part (75%) then there are individual traders and retailers, all over Italy. The price list is national, there are discounts and promotions depending on the local market. Production processes allow a long shelf life (over 45 days) without the use of preservatives: they take place in sterile rooms, without any contamination and with addition of a splash of vinegar (a mild antibacterial). Longer shelf life also allows very low levels of waste at distribution and consumption levels. Moreover the Italian consumer uses industrial bread as a substitution product, of freshly baked bread.

Figure 2 - WFSC framework – Wheat to bread supply chain: global case

Scale	Inputs	Agricultural Production	Grain handling	Milling	Baking	Distribution	Retailing	Consumption
Local								
Regional								
National	Land water workers seeds fertilizers	Soft wheat	Farmers' consortia	Flour (0 type) from external millers / Barilla's internal mill	Baking in Barilla's plants: Cremona (north Italy) and Melfi (south Italy) machinery Packaging Baker's yeast, oil, salt, sugar, water, malt	Collection platforms	Small retailers Retailers Supermarket	Pan Bauletto, 126 ton a day, 2,50 euro per kg (average)
Continental	Land water workers machinery seeds fertilizers	Soft wheat	Traders	fuel energy machinery	fuel energy machinery			
Global	Land water workers seeds fertilizers fuel	Soft wheat		fuel energy machinery	fuel energy machinery			



Source: our elaboration on Food supply chain framework (World Food System Center, Zürich, 2013)

The regional bread supply chain is an intermediate case between local and global. It follows the recent establishment of the Protected Designation of Origin for Tuscan Bread (waiting for official approval after the objection phase). The disciplinary states that Tuscan Bread is to be produced exclusively with soft grains grown within Tuscany Region borders according to the Product Specification of the *Pane Toscano DOP* (Tuscan Bread PDO). Also milling and baking must also take place within the region. An “integrated supply chain project” (Progetto Integrato di Filiera) funded by Tuscany Regional Administration (through the Rural Development Plan 2006-2012) was aimed at enhancing regional wheat production secured by a traceability system for the production of Tuscan Bread sourdough (obtained in accordance with PDO specifications). The aim of the project, currently ongoing, is to establish a formal relationship among all actors of the supply chain, based within regional borders, to encourage farmers to grow soft wheat, especially typical and native varieties (coherent with the PDO specifications). The final goal is to supply a product of high nutritional and organoleptic quality to the consumer: wheat germ preservation, no salt, low gluten content, sourdough leavening method, all contribute to the nutritional value of the final product. The project also includes research and development (measure 124), in collaboration with the Universities of Florence and Pisa aimed at the development of innovative bread making technologies and agronomic protocols to facilitate and consolidate the manufacturing procedures and a traceability system based on objective unambiguous parameters, such as, markers or identifiers of chemical composition of Tuscan bread. The different actors in this production chain are linked by an economic agreement defined in the contract (production quantities and premium price for farmers), but mostly by the common need to ensure the quality of the finished product, a prerequisite to ensure the commercial success of the initiative and thus

the economic return. This requires the identification of the best marketing channels, both GDO and alternative, in order to place the product in its various sizes and packaging, at the most profitable price for all partners that contribute to the supply chain (export is among the objectives). The project involves 50 farms, mainly located in the province of Siena, with a production potential of 16 million tons of wheat for the duration of the supply chain contract. A milling company is the channel captain of the agreement, the Agricultural Consortium of Siena provides six collection centers and storage facilities for an overall capacity of 62 thousand tons of soft wheat. 15 bakeries located throughout the region have joined the agreement. All stakeholders must necessarily integrate and collaborate with each other, because the lack of coordination or the suffering of a single link in this chain would result in failure of the entire production process.

Figure 3 - WFSC framework – Wheat to bread supply chain: regional case

Scale	Production inputs	Agricultural Production	Grain handling	Milling	Baking	Distribution	Consumption
Local							
Regional	Land	Soft wheat production within Tuscany borders	Farmers consortium in Siena	Flour of selected varieties	Sourdough	Bakeries	PDO Tuscan Bread 20 tons* per year
	water			Milling in Lucca	Water	Retailers	3-3,5 euro per kg
	workers				Flour of selected varieties	Supermarkets	
	seeds				Paper packaging		
	fertilizers				Bakers are spread around Tuscany		
National	seeds			machinery	machinery	Retailers	PDO Tuscan Bread 20 tons per year
	machinery			energy	energy		3-3,5 euro per kg
	fertilizers						
Continental	fuel			fuel	fuel		
				energy	energy		
Global	fuel			fuel	fuel	fuel	
				energy	energy	energy	



* data referred to "Pane Toscano a lievitazione naturale", waiting for approval of the official PDO

Source: our elaboration on Food supply chain framework (World Food System Center, Zürich, 2013)

The local bread supply chain takes place on one single farm, situated in the province of Pisa (rural area in central east part of Tuscany) from cultivation of grains to milling, baking and final sale of bread loafs (among other bakery products). Floriddia family farm extends for more than 300 hectares, and employs 12 full time workers. Originally founded by their father, today the farm is led by Rosario and Giovanni, the two sons. The farm turned to organic agriculture in 1987, then started to experiment with the cultivation of ancient varieties of wheat and gradually decided to invest in on farm milling and baking facilities. Thanks to a collaboration with the Rural Seed Network and the local association for organic farming (CTPB) Floriddia experienced that the old varieties in rotation with legumes can achieve excellent results in terms of yields and decided to devote all its land to it. Technologically advanced milling and baking facilities have represented a major investment, partially funded by rural development measure. Milling and baking activi-

ties are keen on preserving the nutritional value of wheat, allowing processing of low gluten, wholegrain flours and sourdough for fermentation. The clientele is varied: from individual private companies that operate mainly in the catering industry (restaurants, pizzerias, gastropubs, shops) and solidarity purchasing groups (GAS) who regularly prepare their list through the website. The e-commerce service is available to any customers throughout the country but it is also possible to come personally to buy the products directly on farm.

Figure 4 - WFSC framework – Wheat to bread supply chain: local case

Scale	Production inputs	Agricultural Production	Grain handling	Milling	Baking	Distribution	Consumption
Local	land and seeds	Organic farm production of several varieties of ancient wheat, soft and hard	On farm storage	Flour type 1 and 2 (stone milling)	Artisanal baking	Direct Sale GAS	Semi-wholegrain bread
	water			energy (solar panels on farm)	other ingredients (olive oil, salt, water, sourdough and bakers' yeast)		
	workers			energy (solar panels on farm)	energy (solar panels on farm)		
Regional	seeds					On line sale	Semi-wholegrain bread 3,9 euro kg
National	seeds			machinery	machinery		
	machinery			energy	energy		
Continental	fuel						
	energy			energy	energy		
Global	fuel						
	energy						



Source: our elaboration on Food supply chain framework (World Food System Center, Zürich, 2013)

3.2 Preliminary Assessment across the three chains

Table 1 indicates the attributes (in alphabetical order) in the first column, then the critical issues emerging from relevant related references (second and third columns). This provides a support to define the meaning of each attribute for the following preliminary assessment of the cases. The fourth column indicates a synthetic evaluation on the extent to which the attribute is discriminating among the local, the regional and the global chains (high, medium, low). The last column gives a preliminary judgement on the best performance among the three chains relative to each attribute (with a synthetic explanation).

ATTRIBUTE	Literature analysis		Expert Judgment on the three bread chains	
	CRITICAL ASPECT	SCIENTIFIC ARTICLES AND CONFERENCE PAPERS RELATED TO THE BREAD CHAIN	DIFFERENCES AMONG CHAINS (LOW MEDIUM HIGH)	SUPPLY CHAIN WITH BEST (EXPECTED) PERFORMANCE
AFFORDABILITY	Possibility to access nutritious and healthy bread for low income families, across cities and city areas, in developing countries	Smith et al. 2013; Flynn et al. 2012; Olaoye and Ade-Omowaye 2013; Mason et al. 2011; Lopez-Class and Hosler, 2010; Caraher et al. 2010; Duvenage and Schönfeldt, 2007; Ploeg et al. 2009;	Medium	Regional: it allows relatively wider access, at an average price for a high nutritional value
BIODIVERSITY	Effects of the decrease in bread wheat genetic diversity in terms of environmental change Ancient varieties of wheat and sourdough fermentation Construction of indicators for measuring biodiversity Evolution of bread wheat varieties in organic farming Quality of bread prepared with old varieties vs bread prepared with improved ones Role of agricultural cooperatives in sustaining wheat productivity and diversity	Bonnin et al. 2014; Coda et al. 2014; Bonneuil et al. 2012; Dawson et al. 2012; Gallo et al. 2009; Falco et al. 2008	High	Local: it experiments with ancient wheat landraces and organic agriculture methods
CONNECTION (OR RELATIONSHIP, OR COOPERATION)	Role of social relationships in organic cereal networks Embeddedness in conventional and alternative bread supply chains Identity preserved sourcing relationships between wheat growers and bakeries for improved coordination and quality chains	Milestad et al, 2010; Magnan, 2011; Penker, 2006	Medium	Local chain is integrated with the organic cereal network, the rural seed network, with research and cooperatives. Regional is connected by definition. The global chain has many connections but more widespread .
CONSUMER BEHAVIOR	Consumer bread consumption in relation to health and nutritional information Consumer behavior of vulnerable societal groups (pregnant women, children, poor)	Hellyer et al. 2012; Barre et al, 2011; Freedman and Bartoli, 2013	High	Incomparable. The global, regional and local chains are very different in terms of consumer behavior which characterizes as: daily consumption for regional, substitution role for industrial, occasional consumption for the local
ECONOMIC AND ECOLOGICAL EFFICIENCY	Genetic progress in wheat yield vs nitrogen use Energy efficiency improvements in baking ovens	Khatir et al. 2013; Tsegaye, 2012; Ortiz-Monasterio et al. 1997	Low	Global and Local respectively perform well in economic and ecological efficiency



FARMERS INCOME AND VALUE ADDED RECEIVED	Role of farmers cooperatives for aggregation, increased yields, adaptation to scarcity and , impact of subsidy policies, price transmission along the chain.	Rumánková, 2014; Cacchiarelli et al. 2013; Douglas et al, 2014; Jat et al. 2014; Schenk et al. 2014; Pan et al. 2014; Li and Rui, 2013; Kimura et al. 2010	Medium	Regional: premium prices are secured by contract. Farmers with Barilla are secured by contracts. Floriddia is autonomous and retains the added value he produces
FOOD SECURITY	Increased wheat productivity in relation of scarce resources, conservation of adaptable local landraces, political instability, impact of biofuel on food availability, sustainability.	He et al. 2013; Ozbek, 2014; Mujeeb-Kazi et al. 2013; Ahmed et al. 2012; Sternberg 2012; Azapagic et al. 2010; Pimentel et al. 2009;	Low	Global and Regional and Local chains contribute to food security in different ways (increased wheat and bread productivity vs. adaptability of local varieties).
GOVERNANCE AND EVEN DISTRIBUTION OF POWER	Governance responses to socio ecological risk Governance changes to increase transparency in the chain and allow full traceability	Bardsley and Bardsley, 2014; Barling et al. 2009	High	Regional and Local: both bread chains contribute drastically to increased chain transparency, in response to socio ecological risk
INFORMATION AND COMMUNICATION	Consumer perception of bread quality, organic vs conventional bread. Effects of information on consumer preference. Information of functional ingredients on bread choice	Hellyer et al. 2012; Gellynck et al. 2009; Annet et al. 2008; Kihlberg et al. 2005;	High	Global Information and communication activity is very intense in the global chain, also on sustainability matters
NUTRITION	Ingredients, baking methods, and types of bread can have health impacts: salt reduction, wholegrain, variety of grains, fiber. Potential of sourdough fermentation and baking techniques to improve nutritional properties of bread. Fortification of staple foods. Consumer attitude towards gluten free products Value of label design and nutritional labeling format on consumer attention.	Antúnez et al. 2013; Talaei et al, 2013; Békés, 2012; Belz et al. 2012; Jones, 2011; Dewettinck et al. 2008; Katina et al. 2005; Yusufali et al, 2012; Ozola and Straumite, 2012	High	Local has the best performing product with respect to most parameters emerging from literature. Regional chain is also very focused on nutritional quality.
PROFITABILITY FOR FARMERS, PROCESSORS AND RETAILERS / COMPETITIVENESS	Selection decisions on healthier foods by retailers in terms of profitability Competition enforcement in the wheat to bread sector to guarantee lower prices for consumers. Concentration in the milling and baking sectors as barriers to market entry Quality of relationships impact on SMEs competitiveness	Ayala et al. 2012; Bonakele and Mncube, 2012; Tsegaye, 2012; Gracia et al. 2010; Louw et al, 2013	Medium	Not enough information to date

<p>RESILIENCE AND LOCAL DEVELOPMENT</p>	<p>Innovative governance responses to socio-ecological risk and roles of cooperatives; Benefits for production, resilience and conservation are linked to biodiversity</p>	<p>Bardsley, D.K., Bardsley, 2014; Enjalbert, 2011</p>	<p>High</p>	<p>Local: organic and ancient wheat varieties increase adaptability, while short chain reduces dependence from policy support and adds quality to the product</p>
<p>RESOURCE USE AND POLLUTION</p>	<p>LCA, Environmental impacts of bread production at different scales (industrial, artisanal, home baking), of different baking methods and other parameters: country of origin of wheat, production method, type of flour, type of packaging (plastic and paper bags), bread losses and waste</p>	<p>Andersson, 2000; Andersson, K., Ohlsson, 1999; Espinoza-Orias et al, 2011; Jury et al 2011; Meisterling et al. 2009; Williams et al 2010; Moudry et al, 2013; Yadav and Marshall, 2011; Williams and Wikstrom, 2011; Koskela et al, 2014; Ruini et al 2014, 2012</p>	<p>High</p>	<p>Local. Industrial bread LCA identifies that what impacts the most is wheat production and consumer behavior, thus the local organic case is best in this sense. The industrial prototype (high level technology) also guarantees a lower environmental impact and resource use during processing. Consumer behavior in terms of waste is low across chains. The local uses paper package, not plastic.</p>
<p>RESPONSIBILITY (CHAIN AND MARKET, STATE)</p>	<p>Corporate social responsibility of processors and retailers Bread subsidies and social/ political stability (e.g. Egyptian uprising)</p>	<p>Magnan, 2011; Forsman-Hugg, 2013; Salevurakis</p>	<p>Medium</p>	<p>Global is relevant in terms of CSR, Regional entails a political responsibility related to financial support</p>
<p>SAFETY</p>	<p>Food safety challenges of traditional foods and role of good manufacturing practices Effects of sourdough fermentation on mycotoxins Dissipation of pesticides during bread making</p>	<p>Lücke and Zangerl, 2014; Vidal et al, 2014; Cauvain, 2012; Sharma, 2005</p>	<p>Low</p>	<p>Local, regional and global chains have all a high safety profile</p>
<p>TECHNOLOGICAL INNOVATION</p>	<p>Genetic improvement of wheat cultivars, yield improvement; innovations in machinery for milling and bread processing; standardization of sourdough technology; Suitability of commercial starters for the production of gluten free sourdoughs, innovation is related to health, pleasure, and convenience</p>	<p>Martinez-Monzo et al. 2013; Campbell et al. 2012; Skudra and Linina, 2011; Moroni et al. 2010; Sener et al. 2009; Clarke and Arendt, 2005; Rolfo et al. 1993.</p>	<p>Medium</p>	<p>Regional: innovation all along the chain (financed), traceability (including grains) and standardization of sourdough technology. Also the local chain has made a lot of investments in innovative technologies.</p>

TERRITORIALITY	<p>Perception of consumers and willingness to pay for locality and organic Protected Designations of Origin and bread quality features Locally adapted bread varieties and ancient wheats</p>	<p>Naspetti and Bodini, 2008; Pasqualone, 2013; Piergiovanni 2013</p>	High	<p>Local and regional have a very strong link to territory</p>
TRACEABILITY	<p>Ethical aspects of traceability and communication to the consumer Shift towards higher quality and identity preserved wheat (varietal traceability)</p>	<p>Barling et al., 2009; Magnan, 2011; Pasqualone, 2013</p>	Medium	<p>Local and regional chains guarantee full traceability (including wheat provenance)</p>
WASTE (OF BREAD)	<p>Identification of bread waste determinants Innovation to retard bread staling and role of packaging in preventing bread loss Bread waste valorization options (and environmental impacts) Comparison of bread production at different scales and different waste management options</p>	<p>Vandermeersch et al, 2014; Fadda et al. 2014; Freedman and Bartoli, 2013; Espinoza-Orias et al. 2011; Williams and Wikiström, 2011; Mohammadi, 2007; Rosing and Nielsen, 2004; Andersson and Ohlsson, 1999</p>	Medium	<p>Global bread and Local bread have low levels of waste but for different reasons</p>

4. Conclusions

The bread sector provides an interesting case in terms of local/global contrasts and we have shown how these are linked to all steps of the supply chain, from raw material production, transformation processes and consumption. We have also explored the meaning of a comprehensive set of sustainability attributes and identified major critical aspects, in the light of the wide scientific literature available on the wheat to bread chain. This provided a basis for a comprehensive - but preliminary - assessment of three bread supply chains, distinguished in relation to level of localness/globalness. In particular, the analysis allowed us to identify which attributes are most discriminating among chains of different lengths which should be further explored through suitable indicators in order to obtain a more solid understanding on the wheat to bread chain sustainability performance.

Among the most relevant attributes for comparison, nutritional quality of bread plays a central role and covers a wide spectrum of characteristics, from ingredients, leavening method, type of flour, salt quantity, etc... Also biodiversity plays a crucial role on bread final quality, in terms of wheat varieties used for milling and link with territoriality. Governance features and information / communication are also very distinctive among the cases selected. Last but not least, environmental impacts – although assessed for the Barilla supply chain (EPD, Barilla, 2011) – need further and thorough assessment relative to the other context.

This preliminary analysis represents a starting point for two further developments. First we will develop a participatory assessment of the attributes with the objective of identifying which emerge (and for whom) as most relevant out of the 19 attributes of reference. In particular participatory checklists will help the evaluation building process allowing for the integration of different points of view, values and judgement criteria of different stakeholders (actors affected by positive or negative supply chains effects). Secondly a multi criteria analysis based on indicators of performance for a subset of attributes would help in highlighting the performance assessment in a transparent and comprehensive way.

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Antitrust intervention and price transmission in pasta supply chain

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Abstract:

Italy has the peculiarity of being, at the same time, the main producer and consumer of pasta; thus, pasta represents a strategic product in the Italian agro-food industry. During the last several years, wheat-pasta chains have been strongly affected by some changes. For example, CAP reforms in the durum wheat sector have progressively reduced government intervention in the market and, starting in the spring of 2007 until March 2008, the semolina and pasta maker stages experienced important production cost increases due to the increase in the price of durum wheat. Furthermore, a case of anticompetitive practices against pasta makers was identified and sanctioned by the Italian Antitrust Authority for the period between October 2006 and, at least, March 2008 (Antitrust 2009). Specifically, based on Antitrust sentence Italian pasta makers (about 90% of Italian market) and two Industrial Unions of Italian pasta makers have put into practice a restrictive-competition accord aimed at harmonizing increases in the sale price for semolina dry pasta that applies to the retail sector.

A useful way to analyze pasta makers' behavior, before and after antitrust sentence, is to investigate whether and how the mechanism of the transmission price, specifically the pasta producer price adjustment process to semolina price variations, was changed with antitrust intervention. The issue of price transmission along the food chain has attracted considerable interest in the EU because of the welfare and policy implications that could potentially be generated. If price increases are more rapidly and completely transmitted through the supply chain than price decrease, then, possible consumer welfare loss may exist.

We employed Kinnucan and Forker model which has been employed in literature for analyzing the impact of a policy intervention on farm-to-retail price transmission in the fluid milk market. Monthly data concerning prices of semolina and pasta producer and cost indexes as labour and energy from January 2005 to September 2013 for Italy were employed. After having conducted a preliminary test to determine whether structural change occurred between before and after antitrust sentence we split dataset into two periods: January 2005-August 2008 (Pre-Sentence) and September 2008-September 2013 (Post-sentence). The estimates showed that in the Pre-Sentence period, the model presents a fast upward adjustment of pasta producer price in response to semolina price increases while the effects of semolina price decreases on producer pasta price were much lower in magnitude than the effects of increases. Long-run asymmetry test proved positive asymmetric price transmission, at 1% of level of significance, representing a confirmation of the pasta makers' anticompetitive behavior. The Post-sentence model shows that pasta producer price adjustment process to semolina price changes presents negative net effect because of the price increases are lower than price decreases. In this case long-run asymmetry test confirms a negative asymmetric price transmission at 10% of level of significance. Consequently, the analysis of the transmission price between semolina and pasta has exhibited that antitrust intervention would seem have produced some substantial effects in the Italian pasta market by restoring a state of appreciable competition among companies.

JEL Classification codes: D49, L49

Keywords: pasta, food supply chain, price transmission, antitrust

Introduction

Vertical price transmission along the food chain has attracted considerable interest in the EU (EU, 2009) because of the welfare and policy implications that could potentially be generated. Perfect transmission of price shocks occurs when changes in prices at a given level of the chain are fully and instantaneously transmitted to the other stages. Therefore, if price increases are more rapidly and completely transmitted through the supply chain than price decrease, then, possible consumer welfare loss may exist (Meyer and von Cramon-Taubadel, 2004; Vavra & Goodwin, 2005).

Among the possible factors that may explain the presence of asymmetries in price transmission along a food chain, many authors suggest the exercise of market power at the processing and retailing stage (Peltzman, 2000; Lloyd et al. 2006).

Pasta represents a strategic product in the Italian agro-food industry since Italy has the peculiarity of being, at the same time, the main producer and consumer of pasta. During the last several years, wheat-pasta chains have been strongly affected by some changes. For example, CAP reforms in the durum wheat sector have progressively reduced government intervention in the market. Furthermore, starting in the spring of 2007 until March 2008, durum wheat prices have increased sharply causing important costs increases for the semolina and pasta maker stages. Finally, a case of anticompetitive practices against pasta makers was identified and sanctioned by the Italian Antitrust Authority for the period between October 2006 and, at least, March 2008 (Antitrust, 2009). Specifically, based on Antitrust sentence Italian pasta makers (about 90% of all firms in the Italian market) and two Industrial Unions of Italian pasta makers have put into practice a restrictive-competition accord aimed at harmonizing increases in the sale price for semolina dry pasta that applies to the retail sector.

Our goal is to investigate whether antitrust intervention has produced some substantial effects in the Italian pasta market by restoring a state of appreciable competition among firms.

A useful way to analyze pasta makers' behavior, before and after antitrust sentence, is to investigate whether and how the mechanism of the transmission price, specifically the pasta producer price adjustment process to semolina price variations, was changed with antitrust intervention.

Methodology

Based on structural characteristics of the pasta chain and preliminary tests on the direction of causality, among the various models of the asymmetric price transmission methodology we employed Kinnucan and Forker model (1987) which has been used in literature for analyzing the impact of a policy intervention on farm-to-retail price transmission in the fluid milk market (Cacchiarelli et al., 2013).

In the pass-through between semolina and pasta producer price the specification model assumes the following form (1):

$$PA_t = \alpha T + \sum_{i=0}^{M1} \pi_i^r SR_{t-i} + \sum_{i=0}^{M2} \pi_i^f SF_{t-i} + \delta C_t + \varepsilon_t$$

Where PA_t is the accumulated change in pasta producer price, T is a time trend variable,

$$SR_t = SR_1 \sum_{i=0}^{t-1} \text{Max}(\Delta S_{t-i}, 0)$$

measures the accumulated increases in semolina price up to period t , while

$$SF_t = SF_1 \sum_{i=0}^{t-1} \text{Min}(\Delta S_{t-i}, 0)$$

measures the accumulated decreases in semolina price up to period t , with $\Delta S_t = S_t - S_{t-1}$, $S_t \cdot C_t$ is the accumulated changes in marketing costs, and, finally, is a stochastic disturbance. The semolina-pasta model is presented in a completely general form, which allows different numbers of lagged values to be incorporated. This implies that pasta producer price could respond differently to rising and falling semolina prices with respect to both the magnitude and speed. In effect, the different superscripts on the summation term of increasing (M1) and decreasing (M2) variables allows that price transmission does not necessarily require the same number of lags for the two different components.

Neither theory nor empirical studies suggest the exact number of lagged values to include in both models, therefore, we proceeded to evaluate different structures and chosen the model that best fits the data. In the semolina-pasta model, we determined that the best lag structure incorporates the current period and three lagged prices both for increasing and decreasing components.

In this study the main focus is to identify the presence of asymmetries in price transmission between the two selected stages of the pasta chain. To determine whether pasta producer price responds in an asymmetric way to semolina price changes, we conduct two different tests:

$$H_0: \pi_i^r = \pi_i^f ; H_a: \pi_i^r \neq \pi_i^f \text{ for lags } i = 0, 1, 2, 3 \quad (2)$$

and;

$$H_0 = \sum_i^3 \pi_i^r = \sum_i^3 \pi_i^f ; H_a = \sum_i^3 \pi_i^r \neq \sum_i^3 \pi_i^f \quad (3)$$

Hypotesis test (2) is sometimes referred to as short-run tests of asymmetry and was performed on the individual parameters. This hypothesis focuses on the equality of transmission rates during the same period for increasing and decreasing upstream prices. In the second hypothesis test shown in equation (3), all lagged variables are incorporated both for increasing and decreasing components of the model to test whether the pasta prices return to same level after equivalent increases and decreases in the semolina prices. This type of test is referred as of long-run asymmetry.

Results

We employed monthly data provided by Istituto di Servizi per il Mercato Agricolo Alimentare (ISMEA) and The National Institute for Statistics (Istat). Data concern prices of semolina and pasta producer and cost indexes as labour and energy from January 2005 to August 2013 for Italy. After having conducted a preliminary test to determine whether structural change in the price transmission occurred with prices instability and antitrust intervention we split dataset into two periods: January 2005-August 2008 (Pre-Antitrust intervention) and September 2008-August 2013 (Post-Antitrust intervention). Finally, we conducted tests on stationarity and cointegration of the time series employed in the model. Specifically, two alternative tests, the augmented Dickey-Fuller (ADF) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test, were used to determine whether the time series were stationary while for cointegration tests we employed the Granger and Engle (1987) procedure. The results show that variables in the models were non-stationary and cointegrated.

The models were estimated by generalized least-squares using Prais-Winsten methods due to serial correlation of the errors.

Capps & Sherwell (2007) argue that pre-cointegration approach such as Kinnucan and Forker model might not be the best one to be used in the situations where data exhibit non-stationarity

properties. They suggest that in the case in which the variables are cointegrated the Asymmetric Error Correction Model (ECM) might be a superior alternative to pre-cointegration models. However, after having estimated both Kinnucan and Forker and ECM model to analyze the price transmission before and after antitrust authority intervention, we concluded that the results were essentially statistically similar.

As a consequence, only the estimates of the first model are reported in Table 1. In the Pre-Antitrust intervention period, the model presents a fast upward adjustment of pasta producer price in response to semolina price increases. The current period effect is statistically significant at the one percent level of significance and is the coefficient estimated with the greatest magnitude. In the subsequent three months, the first and the third show negligible and insignificant downward movements while the second an additional increase, significant at the ten percent level. The effects of price decreases on semolina price are overall much lower in magnitude than the effects of increases. While the current period presents a positive and insignificant coefficient the first month is characterized by a significant and wide upward movement (negative coefficient). The last two months conclude the price transmission with a large and statistically significant downward correction. Finally, the processing cost increases were estimated to have no statistically significant effects on pasta price.

Tab 1. Estimated Pre-Antitrust Sentence and Post-Antitrust Sentence pasta producer price models

	Jan2005-Aug2008		Sept2008-Sept2013	
	Estimate	t	Estimate	T
Rising semolina price coefficients				
Current period	0.768	5.48*	-0.417	-3.57*
One month	-0.016	-0.110	0.219	1.91***
Two month	0.591	3.92*	-0.063	-0.530
Three month	-0.029	-0.190	0.300	2.62**
Falling semolina price coefficients				
Current period	0.493	1.52	-0.137	-0.68
One month	-2.737	-6.81*	0.712	3.2*
Two month	0.891	1.95***	0.199	0.92
Three month	1.642	4.22*	0.009	0.06
Other costs				
Labour	-0.002	-0.990	0.000	-0.500
Energy	0.000	0.380	0.000	0.260
Trend	-0.001	-1.81***	0.004	3.37*
Aggregate lagged effect				
Sum of rising coefficient	1.314		0.039	
Sum of falling coefficient	0.288		0.783	
Difference	1.026	3.61*	-0.745	3.65*
R2	0.92		0.88	
Durbin-Watson	1.88		1.67	
Sample size	44		60	

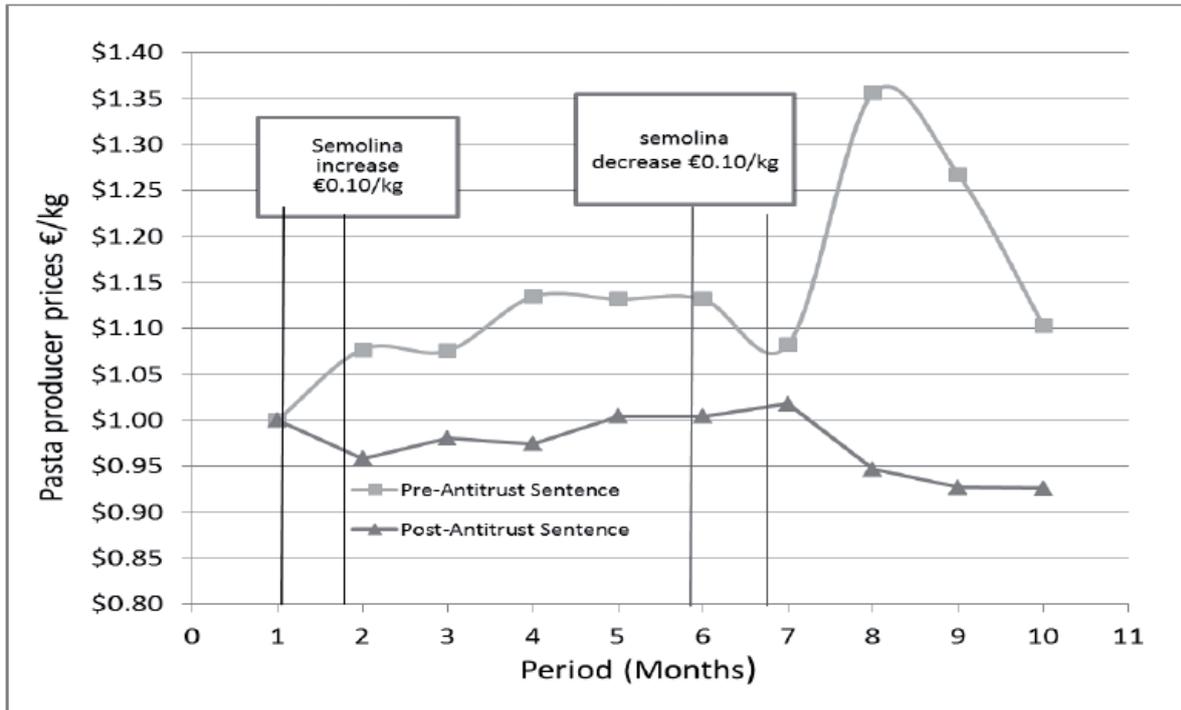
*Statistically different from zero at 1%;** Statistically different from zero at 5%;***Statistically different from zero at 10%;

In the Post-Antitrust intervention period, the results show a great difference in the pasta price adjustment process to semolina price changes when compared to the Pre-Antitrust intervention model. In particular, the effect of price increases is overall negligible while semolina price decreases are transmitted with a greater intensity than in the previous period.

A useful way to illustrate pasta producer price response is to capture the accumulated current and lagged effects, holding all other effects constant, by simulating equivalent semolina price increases and decreases (Figure 1). An initial pasta producer price of €1.00 per kilo is assumed. After two months, we assume a semolina price increase of €0.10 per kilo and allow these effects to fully impact the pasta producer prices without introducing any other changes until the sixth month (this allows all estimated lagged increases to fully impact the semolina price). For

the Pre-Antitrust intervention period, in the current period pasta price increases to €1.078 per kilo, followed by a slight downward movement, a further but less marked raise and a another imperceptible decrease. Thus, by considering the net effect of about €0.13 we can argue that the transmission rate of a semolina price increase on pasta price was about 130%.

Figure 1. Estimated effect on pasta producer price of an equivalent semolina price increase and decrease



After the adjustment process was complete, we introduce an equivalent reduction of €0.10 per kilo on semolina price. As a result, the final pasta producer price fails to return to the initial level remaining at about €1.10 per kilo. For comparison purpose, we set up the same simulation in the Post-Antitrust intervention period. In this case, the pasta price adjustment to semolina price increase produces a price of 1.004 with a transmission rate of 0.4%. Next, we examine the impact of a semolina price decrease of €0.10. The final result was €0.93 per kilo, which is lower than the initial pasta price. The aggregate partial analysis provides an interesting comparison of the two periods, with a strong indication of positive long-run asymmetry in the Pre-Antitrust intervention period, which then moves to an evidence of negative asymmetry after Antitrust Authority intervention.

The next step is to test whether the observed asymmetric price transmission behavior we found for pasta producer prices are statistically significant.

As mentioned above, we apply two different hypothesis tests (the results are reported in Table 2). In the first test (short-run asymmetry), the null hypothesis is the equality of transmission speed of adjustment during the same period for upstream price increases and decreases. The second test, referred to as long-run asymmetry, provides statistical evidence about whether downstream price returns to the same level after equivalent upstream price increases and decreases.

Regarding short-run asymmetry test we found some evidences exclusively in the Pre-sentence period while after antitrust intervention, the transmission speed of adjustment during the same period for upstream price increases and decreases is statistically equal.

The results of the second test show that in both periods we reject the long-run symmetry null hypothesis. This allows us to confirm that: i) there is a statistical evidence, at 1% of level of significance, that net changes in prices was greater following equivalent increases and decreases in semolina prices before the intervention of Italian antitrust; ii) after antitrust authority action, there is a statistical evidence, at 1% of level of significance, that, after an equivalent increases and decreases in upstream prices, the final price is lower than its initial level.

Table 2. Hypothesis tests of asymmetric pasta producer price response for Pre-Antitrust and Post-Antitrust

	Period	Jan 2005-Aug 2008	Sept 2008-Aug 2013
Rising semolina price coefficient vs Falling semolina price coefficient	Current	0.54	1.51
	1 st month	39.2*	2.79
	2 nd month	0.38	1.46
	3 rd month	15.41*	0.21
Sum of Rising coefficients vs Sum of Falling coefficients		13.09*	13.33*

*Statistically different from zero at level of significance 1%;

Conclusion

Pasta represents a strategic product in the Italian agro-food industry. In the last years, among the events which have characterized the Italian pasta supply chain such as CAP reform and prices instability, a case of anticompetitive practices against pasta makers was identified and sanctioned by the Italian Antitrust Authority.

Our goal was to investigate whether antitrust intervention has produced some substantial effects in the Italian pasta market by restoring a state of appreciable competition among firms.

A useful way to analyze pasta makers' behavior, before and after antitrust intervention, was to investigate whether and how the mechanism of the transmission price, specifically the pasta producer price adjustment process to semolina price variations, was changed.

The empirical analysis showed interesting changes to price transmission in the pasta market with the antitrust intervention. While in the Pre-Intervention period the effects of semolina price decreases on producer pasta price were much lower in magnitude than the effects of increases, after Antitrust Authority action pasta producer price responded to semolina increases in a completely different way by incorporating only a minimum part of the cost rises of the raw material. Furthermore, the effect of semolina decreases on producer pasta price was greater than that shown before of the Authority action. Therefore, the net effect was negative because of the price increases that were lower than price decreases.

The long-run asymmetry tests confirm, respectively, a positive asymmetric price transmission in the first period (2005-Aug 2008) and a negative asymmetric adjustment of pasta producer price in response to semolina price changes in the second (Sept 2008-Aug 2013) one.

Consequently, the analysis of the price transmission has showed that antitrust intervention would seem have produced some substantial effects in the Italian pasta market by restoring a state of high competition among companies. However, among the reasons which could have pushed firms to a higher competition, it is important to consider that in the last years, as suggested by Cacchiarelli (2014), the role played by retailers is decisively more important. In fact, retailers,

entering pasta market through private labels, have improved their bargaining power toward pasta makers. Based on the last sentences, it is worthwhile to briefly underline the importance of competition law in the food supply chain which connects sectors with a very articulated structure. The agricultural sector is characterized by highly fragmented production while the market structure in processing and retailing stages is much more concentrated. This often allows processors and retailers to exert their potential market power to extract rent from government interventions sustaining farmers by different forms of subsidies. Therefore, for an effective antitrust policy it is crucial both the monitoring activities

of antitrust authority and the measures of the Common Agricultural Policy (CAP) which can be successful in rebalancing the market power among the sectors of the agro-food chains. In effect, although national antitrust authorities can intervene, as we demonstrated in this paper, by restoring a state of competition among companies this is not sufficient to prevent anti-competitive conducts. This goal can be reached through a policy which might improve the bargaining power of farmers. In this direction, we consider very useful the measures of the 2013 CAP Reform to strengthen and extend the role for Producer Organisation and Interbranch Organisation in all agricultural sectors for their capability to concentrate producers' supply and provide alternative marketing channels with more balanced contracts and transactions.

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The taste of sustainability: effect of labeling on consumers liking and willingness-to-pay for wine

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Abstract:

While a growing amount of research investigates consumers' attitude and behavior toward sustainable wine, to date, little research has assessed the influence of specific sustainability labels on taste evaluations. Current paper, applying experimental auctions, reveals that respondents (N=100) assign a significantly higher WTP and better taste ratings to the sustainability labeled wines compared to the same conventional wine with no sustainability sign, indicating a pure label effect.

JEL codes: D44; Q13

Keywords: Sustainability label; wine; willingness-to-pay; experimental auctions

Introduction

Sustainable consumption, i.e. consumption practices, where consumers take into account effects on the social and natural environment, has been a growing trend in many developed countries for over a decade. However most consumers claim to consider sustainability issues generally important and desirable, this does not necessarily translate into manifest sustainable consumer behavior. Indeed, previous research highlights the importance of consumer motivation and consumer knowledge for use of sustainability information on food products, and additionally underlines the importance of trade-offs between sustainability and other product information when making food choices (Grunert *et al.*, 2014). Nonetheless, it is well known that consumers tend to base their evaluations of products on extrinsic product cues (e.g., price, appearance, or tags) rather than intrinsic cues (e.g., quality or nutritional value) (Pohl, 2004). Thus, external cues generate expectations about food products and influence consumer choice, sensory perception and hedonic liking of food, according to 'expectation theory' (Deliza and MacFie, 1996). In general before tasting a particular food product consumers usually have an idea of what its sensory characteristics might be (sensory expectations) and how much they will like or dislike it (hedonic expectations), (see among others Olson and Dover, 1979). Furthermore the role of credence in the marketing of food has recently increased (Grunert *et al.*, 2000), covering a wide range of categories, from health properties, to production methods, origin and environmental/social certifications and labels (Moser *et al.*, 2011). Literature demonstrates that wine is judged to taste better when it is believed to be more expensive (Plassmann *et al.*, 2008), while beer is judged to taste better if it bears the label of one's favorite brand (Allison and Uhl, 1964); and products are judged to taste better if they are labeled with fancy premium brand logos. Furthermore several recent studies reveal consumer general interest toward environmentally friendly or socially responsible wines (Berghoef and Dodds, 2011; Mueller and Remaud, 2013; Ginon *et al.*, 2014; Pomarici and Vecchio, 2014). Alongside some research has also found significant availability of consumers to pay a premium price for these wines (Vecchio, 2013). Despite a growing amount of research producing insights into consumers' attitude and behavior toward sustainable wine, to date, little research has assessed the influence of specific sustainability labels on taste. The current study focuses on a specific market segment and on a particular sustainability label, as previous research have demonstrated that young consumers are a promising target for sustain-

able food products (Vecchio and Annunziata, 2013) and a wide-ranging label is more appropriate than a single-aimed label (such as an environmental-friendly or fair-trade certification).

Data and Methodology

We recruited 100 subjects among Italian university undergraduates (representing various fields of study, e.g., law, business administration, humanities, social sciences), the only requirement was to be a wine consumer (at least once a month). Drawing on the work of Combris and colleagues (2009), we organized 10 sessions with 10 participants each. Respondents were randomly assigned to a specific treatment: control group or experimental group (see Figure 1 below for further details). No reference price was given to respondents since previous scholars have demonstrated that provision of reference or field price information influences bid values in experimental auctions (Drichoutis *et al.*, 2008; Corrigan and Rousu, 2006). The full bidding approach was used, asking participants to bid on two wines, *ceteris paribus* (a Cabernet Sauvignon and a Merlot¹ from the same producer, same geographical origin and same vintages). Two training auctions were organized using chocolate snacks and potato chips. Subjects were endowed for participating in the experiments with €10 cash at the end of the session. In addition, we carefully explained that only one scenario and one product were binding, to avoid demand reductions and wealth effects. Fifth-price auctions were applied (Vickrey, 1961). Respondents completed a short questionnaire after the auction. Information on socio-demographics, lifestyle, attitudes towards the environment and society, wine consumption habits and knowledge of sustainability practices were collected². No communication between participants was permitted, while participants were welcomed to ask questions to the researchers at any time. All data was analyzed with SPSS statistics (version 21). A between sample procedure was applied: 50 subjects (control group) participated in an experiment in which they first were asked to bid for the two wines just observing the bottles carrying no sustainability label (Visual scenario) and subsequently taste the wines (ISO glasses were used with 30 ml of wine, tasting occurred in a sensory analysis laboratory), bid again and rate overall liking on a continuous nine-point hedonic scale (100mm vertical line) - each point on the hedonic scale was assigned a value ranging from 1 to 9 (Taste scenario)-; 50 respondents (experimental group) completed the same procedure (Visual and Taste scenarios) with the wine bottles carrying the VIVA sustainability label - a certification assigned by the Italian Environmental Minister considering air emissions, water footprint, vineyard management and landscape preservation. In both scenarios, the bottles carried only the denomination of origin, vintage, alcoholic volume (13% for both wines) and grapevine while the order of presentation was balanced to account for first order and carry-over effects (MacFie *et al.*, 1989) and brand/producer name were blinded. We applied the 9-point hedonic scale (Peryam and Girardot, 1952; Peryam and Pilgrim, 1957) as it is the most commonly used scale for testing consumer preference and acceptability of foods. However we do recognize that this scale has several important limitations, as the inequality of scale intervals, the lack of a zero point (Peryam and Pilgrim, 1957; Moskowitz and Sidel, 1971) and its high vulnerability to ceiling effects (Schutz and Cardello, 2001).

1. We decided to use these two types of wines due to general public familiarity and wide availability in the market.

2. In particular, a reduced and modified version of the New Ecological Paradigm (NEP) scale was applied to evaluate attitudes towards the environment (Dunlap *et al.*, 2000), while for society items were adapted from Sparks and Shepherd (1992) and Shaw and Shiu (2003).

Figure 1 – Experimental procedure

Control Group (N=50)		Experimental Group (N=50) 
Visual Scenario		Visual Scenario
2 wines with conventional commercial labeling showed to respondents. Full bidding procedure.		2 wines with conventional commercial labeling + VIVA certification showed to respondents. Full bidding procedure.
Tasting Scenario		Tasting Scenario
Respondents taste the same 2 wines with conventional commercial labeling. Full bidding procedure. Overall liking rating.		Respondents taste the same 2 wines with conventional commercial labeling + VIVA certification. Full bidding procedure.
		Overall liking rating.
Four winners pay the randomly drawn wine (5 th price).		Four winners pay the randomly drawn wine (5 th price).
Additional information is collected.		Additional information is collected.
Subjects receive endowment for participation.		Subjects receive endowment for participation.

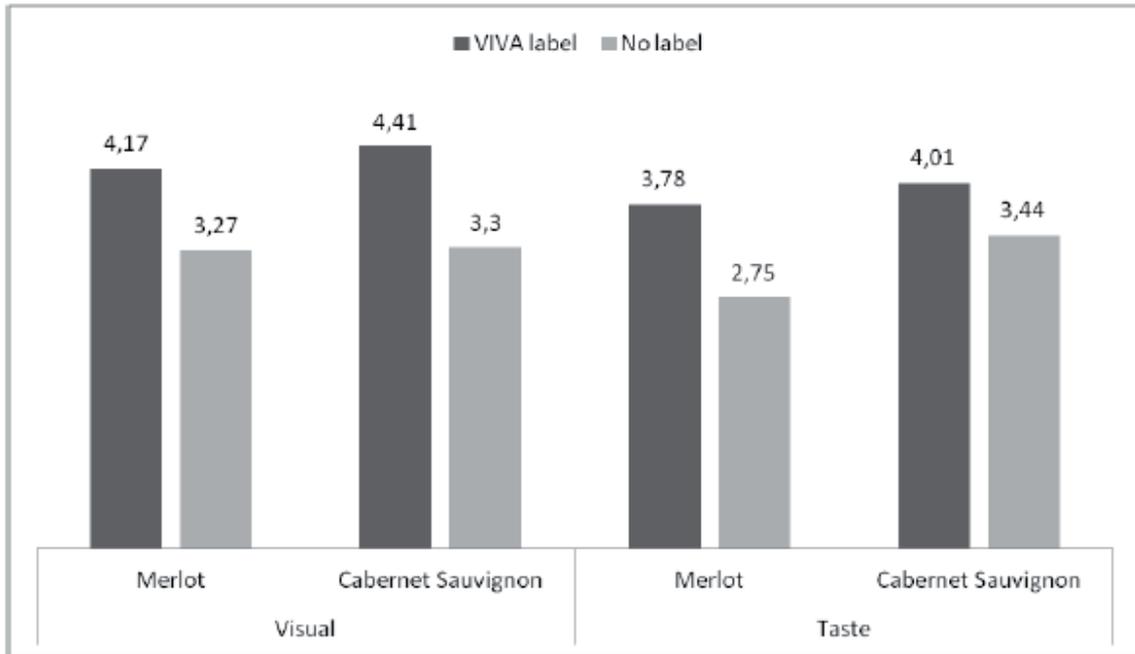
Since bids were limited from 0 to €10 and the panel nature of data, two random-effects Tobit models were considered appropriate to analyze WTPs, in particular the models were (for both Merlot and Cabernet Sauvignon): $y^*_{ij} = \alpha + \beta X_{ij} + U_i + u_{ij}$ where α is the average bid for the entire population, X_{ij} are the independent variables, β is the parameter, U_i represents the individual random effects, and u_{ij} is the error term of individual i for wine j . Likelihood-ratio tests were fulfilled to compare the random-effects models with the standard Tobit models.

Results

Results show, in accordance with existing research insights, that consumers tend to assign a premium to sustainable products over conventional ones³. In particular outcomes reveal that even if respondents tasted the identical products, they ascribe a significantly higher WTP and better taste ratings to the sustainability labeled wines compared to the conventional alternatives, indicating a pure label effect (see Figure 2).

3. Wilcoxon signed-rank tests were performed to verify statistical significance of mean bids' differences, p values were all below 0.001.

Figure 2 - Overview of mean bids (€ per 0,75 ml bottle) for the two wines, with and without VIVA label, in the two scenarios – visual and taste



In the visual scenario the mean bid for Merlot with the VIVA label is 27.5% higher compared to the same wine with no label, reaching 33.6% for Cabernet Sauvignon. Similarly in the taste scenario bid differences are still very large +37.4% for Merlot and +16.6% for Cabernet Sauvignon with the sustainability label.

Figure 3 - Overview of mean hedonic scores (1-9) for the two examined wines, with and without VIVA label

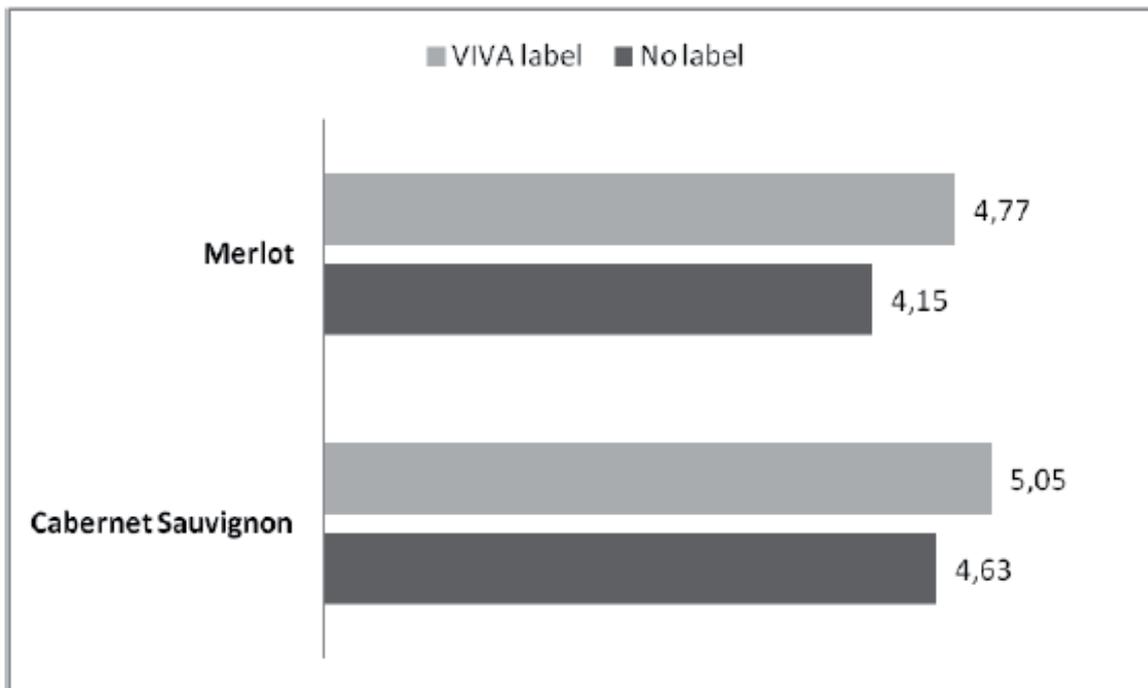




Figure 3 reveals that the mean hedonic scores assigned by participants are also influenced by the labeling, as the same wines carrying the VIVA logo receive higher rates, in particular +14.9% for Merlot and +9% for Cabernet Sauvignon compared to their non-labeled counterparts. Econometric analysis highlighted specific variables and scenario effects on WTPs for the two wines. In particular age, VIVA label and hedonic rating exerted a positive effect on bids, while consumption frequency a negative one.

Table 1 - Willingness to pay estimates with random-effects Tobit models

	Merlot	Cabernet Sauvignon
Variables	Coefficients	Coefficients
Age	0.14**	0.15**
Female	0.08	-0.06
Household Income	0.18	0.04
Area of residence	-0.46	-0.39*
Environmental sensibility	0.25	0.14
Social sensibility	-0.07	-0.09
Consumption frequency wine	-0.40**	-0.25*
Wine expert	0.57**	0.22
Average price per bottle of wine	-0.02	0.03
VIVA label	0.82**	0.63**
Taste Scenario	-0.45**	-0.14
Hedonic rating	0.30**	0.53**
Constant	-1.54	2.30

Note: **(*) Statistically significant at 5% (10%) level.

Discussion and concluding remarks

A significant research avenue has demonstrated that consumers generally implicitly associate healthy food with bad taste and vice versa unhealthy food with good taste (e.g. Wansink, 1994; Raghunathan *et al.*, 2006). Moreover several scholars have focused on understanding the impact of several extrinsic cues on wine quality perception (e.g. Veale and Quester, 2008; Sáenz-Nava-jas *et al.*, 2014). However few studies have dealt with consumer sensory expectations towards sustainable food. While recent studies reveal that ethical labels increase consumers' reported taste ratings (Lotz *et al.*, 2013). If people perceive sustainable wine as better, producers could benefit from consumers' higher willingness-to-pay, thereby reaping higher profits. However, if sustainability labeled wine subjectively tastes better but consumers do not anticipate this, they might never learn this as they might be reluctant to purchase such goods. For marketers, it can hence be problematic that people expect no differences between sustainable and conventional wine. In addition, recent research has revealed that many certifications and logos are not well known by consumers and only few successfully convey a message related to environmental sustainability (Ginon *et al.*, 2014; Pomarici and Vecchio, 2014). Therefore, given the variety of labels used to inform consumers, research should elaborate on how sustainability labels interact with other information conveyed to the final user (as origin, price, expert judgments, brand loyalty). Furthermore previous studies have demonstrated that wines can receive a positive premium for environmental attributes only if consumers' sensory expectations are fully satisfied (Schmit *et al.*, 2013). This study has several limitations. Primary, as our participants consisted

of only undergraduates recruited from a local university, the external validity is limited given that the sample was socioeconomically as well as geographically biased. Furthermore there is evidence in literature suggesting that the level of expertise of wine consumers is an important factor in determining quality perception (Jover *et al.*, 2004; Blackman *et al.*, 2010; Parr *et al.*, 2011). In addition, the specific quality of the wines selected for the experiment had an impact on respondents' evaluation and willingness-to-pay. Subsequently experimental design settings had certainly some effect on final outcomes (see Vecchio and Pomarici, 2013; Vecchio and Annunziata, 2014). Nevertheless the current paper provides some interesting information on the influence of the VIVA sustainability label on wine taste for a specific market segment (i.e. young consumers).

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Drivers of eco-innovation in the wine industry

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Abstract:

The importance to industry of eco-innovations has risen exponentially in recent years. However, although current trends show increasing commitment to eco-innovations, little is known about why and how companies integrate environmental sustainability into new product development. In this paper we provide a detailed analysis of the drivers of eco-innovation in the wine industry. We distinguish between two types of environmental innovation, cleaner production (CP) and end-of-pipe technologies (EOP), and account for three sets of drivers - environmental regulation, demand factors and firm-specific and technology-push factors. The empirical evidence is based on a questionnaire survey administered to 334 Italian wine producers. The analysis of a specific industry and product allows us to control for cross-industry differences emerging from other empirical work on eco-innovation. Our results confirm the importance for eco-innovation of certain regulatory aspects and open innovation activities.

keywords: Wine industry, ecoinnovation, environmental innovation, green innovation, drivers

1 Introduction

The importance to industry of eco-innovation has risen exponentially in recent years. Traditionally, eco-innovation was understood as a solution to minimize or fix the negative environmental impacts from production and consumption activities. However, it is clear that the key challenges of the 21st century are related not only to reducing pollution but also to controlling consumption of natural resources. There is evidence that substantial resource-efficiency gains in industrial production can be realised relatively easily and cost effectively (EIO, 2011: 7). Food industry is considered the most closely related sector to environment. Similarly, the growing concern about the environmental impact of productions, based on the increased awareness of producers and consumers, supported by government incentives to adopt environmentally friendly technologies and processes. Wine production, similarly to other agro-food industries is in line with the “going-green” phenomenon with a higher speed compared to other food sectors, because of the high intrinsic value of the products and the strong relationship with the environmental sound production.

In line with recent work on eco-innovation (Horbach et al., 2012), the aim of our paper is to contribute to research on the drivers of eco-innovation focusing on different areas of environmental impact. We conduct a comprehensive analysis of the drivers of eco-innovation in the wine industry. We analyse the impact of firms’ characteristics and their technological and organisational capabilities. On the basis of a large survey of Italian wine producers carried out in 2013 we investigate the main characteristics of eco-innovations in the wine industry and the key drivers of their adoption.

2 Background

2.1.1 Environmental regulation

The environmental economics literature underlines the relevance of regulatory aspects for promoting eco-innovation (Klaassen et al., 2005; Popp, 2006; Brunnermeier and Cohen, 2003). En-

environmental regulation could force industry to innovate and, thus, increase resource efficiency and enhance productivity. Environmental regulation increases firms' turnover and profits by creating markets for environmentally improved products and technologies (Porter and van der Linde, 1995b).

2.1.2 Demand factors

It is acknowledged in the innovation literature that demand factors play a critical role in innovation. However, in the case of eco-innovation, these factors have generally been overlooked (Kesidou and Demirel, 2012). A small number of recent empirical studies suggest that demand factors play a significant role for the creation of eco-innovations (Horbach, 2008; Horbach et al., 2012; Wagner, 2007). In fact, there is ample empirical evidence (Darnall, 2006; Horbach, 2008; Kesidou and Demirel, 2012; Wagner, 2007).

2.1.3 Firm-specific and technology-push factors

There is limited evidence in the economic literature about the role of firms' organisational and structural characteristics as a driver of eco-innovation (Johnstone and Labonne, 2009). With regard to firms' openness towards the external environment, innovation studies have underlined the crucial role played by the interactions among different organisations for fostering the innovation process (Freeman, 1979; Dodgson and Rothwell, 1994; Von Hippel, 1988).

3. Empirical analysis

3.1 Introduction on eco-innovations in the wine industry

The wine industry has several interesting aspects. First, food and beverages is the highest ranked manufacturing sector in Europe and is particularly significant in economic terms for Italy. Second, the wine industry is a highly innovative, export-oriented sector, especially within the food industry and, unlike other food sectors, the absence of a price cap allows unlimited product differentiation and innovation. Third, wine industry potentially provides a good example of win-win strategy, which has been found to be a key driver of eco-innovation (Porter and van der Linde, 2005). The wine industry is characterized by the presence of stringent regulation, and grapevine cultivation has pervasive effects related to landscape preservation and tourism. Therefore, investment in eco-innovation could have indirect effects on rural economies and their sustainability.

The environmental impact of wine production could be reduced by adopting a wide set of technical solutions.¹ A frequent distinction in eco-innovation literature is made between CP (Cleaner Processes) and EOP (End of Pipe) technologies, as suggested by Del Rio Gonzalez (2009), which distinction is applicable to the wine industry. In the wine industry CP indicators of eco-innovation include:

- improvements to resource efficiency;
- reductions in water;
- reductions in energy;

EOP indicators include:

- waste management;
- gas emissions.

3.2 Econometric analysis

In order to estimate the key drivers of eco-innovations we constructed a sample of 2,000 randomly selected wineries and designed a questionnaire for a CATI survey addressed to company

1. See www.agro.geoenvi.org

managers.² The questionnaire was available on a web-based platform. Companies were contacted by telephone to invite participation and guided to the answer. Finally, the response rate was 16.8%,³ providing 334 completed questionnaires.

3.2.1 Methodology and Results

We test the research hypothesis by employing a set of *logit* regressions and one *ordered logit* regression. The *logit* regressions estimate the correlation among the theoretical drivers on the probability of the firm adopting CP and EOP innovations. The ordered *logit* regression evaluates the impact of the same drivers on the cumulative probability of the firm adopting one specific type of eco-innovation (CP or EOP) and AEI. Individual regressions highlight the mechanisms enabling a specific type of innovation. CP concerns improvements in the resource/cost efficiency in production process and technologies. Thus, its implementation could be based on profit-maximising reasons, implying good knowledge and high level of technologies and skills among firm personnel as well as tighter networking across the supply-chain. EOP is related to waste management and CO₂ reduction. Its implementation is related more to the environmental profile of the company.

Although demand factors are acknowledged as crucial for innovation activity generally, they have been rather overlooked in the eco-innovation literature.

Several firm specific and technology-push factors have been found to be positively correlated with eco-innovation activity (Triguero et al. 2013; Horbach et al., 2008). R&D effort measured as level of in house wine experimentation, is highly correlated with the probability of eco-innovation. The indicator of internal capabilities, expressed as share of graduate employees, is not significant in any of the regressions. We find that wine companies that are more open to interaction with the external environment are also more likely to eco-innovate (Trigueiro et al., 2013). We found a positive correlation between eco-innovation activity and firms' networking with other wineries and consortia. The exchange of knowledge within such a network could generate a leader-follower mechanism that enhances eco-innovation propensity.

4. Concluding remarks

The importance of eco-innovation for industry has risen exponentially in recent years. Many countries, especially the most industrialised ones, are promoting policies with a focus on environmental aspects of production and sustainability across the supply-chain. This paper provides a comprehensive analysis of the drivers of eco-innovation in the Italian wine industry to add to the knowledge on why and how companies integrate environmental sustainability into their product, processes and organisation. The analysis is based on original survey data which are used to determine the impact of the drivers identified by the economic literature, which tends to be non-industry-specific. In contrast to existing empirical studies, we offer a fine grained analysis of a single sector, the wine sector, to understand the difference between a single focus and a broader analysis of a highly diversified national industry, from regulatory to technological perspectives. Our results confirm the importance of regulation and the access to knowledge while demand factors were found not to be relevant drivers of eco-innovation. In fact, voluntary certification corresponds to entrepreneurial attention to environmental issues and is used as a proxy for environmental aspects in the company mission.

2. The universe of Italian companies is of about 380,000 wineries (ISMEA, 2012)

3. Sampling choices and stratification are oriented to minimizing selection bias. When compared with national data on wineries (Source: ISTAT 2011 - Censimento dell'Industria e dei Servizi), the sample is a good representation of all size classes (expressed as numbers of employees) with less than 4% deviation, with the exceptions of wineries with just 1 employee which are under represented, and companies with 3-9 employees which are over represented.

We also found a positive correlation between networking and the propensity to eco-innovate. Vertical and horizontal collaboration within the supply-chain and partnerships with competitors, universities and research centres accelerate the adoption of ecological innovations. Such an effect could be related to the specificity of the eco-innovation process, which requires wine companies to rely on good access to external information and new knowledge. The crucial role of knowledge is confirmed by a further finding showing a positive correlation between wineries' R&D effort and their eco-innovative behavior.

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Table 1 (following page). Results of the econometric analysis



	Ordered Logit Model				Logit Models			
	Coeff.	Marginal fx		Coeff.	Marginal fx	Coeff.	Marginal fx	
		Outcome = 1	Outcome = 2					Y = 1 (C:P)
		0.331	0.217		0.513		0.236	\$
	Y = 1 (CP or EOP) Y = 2 (AEI)							
Regulatory Aspects	Using Organic Grapes for Wine Making	0.618 [0.483]	0.039	0.111	0.339 [0.540]	0.084	0.943 [0.606]	0.183
	ISO 14000/14004 Certification	2.774** [1.051]	-0.16	0.6	2.501+ [1.289]	0.442	3.160** [1.176]	0.655
	Carbon Footprint Certification	-0.739 [1.309]	-0.08	-0.101	-1.039 [1.488]	-0.244	-1.723 [1.762]	-0.19
Demand Factors	Conducting Market analysis	0.64 [0.460]	0.039	0.116	0.8 [0.539]	0.195	0.161 [0.636]	0.029
	Number of exhibitions	0.008 [0.054]	0.001	0.001	-0.017 [0.062]	-0.004	0.072 [0.076]	0.013
	Regional Penetration of Organic Products	-0.015 [0.0503]	-0.001	-0.002	0.034 [0.056]	0.008	-0.055 [0.072]	-0.01

	wine productions	[0.459]		[0.530]		[0.585]		#
	Relationships with Universities	1.121* [0.564]	0.034	0.223	1.456* [0.705]	0.323 [0.709]	0.33	0.061
	Collaboration with Other Wineries and Consortia	1.261** [0.455]	0.058	0.236	0.959+ [0.510]	1.590** [0.590]	0.233	0.316
	Relationships with Suppliers of Grapes, Equipment and Chemical Products	1.359** [0.444]	0.086	0.237	1.404** [0.509]	1.274* [0.614]	0.336	0.234
	Relationships with Customers	1.506* [0.713]	-0.003	0.321	1.571+ [0.885]	1.917* [0.934]	0.341	0.427
	Volume of Sales (1-5 scale)	-0.217 [0.301]	-0.017	-0.037	-0.129 [0.339]	-0.508 [0.413]	-0.032	-0.091
	Corporate firm	0.7 [0.775]	0.061	0.112	1.047 [0.874]	0.716 [1.017]	0.255	0.122
	No. Food Firms	-0.008 [0.014]	-0.001	-0.001	-0.009 [0.016]	-0.009 [0.023]	-0.002	-0.002
	Geo-Economic Controls							

		0	0	0	0	0	0	0	0	0	#
	Province Value Added	[0.001]	[0.000]								
	South	-2.275 [1.799]	-1.164 [1.921]	-0.33	-0.184	-0.283	-0.338 [2.377]	-0.484			
	Centre	-1.886* [0.827]	-1.308 [0.909]	-0.228	-0.199	-0.308	-2.837* [1.155]	-0.317			#
	Cut1 (Constant for Logits)	-4.597 [5.853]	-1.077 [6.542]			10.68 [7.701]	8.438 [7.675]				
	Cut2	-3.115 [5.848]									
	Pseudo R2	.2267	.2740				.3470				
	Obs	134	134				134				

The consumer preferences of Parmesan cheeses in foreign countries: a non parametric analysis using CUB models

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Abstract

In the last decade the Italian exports of Parmesan cheese has been reinforced in the north American countries (US and Canada) because of a strong increase in consumption. However, factors boosting this consumption are not always so obvious. For instance, in US both Reggiano and Grana Padano are generally classified as “Parmesan Reggiano and Parmesan Padano” where the term Parmesan is well-known while the differentiation between Reggiano and Padano is often not appreciated or not so clear for North American consumers even because the imported Parmesan is about 6-7% of the total consumption.

This paper analyzes data of a survey carried out on US and Canada about the Parmesan’s consumption through a class of mixture models with covariates know as CUB models. The survey was done in some restaurants chains in US and Canada. A questionnaire was filled out by 540 customers to get information about the of knowledge and appreciation of Parmesan, purchase features as well as factors influencing the purchase and willingness to pay. Information about consumer’s profile were also collected.

CUB models, applied to ordinal scale data, allow us to estimate the latent variables known as feeling and uncertainty. The feeling indicates the conviction of the respondent and the attraction/repulsion he feels towards the evaluation, while the uncertainty is a random component related to factors such as lack of knowledge or interest, high times for valuation, laziness / apathy.

The CUB model detected a high feeling on the level of knowledge, the appreciation and frequency of purchase of the Parmesan while the CUB model with covariates showed a discriminatory effect of the age and country of residence on feeling as well. By contrast, the results show a high uncertainty on the knowledge of differences between Parmesan Reggiano and Parmesan Padano. The simulations with covariates revealed no discriminatory effect of demographic, geographic and behavioral variables while confirming that the Parmesan cheese is a well-known but also that Reggiano-Padano cheeses are poorly understood. This phenomenon may be interpreted as positive for the reputation of Parmesan but it could hide a lack of information for consumers which may encourage the local production at the expense of Made in Italy one.

JEL:

D12, Consumer Economics: Empirical Analysis
Q13, Agricultural Markets and Marketing, Cooperatives, Agribusiness
L66, Food • Beverages, Cosmetics, Tobacco, Wine and Spirits

Keywords: Parmesan, exports, consumer, Cub models

Introduzione

Nel corso dell’ultimo decennio le esportazioni di formaggi grana dall’Italia sono costantemente aumentate. In particolare, nel periodo 2001-2012, i volumi esportati sono saliti di oltre 34 mila tonnellate, pari ad un incremento di circa il 90%. Un caso emblematico è rappresentato dal Nord America ed, in particolare, dagli Stati Uniti. In questo paese i consumi di formaggi sono in continua crescita: dai 10 Kg procapite dei primi anni novanta agli oltre 15 kg del 2012. Si

tratta di consumi in linea con la media comunitaria (circa 16 kg pro-capite) e inferiori rispetto a quelli italiani (circa 22 kg pro capite) ma che diventano elevati in termini assoluti grazie ad una popolazione che sfiora i 300 milioni di abitanti. Nella composizione dei formaggi consumati negli Stati Uniti, i cosiddetti Italian type (Pecorino, Provolone, Parmesan, mozzarella, ecc.) hanno accresciuto la loro importanza rispetto ai tradizionali american cheese (es. cheddar). D'altra parte nei consumi di formaggi Italian type solo una quota modesta, circa 30 mila ton (1,4% dei consumi), proviene da importazioni a conferma della sproporzione tra produzione interna e quella made in Italy. Nell'ambito delle vendite di formaggi italiani verso gli Stati Uniti, Pecorino e Parmigiano Reggiano-Grana Padano registrano volumi rispettivamente di 14 e 10 mila tonnellate che, rispetto ai corrispondenti consumi nazionali, contano per il 38 e 7%¹.

Questi risultati evidenziano il forte appeal dei formaggi italiani sui consumatori statunitensi; tuttavia, questo fenomeno sembra aver avvantaggiato sia le importazioni di Parmigiano Reggiano e Grana Padano dall'Italia ma anche le importazioni da altri paesi e, soprattutto, le produzioni statunitensi del cosiddetto Parmesan.

Sulle cause di questo fenomeno restano tuttavia delle perplessità non tanto sulla conoscenza o sull'apprezzamento del Parmesan quanto sulle capacità del consumatore di riconoscere il prodotto made in Italy ovvero se il consumatore nordamericano riesce ad apprezzare il prodotto italiano rispetto all'Italian sounding. Vale la pena sottolineare che negli Stati Uniti e in Canada il Parmigiano Reggiano e il Grana Padano sono conosciuti con il termine generico di Parmesan, categoria che si estende anche ai Parmesan non prodotti in Italia, e che, limitatamente al prodotto importato dall'Italia, viene declinato come Parmesan Reggiano e Parmesan Padano.

La percezione dei consumatori sui formaggi è un argomento molto trattato dalla letteratura. Le principali aree di indagine possono essere classificate in: studi sensoriali; psico-attitudinali e socio-economici. Una linea di studi si focalizza sui profili sensoriali dei formaggi collegandoli all'origine, alla varietà o a specifici attributi come la stagionatura o la presenza di particolari additivi (Heisserer *et al.*, 1993; Rétiveau, *et al.*, 2005; Liggett *et al.*, 2008). Drake and Drake (2010) studiano anche il fenomeno imitativo, molto diffuso nei formaggi, cercando di comprendere gli aspetti sensoriali apprezzati dal consumatore ovvero i fattori in grado di condizionare gli acquisti di formaggi. In particolare, i due autori confrontano i formaggi noti con le corrispondenti imitazioni e individuano nei profili sensoriali degli elementi gustativi comuni alle due categorie di formaggi.

Un altro importante filone di studio è la mappatura delle preferenze dei consumatori con l'intento di individuare i fattori di successo di un prodotto sul mercato, sempre basati sull'analisi sensoriale (Gambaro *et al.*, 2007). Ad esempio, Barcenas *et al.* (2001) applica il metodo del prezzo edonico ai risultati dell'analisi sensoriale condotta su alcuni formaggi tipici spagnoli mentre Johansen *et al.* (2010) impiegano la tecnica del fuzzy clustering per mappare le preferenze dei consumatori svedesi su 12 gruppi di formaggi.

Sempre nella letteratura meno sensoriale, si rilevano dei contributi interessanti che pongono maggiore enfasi su aspetti psicologici, sociologici ed economici. McCarthy *et al.* (2001) rilevano tra i consumatori irlandesi il segmento degli "innovatori" sulla base di elementi psicologici, comportamentali e attitudinali: questi consumatori acquistano spesso e molte varietà di formaggi grazie ad un'ampia conoscenza sulle cosiddette specialità. Lengard Almlí *et al.* (2011) valutano la percezione dei consumatori francesi e norvegesi su alcune innovazioni (pastorizzazione, metodo biologico, ecc.) in alcune categorie di formaggi e rilevano differenze significative tra le due tipologie di consumatori. Tendero e Bernabeu (2005) effettuano un'indagine al consumo per investigare le preferenze dei consumatori con riferimento al prezzo, tipologia e denominazione geografica e rilevano l'importanza dell'origine rispetto ad altri attributi.

1. Dati riferiti al 2010 (fonti: Usda e GTA)

Nella letteratura socio-economica molti studi sono focalizzati sull'importanza dell'effetto del paese di origine (country-of-origin effect, COO) e ciò vale per un'ampia categoria di prodotti alimentari, compresi i formaggi (Agrawald and Kamakura, 1999; Verlegh and Steenkamp, 1999; 2006; Schnettler *et al.*, 2008). Alcuni autori (Tanner Ehmke, 2006) rilevano come il COO assuma valori diversi per i consumatori esteri in relazione alla forza delle certificazioni o della legislazione sull'etichettatura in grado di attenuare l'asimmetria informativa collegata all'origine. Analogamente, la percezione del consumatore sull'origine è fortemente influenzata dalla relazione tra denominazioni geografiche, brand e caratteristiche del prodotto (Aurier e Fort, 2007). L'approccio comunicativo è invece l'aspetto innovativo seguito in alcune ricerche condotte su prodotti alimentari, tra cui i formaggi (Moskowitz *et al.*, 2007, 2008, 2009) dove si enfatizza che l'apprezzamento dei consumatori e, quindi la segmentazione del mercato, trascende i confini nazionali o le tradizionali classificazione anagrafiche e segue percorsi motivazionali, sensoriali ed emozionali.

In questo paper si è optato una metodologia di analisi non-parametrica in grado di valutare la percezione del consumatore sui formaggi Parmigiano Reggiano e Grana Padano e di rilevare elementi di segmentazione delle preferenze rispetto ad aspetti anagrafici, geografici, comportamentali (frequenza e modalità e canali di consumo) e motivazionali (legati al consumo) nonché alle opinioni di carattere economico (prezzo).

L'approccio seguito in questo studio rientra nei modelli probabilistici CUB (*Covariate Uniform Binomial*) in grado di analizzare le preferenze del consumatore, espresse su una scala ordinale, e di reinterpretarle come una combinazione di due variabili latenti, continue e non osservabili: la componente feeling, legata alle motivazioni dell'intervistato, e la componente incertezza intrinseca, associata alle circostanze delle rilevazione (Iannario *et al.*, 2012; Cicia *et al.*, 2010; Corduas *et al.*, 2013).

La scelta metodologica è giustificata dall'obiettivo di discriminare segmenti o gruppi di consumatori per conoscenza e apprezzamento del Parmesan, modalità e frequenza di acquisto, motivazioni di acquisto, opinione sul prezzo o per capacità di riconoscere le varianti Reggiano e Padano e quindi il prodotto made in Italy.

Il paper è organizzato come segue. Nel secondo paragrafo viene brevemente illustrata la metodologia, nel terzo l'indagine, nel quarto i risultati e quindi le conclusioni.

Cenni metodologici

L'indagine è stata condotta su un campione di consumatori statunitensi e canadesi presso alcune catene di ristoranti. Agli intervistati è stato somministrato un questionario articolato in tre sezioni: la prima anagrafica (età, il sesso e paese di provenienza); una seconda parte in cui si raccolgono informazioni sulla conoscenza e apprezzamento del Parmesan, sulle preferenze di acquisto e di consumo, e un'ultima parte dove si chiede un'opinione sui fattori che influenzano l'acquisto e il prezzo oltre alla disponibilità a pagare.

Il dataset è stato analizzato tramite l'applicazione di un modello statistico CUB per dati ordinali (Piccolo, 2003, 2006; Piccolo e D'Elia, 2008). I CUB sono modelli probabilistici che consentono di esplorare la relazione tra gli intervistati e gli attributi rilevati (*item*) consentendo di sintetizzare la distribuzione delle preferenze (*ranking*) espresse dai rispondenti, tramite una scala qualitativa di tipo Likert. Partendo da giudizi di preferenza di carattere qualitativo, i modelli CUB effettuano un'analisi sulla distribuzione delle valutazioni (*rating*) scomponendole nelle variabili latenti feeling e incertezza e collegandole alle caratteristiche degli intervistati.

Si consideri la variabile casuale R , nella quale le due componenti di feeling ed incertezza sono adeguatamente ponderate e la cui distribuzione di probabilità è illustrata dalla seguente equazione:

$$Pr(R = r) = \pi \left[\binom{m-1}{r-1} (1-\xi)^{r-1} \xi^{m-r} \right] + (1-\pi) \left[\frac{1}{m} \right] \quad (1)$$

con $r = 1, 2, \dots, m$, dove $\xi \in (0,1)$, $\pi \in (0,1]$ e $m > 3$ è il valore più elevato della scala Likert utilizzata dagli intervistati. Viene fissato un valore $m > 3$, per evitare di avere una variabile random degenerare ($m=1$), un modello indeterminato ($m=2$), o un modello saturo ($m=3$).

La prima componente dell'equazione, con peso π , è denominata feeling ed indica la convinzione profonda del soggetto che esprime il giudizio e la forza di attrazione/repulsione che egli prova verso la valutazione. Il feeling è una variabile continua resa discreta dal vincolo che la scelta (il giudizio, le preferenze, la valutazione) e viene espressa mediante m valori ordinali prefissati. La seconda componente con peso $1-\pi$, è definita incertezza che si genera laddove un soggetto deve tradurre una propria convinzione in un punteggio. L'incertezza è la componente personale intrinsecamente correlata ad ogni scelta umana ed è il risultato di alcuni fattori convergenti come l'ignoranza dei problemi e/o delle caratteristiche degli item; lo scarso interesse dell'intervistato, il tempo impiegato per giungere alla valutazione espressa, la pigrizia o apatia verso la valutazione.

La performance del modello, espressa come capacità di interpretare i dati osservati, viene stimata dall'indice di dissimilarità:

$$Diss = \frac{1}{2} \sum_{r=1}^m |f_r - p_r(\hat{\pi}, \hat{\xi})|, \quad 0 \leq Diss \leq 1 \quad (2)$$

dove f_r e $p_r(\quad)$ sono, rispettivamente, le frequenze osservate e le probabilità stimate dal modello CUB. Il modello è accettato quanto il Diss è inferiore a 0.1 -0.12.

L'estensione del modello CUB alle covariate, indicato con CUB(p,q)² (Iannario, 2009; Piccolo e D'Elia 2008), permette di cogliere differenze nella distribuzione delle valutazioni e quindi di individuare $\hat{\pi}, \hat{\xi}$ tuali sottogruppi di intervistati con preferenze omogenee. La formulazione per i modelli CUB(p, q) è specificata come segue:

$$Pr(Y_i = y_i) = \pi_i \left[\binom{m-1}{y_i-1} (1-\xi_i)^{y_i-1} \xi_i^{m-y_i} \right] + (1-\pi_i) \left[\frac{1}{m} \right] \quad (3)$$

$$\pi_i = \frac{1}{1 + e^{-\beta_0 - \beta_1 x_{i1} - \dots - \beta_p x_{ip}}} = \frac{1}{1 + e^{-\beta_0 - x_i \beta}} \quad (4)$$

$$\xi_i = \frac{1}{1 + e^{-\gamma_0 - \gamma_1 w_{i1} - \dots - \gamma_q w_{iq}}} = \frac{1}{1 + e^{-\gamma_0 - w_i \gamma}} \quad (5)$$

Le funzioni logistiche functions π_i and ξ_i misurano l'effetto delle covariate introdotte.

Risultati

L'indagine ha coinvolto 543 intervistati, di questi, 307 sono statunitensi e i restanti 236 canadesi (tabella 1). La distribuzione degli intervistati per sesso e classe di età è piuttosto equilibrata (tabella 2). Le variabili età, sesso e paese di origine nel modello CUB sono indicate come covariate.

2. CUB(p,q), dove p e q indicano, rispettivamente le componenti incertezza e feeling.

Tabella 1 Distribuzione percentuale geografica degli intervistati

Paese di residenza	N	%	
USA	307	57%	
Canada	236	43%	
Totale	543	100%	

Tabella 2 - Distribuzione di intervistati per età e per sesso

Età	Sesso (N)				Sesso (%)			
	F	M	nr	tot	F	M	nr	tot
<25	42	35	1	78	7,7	6,4	0,2	14,4
25-40	68	79	1	148	12,5	14,5	0,2	27,3
40-60	96	85	3	184	17,7	15,7	0,6	33,9
>60	64	67	2	133	11,8	12,3	0,4	24,5
Totale	266	270	7	543	49,0	49,7	1,3	100,0

Il confronto della distribuzione degli intervistati rispetto all'universo censuario rileva una bassa rappresentatività della classe dei giovani e quindi il peso maggiore delle classi con età elevata. Questo risultato se da una parte appare in linea con la composizione della clientela dei ristoranti oggetto di indagine dall'altra, pone dei limiti alle estensione dei risultati dell'analisi all'universo. Oltre alla bassa rappresentatività dei giovani la rilevazione soffre anche i limiti della delimitazione geografica in quanto effettuata nella costa est degli Stati Uniti e del Canada. Pur con questi limiti, si è preferito procedere con l'analisi in quanto la numerosità delle osservazioni appare in grado di fornire dei risultati utili per rispondere agli obiettivi dello studio.

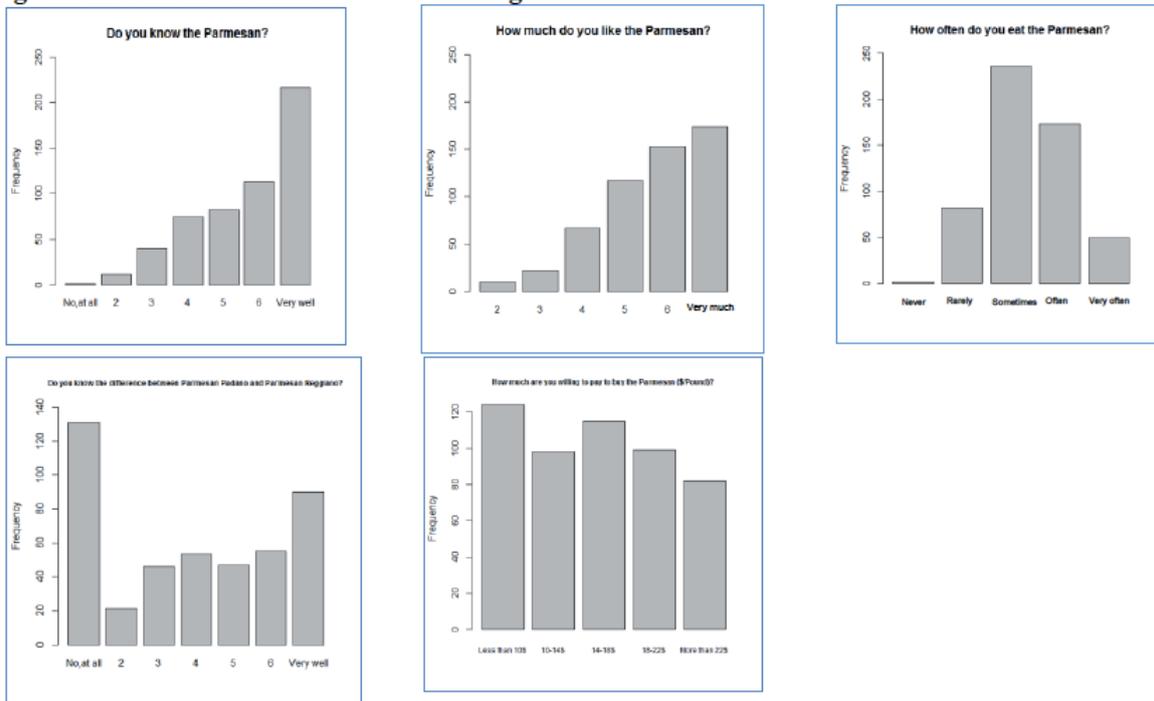
Tabella 3 – Confronto composizione del campione e dati censuari (in %)

		Paese		Totale
		Stati Uniti	Canada	
Campione				
Sesso	Maschi	54.1	43.7	49.2
	Femmine	45.9	56.3	50.4
Età	< 25	11.1	18.6	14.4
	25 - 40	29.0	25.0	27.3
	40 - 60	37.5	29.7	34.1
	60 e oltre	22.5	26.7	24.3
Censimento				
Sesso	Maschi	49.2	49.6	49.2
	Femmine	50.8	50.4	50.8
Età	< 25	34.0	29.9	33.6
	25 - 40	19.8	20.5	19.9
	40 - 60	27.7	29.7	27.9
	60 e oltre	18.5	19.9	18.6

Source: US and Canada Census 2010

Uno primo screening dei dati è stato effettuato sul livello di conoscenza e di apprezzamento del Parmesan³. La distribuzione delle valutazioni non sembra essere influenzata dalle covariate come pure dalle modalità con cui gli intervistati hanno conosciuto il Parmesan, dalla loro disponibilità a pagare e persino dalla loro capacità di riconoscere il Reggiano dal Padano. Questo risultato sembra confermare la necessità di procedere ad un esame più approfondito delle risposte degli intervistati. Si è quindi proceduto alla stima dei modelli CUB in grado di depurare le risposte dalla componente incertezza per poi procedere ad un’analisi approfondita della componente feeling.

Figura 1 – Distribuzione delle valutazioni degli item analizzati



Il punto di partenza dell’analisi è costituito dal stima del modello CUB(0,0) senza covariate, che consente di stimare, per ciascuna delle variabili analizzate, il grado di feeling e il grado di incertezza.

Sono stati analizzati i seguenti modelli: 1) conoscenza e apprezzamento del Parmesan; 2) consumo del Parmesan; 3) prezzo del Parmesan. Successivamente, l’analisi del modello 1 è stata estesa alle covariate

per comprendere i fattori in grado di influenzare la componente feeling e quindi verificare l’esistenza di

segmenti tra gli intervistati statisticamente diversi.

Modello 1

Gli item d’interesse selezionati sono: “Conoscenza del Parmesan” (know), “Apprezzamento del Parmesan (like)”, “Conoscenza delle differenze tra Parmesan Padano e Parmesan Reggiano”

3. Le opinioni degli intervistati sono espresse su scale ancorate agli estremi. Per molti quesiti sono previste scale a 7 punti; per alcuni, invece, le scale sono limitate a 5 punti in relazione al plausibile range di risposta degli intervistati.

(diff), “Frequenza di acquisto del Parmigiano” (freq), “Disponibilità a pagare” (wpay). La distribuzione delle valutazioni degli item fornisce un’idea, seppur molto approssimativa, sui giudizi espressi dal campione (figura 1). Se da una parte si registra una prevalenza di punteggi elevati per il livello di conoscenza, apprezzamento e consumo del Parmesan dall’altra, si riscontra una più ampia variabilità nelle valutazioni espresse sulla conoscenza delle differenze tra Reggiano e Padano e sulla disponibilità a pagare.

Per ogni item, sono state effettuate le stime di π e ξ , dei corrispondenti errori e dell’indice di dissimilarità (tabella 4). Questo ultimo registra valori significativi per tutti gli item analizzati con l’eccezione del grado di conoscenza dove il modello appare meno attendibile.

Tabella 4 – stima del modello CUB(0,0)

	π	errore(π)	ξ	errore(ξ)	Diss*	l_{00}	m
know**	0.655	0.044	0.123	0.015	0.165	-888	7
like**	0.898	0.029	0.197	0.009	0.118*	-844	7
freq**	1.000	0.087	0.414	0.011	0.083*	-691	5
diff	0.178	0.027	0.990	0.068	0.105*	-828	7
wpay	0.050	0.050	0.998	0.183	0.033*	-831	5

l_{00} indice di massima verosimiglianza; m , punti scala di valutazione

* Il modello è accettabile quando l’indice di dissimilarità è inferiore a 0.1-0.12

** Variabili aventi grado di feeling elevato.

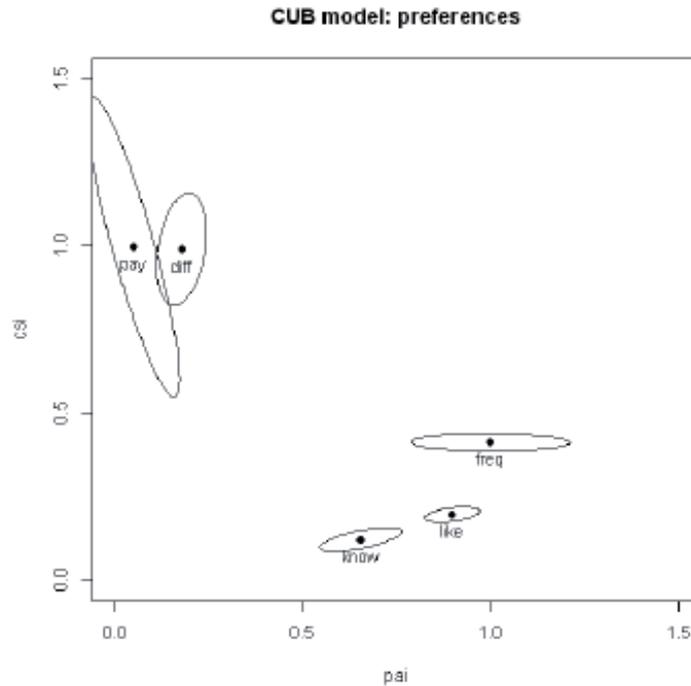
Il modello permette di costruire uno spazio parametrico dei valori stimati per π (pai) e ξ (csi), creando

una regione di confidenza del 95% attorno a questi punti (figura 2). In particolare:

- $(1-\pi)$ quantifica la propensione dei rispondenti a fornire risposte totalmente casuali, quindi più π è spostato a destra del quadrato unitario e più le valutazioni/preferenze espresse riflettono risposte ben definite (l’incertezza è bassa);
- $(1-\xi)$ misura la forza del feeling espressa dal soggetto a favore di una diretta e positiva valutazione del soggetto, quindi più vicino è ξ al bordo inferiore del quadrato unitario e più l’item è preferito.

Da un primo analisi, appare evidente che gli intervistati manifestino una preferenza riguardo alla conoscenza, all’apprezzamento e alla frequenza di acquisto mentre l’incertezza aumenta quando i quesiti richiedono un sforzo supplementare degli intervistati ossia giudizi su aspetti meno conosciuti come le differenze tra Reggiano e Padano oppure sul prezzo. Questo ultimo aspetto è confermato dall’ampia regione di confidenza riscontrata nella disponibilità a pagare rispetto agli altri item analizzati.

Figura 2 – Distribuzione π (pai) e ζ (csi) e regione di confidenza



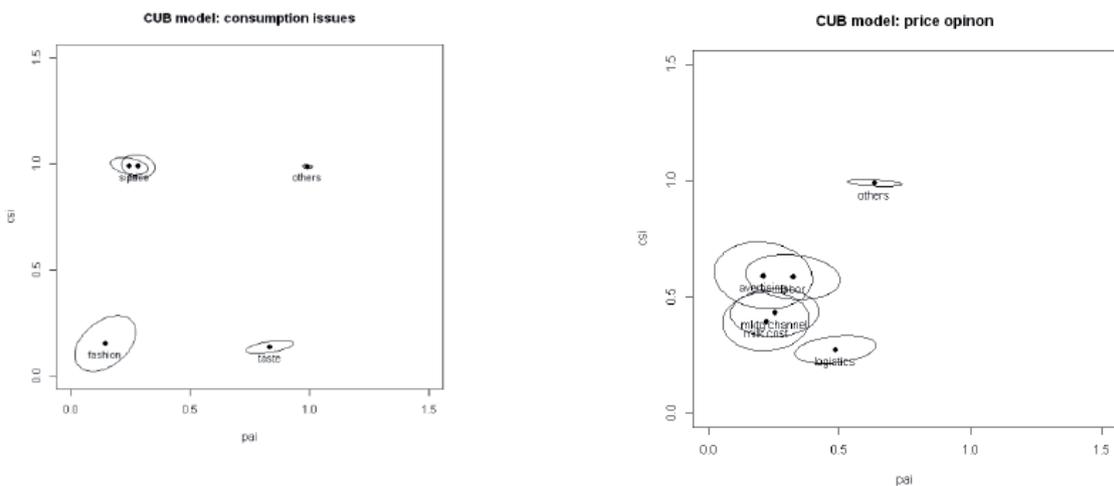
Modello 2 e modello 3

Gli item d’interesse selezionati per il modello 2 “consumo” sono: prezzo (price), formato e packaging (size), gusto (taste), moda (fashion) e altri fattori (others).

Gli item d’interesse selezionati per il modello 3 “prezzo” sono: costi di trasporto e logistica (logistics), canali distributivi lunghi (mktg channels), costi elevati delle materie prime (milk cost), alti costi del lavoro (labor), costi promozionali elevati (avertising) e altri fattori (others).

Per questi 2 modelli viene fornita solo la rappresentazione grafica per l’economia del paper.

Figura 3 – π (pai) e ζ (csi) e regione di confidenza: modello 2 e modello 3



Nel modello “consumo”, gli intervistati manifestano un’importante componente feeling per i fattori gusto e moda. In altre parole, i consumi di Parmesan sono motivati per lo più dalle caratteristiche sensoriali di questi formaggi ma anche da fattori legati alla moda e in parte ri-

conducibili alla reputazione del made in Italy. Per contro, i fattori prezzo e packaging/formato manifestano un’elevata componente di incertezza che potrebbe essere interpretata come uno scarso interesse dei rispondenti o da una scarsa informazione.

Nel modello “prezzo”, si riscontra un’elevata componente incertezza su tutte le opzioni di risposta e questo sembra suggerire una scarsa conoscenza dei fattori in grado di influenzare il prezzo di vendita del Parmesan. Tuttavia, la componente feeling assume dei valori interessanti nei fattori costi del trasporto, canali distributivi e costo di produzione.

Successivamente, si è proceduti alla stima dei modelli CUB(0,q) con covariate ossia allo studio della distribuzione della componente feeling rispetto alle variabili anagrafiche (età e sesso) e geografiche (paese di residenza) con l’intento di capire se e quali covariate influenzano le valutazioni degli intervistati.

Sono state stimate diverse ipotesi di modello: CUB(0,1); CUB(0,2); CUB(0,3). I risultati della regressione delle covariate sono stimati da coefficienti γ dove i pedici indicato rispettivamente la costante (γ_0), l’effetto della prima (γ_1), della seconda (γ_2) e terza covariata (γ_3).

I risultati del modelli CUB(0,1) (tabella 5) rilevano una segmentazione per le seguenti covariate: i) effetto paese (Stati Uniti vs. Canada) sulla conoscenza e sulla frequenza di consumo; ii) effetto età (<25, 25-40, 40-60, 60 e oltre) sull’apprezzamento del Parmesan e sulla frequenza di acquisto. Per contro, non si registrano effetti legati al sesso mentre gli item che valutano le differenze tra Reggiano e Padano e la disponibilità a pagare non registrano effetti significativi delle covariate anche in conseguenza del basso livello di feeling.

I risultati del modelli CUB(0,2) (tabella 6) sono più articolati. In particolare, l’azione congiunta del paese e dell’età produce degli effetti discriminanti sul livello di conoscenza di apprezzamento del Parmesan mentre le altre combinazioni rilevano solo effetti singoli, specialmente del paese di residenza.

Infine, il modello CUB(0,3) (tabella 7) sembra in grado di cogliere in modo più esaustivo l’effetto congiunto delle covariate. In particolare, i possibili elementi discriminati riscontrati sul livello di conoscenza del Parmesan e sulla frequenza di acquisto sono l’età e il paese di residenza.

Tabella 5 – Stime Modelli CUB(0,1)

CUB(0,1), sesso (γ_1)

	π	γ_0	γ_1	l_{01}
know	0.669*	-2.001*	0.184	-875,169
like	0.896*	-1.454*	0.104	-833,679
freq	1.000*	-0.366	0.029	-682,916
diff	0.073	-18.423	6.067	-845,995
wpay	0.064	2.700	1.387	-819,688

CUB(0,1), paese (γ_1)

	π	γ_0	γ_1	l_{01}
know	0.654*	-1.816*	-0.395**	-873,931
like	0.896*	-1.324*	-0.163	-832,996
freq	1.000*	-0.231*	0.001*	-677,775
diff	0.112	16.444	-19.128	-841,077
wpay	0.062	8.259	-5.726	-819,534

CUB(0,1), età (γ_1)

	π	γ_0	γ_1	l_{01}
know	0.663*	-1.700*	-0.277	-874,637
like	0.896*	-1.634*	0.086**	-832,756
freq	1.000*	-0.288*	-0.024*	-682,824
diff	0.127	36.780	-12.925	-837,871
wpay	0.058	3.243	0.355	-819,315

* p-value<0.05. ** p-value <0.10

Tabella 6 – Stime Modelli CUB(0,2)

 CUB(0,2), sesso (γ_1) - paese (γ_2)

	π	γ_0	γ_1	γ_2	l_{02}
know	0.002*	-1.881*	0.149	-0.374	-873,667
like	0.901*	-1.381*	0.126**	-0.179	-832,301
freq	1.000*	-0.258*	0.059	-0.293	-677,556
diff	0.086	14.426	-19.728	-16.280	-844,916
wpay	0.085	4.185	-1.857	-3.186	-819,341

 CUB(0,2), sesso (γ_1) - età (γ_2)

	π	γ_0	γ_1	γ_2	l_{02}
know	0.670*	-1.577*	0.156	-0.160**	-873,642
like	0.896*	-1.694*	0.108	0.087	-832,241
freq	1.000*	-0.303*	0.030	-0.024	-682,773
diff	0.132	49.031	2.358	-17.482	-836,559
wpay	0.084	3.048	3.024	-0.769	-819,081

 CUB(0,2), paese (γ_1) - età (γ_2)

	π	γ_0	γ_1	γ_2	l_{02}
know	0.658*	1.375*	0.365**	0.167**	-872,442
like	0.900*	-1.549*	-0.152	0.081**	-831,758
freq	1.000*	-0.147	-0.290*	0.031	-677,537
diff	0.129	12.306	23.701	-12.216	-836,801
wpay	0.067	19.248	-11.589	-4.803	-819,188

* p-value<0.05. ** p-value <0.10

Tabella 7 – Stime Modelli CUB(0,3)

 CUB(0,3), sesso (γ_1)- età (γ_2) - paese (γ_3).

	π	γ_0	γ_1	γ_2	γ_3	l_{03}
know	0.663*	1.438*	0.136	-0.164**	-0.351	-872,219
like	0.900*	-1.611*	0.128	0.082	-0.168	-831,039
freq	1.000*	-0.175	0.058	-0.031	-0.296*	-677,321
diff	0.104	-18.084	31.186	-12.639	23.891	-841,335
wpay	0.086	6.147	-2.009	-0.510	-3.985	-818,883

* p-value<0.05. ** p-value <0.10

I modelli stimati forniscono un quadro sulle preferenze degli intervistati nei confronti del Parmesan ma l'elevata componente incertezza riscontrata sulla conoscenza Reggiano-Padano non consente di spiegare le cause di tale fenomeno. D'altra parte i modelli CUB possono diventare utili cercare di individuare le covariate in grado di discriminare le valutazioni degli intervistati anche per la componente incertezza. Tuttavia, i risultati dei modelli CUB(p,0) sulla componente incertezza, stimati sulle covariate sesso, età, paese di residenza, disponibilità a pagare (fino a 18\$/libbra e oltre fino a 18\$/libbra), frequenza di acquisto (acquisto frequente vs acquisto poco frequente) non hanno evidenziato alcun effetto discriminante con la sola eccezione del paese di residenza.

Conclusioni

L'indagine presso i consumatori nordamericani si proponeva di analizzare il consumo di Parmesan facendo emergere il livello di conoscenza e di apprezzamento di questo formaggio, le opinioni sui fattori che influenzano i consumi e il prezzo di vendita e un parere sulle differenze tra il Parmesan Reggiano e il Parmesan Reggiano. Questo ultimo quesito è in realtà un modo per capire fino a che punto il consumatore nordamericano sa riconoscere il prodotto importato dall'Italia da quello di produzione locale e comunque non italiano.

L'indagine, effettuata presso un campione di consumatori negli Stati Uniti e Canada, ha rilevato le opinioni degli intervistati mediante scale non comparative. Queste valutazioni qualitative

sono state successivamente analizzate mediante i modelli CUB che stimano due variabili latenti: i) il feeling, che misura la preferenza degli intervistati nei confronti del quesito proposto; 2) l'incertezza, che misura la propensione degli intervistati a fornire risposte casuali.

I risultati hanno evidenziato delle componenti feeling significative sul livello di conoscenza, sul grado di apprezzamento e sulla frequenza di acquisto del Parmesan a conferma che il prodotto è conosciuto, piace e viene acquistato. La successiva applicazione dei modelli CUB sulle covariate ha evidenziato un effetto discriminante dell'età e paese di residenza sulla componente feeling.

Per contro, i modelli CUB hanno registrato una bassa significatività del feeling ed un'elevata incertezza sulla conoscenza delle differenze tra Parmesan Reggiano e Parmesan Padano e sulla disponibilità a pagare. Anche i test condotti dai modelli CUB sulle covariate non hanno evidenziato alcun effetto discriminante delle covariate nella valutazione dei soggetti in merito alla differenze Reggiano-Padano. I risultati sembrano suggerire che il consumatore nordamericano conosce e consuma il Parmesan anche se con differenti valutazioni tra Stati Uniti e Canada e tra diverse classi di età. Tuttavia, quando i quesiti si spostano su aspetti che necessitano maggiori conoscenze (differenze tra Reggiano e Padano, prezzi, costi, ecc.) le risposte sono caratterizzate da un'elevata componente di incertezza e ciò potrebbe indicare una scarsa informazione o uno scarso interesse degli intervistati per gli aspetti che richiedono sforzi supplementari per la ricerca di informazioni.

I risultati di questa indagine appaiono confortanti per l'aspetto dei consumi ma preoccupanti per la conoscenza made in Italy anche a causa di un'insufficiente comunicazione lungo i canali distributivi (Berti et al., 2005; De Roest e Menghi, 2000). Vi è quindi la necessità di procedere al rafforzamento delle iniziative promozionali, magari unendo gli sforzi dei Consorzi di Tutela e sostenere in sede di accordi internazionali il riconoscimento delle denominazioni comunitarie.

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The advantages of being short: Farm perspective of short food supply chain

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Abstract

This paper aims to test whether farmers joining short supply chains do experience better economic performances. To that end, we use Italian Farm Accountancy Data Network data, for the years 2008-2010, and a propensity score-matching model was implemented in an attempt to estimate average differences, in several farm profitability indexes, between farms participating in direct sales activities and farms non-participating. Results indicate that participation in the short supply chain seem to increase farms' competitiveness and profitability.

Keywords: direct selling, propensity score matching, competitiveness, FADN

1. Introduction

In recent years a new form of food production and distribution organization, called Short Supply Chains (SSC) as part of small-scale agriculture, have been gaining ground. This alternative model of food production and distribution moves away from mainstream models, the latter mainly oriented to high productivity, economic performance and production (DeLind 2002). The mainstream model, also refereed by several authors as industrial agriculture, has its principal aim in the production maximization at the lowest cost (Lyson and Guptill 2004). It is distinguished by few vertically integrated multinationals that follow the global rules of the market to gain, or hold, a considerable market share (Grey, 2000). As opposed to industrial agriculture, the main characteristic of SSC is the strong and direct relation between farmers and consumers which entails the creation of a real community in which consumers and producers have the opportunity to interact closely whilst sharing decisions and resources (Jansen, 2010). Moreover, SSC is focused in the promotion of economic sustainability by farmers and consumers to enhance social equity among members of a community (Murdoch, et al., 2000, Feenstra 2002). On the retail side, examples of SSC are Farmers' markets, Community Supported Agriculture, Solidarity Purchase Groups, Pick-your-own, Box Schemes and direct selling (Lyson 2004). All these recent forms of supply organization are simultaneously taking place in US and Europe. In US farmers' markets have increased in number from 1,755 to 5,274 units in 1994-2009 time span (Martinez, 2010). Products sold range from vegetables, fresh fruits, flowers, dairy products and baked goods. In Europe the phenomenon has followed about the same trend. In UK over 500 farmers' markets have taken place visited by more than 15 million of consumers per year, accounting for over 150 million pounds in sales (www.farma.org.uk). In Germany are operating about the same number of farmers' markets (www.farmersmarkets.net). Direct selling in France covers over the 15% of food purchase and a new form of SSC is taking place, namely AMAP (*Associations pour le Maintien d'une Agriculture Paysanne – AMAP, 2012*). In Italy several SSC organizations are well established such as solidarity purchase group (Brunori et al., 2011; Cembalo et al. 2013), Community Supported Agriculture and Box Scheme (Cicia et al. 2011), and Pick-your-own. However, the most spread SSC organization in Italy is farmers' markets managed by Coldiretti (the largest Italian farmers'

association) (Cicatiello and Franco, 2008). Coldiretti (2012) reported 1,105 farmers' markets fueled by 4,739 farms, visited regularly by 7 million consumers and, occasionally, by 21 million people that represents about a third of Italian population. In 2009 in Italy farm direct selling involved about 63,000 farms (Coldiretti, 2009) showing an increase of 64% compared with 2001. Even though this type of supply chain organization is mostly located in northern Italy, being Tuscany the leading region, direct selling can be considered a nation-wide phenomenon (Aguglia, 2009 and D'Amico et al., 2014). Products sold range from baked goods, wine, olive oil, fruit and fresh vegetables (Pascucci et al., 2011). In Italy, as everywhere else, selling through direct channels can represent an opportunity for both consumers and farmers. Consumers receive fresh products and quality produce, while narrowing the information gap on food quality due to their direct participation at local supply chain and, in some form of SSC, due to their involvement in different production stages (Lyson 2004; Pascucci et al. 2013). Farmers, on the other hand, bypass middlemen internalizing, in this way, additional margins that, in the mainstream supply chain organization, usually go to other agents such as retailers. Put differently, selling products to consumers through SSCs can be seen as a strategy to reach consumers with higher willingness to pay. In this way a win-win solution might take place where consumers and farmers share mutual benefits: consumers seize the opportunity of procuring higher quality food for their households while farmers may internalize higher margins (Gilg and Battershill, 1998; Verhaegen and Van Huylenbroeck, 2001; La Trobe, 2001; Cembalo et al., 2013). Furthermore, farmers' participation in direct channels has been found to have benefits going beyond farmers' performances (Raffaelli et al., 2009; Mariani et al., 2011). Brown (2002) and Brown and Miller (2008) literature reviews assess the role of FMs and CSAs for local communities, participant farms, and consumers in the US, finding a substantial impact on income of participant farms (especially small ones), improvement of human capital, improving access to local fresh produce to consumers, and positive impacts (from both a social and an economic perspective) for the communities where they locate (Bazzani and Canavari, 2013).

In spite of several studies on consumers side defining SSCs and the motivations underlying participation (Toler et al. 2009; Cembalo et al. 2012; Cembalo et al. 2013), a fewer number of studies addressed profitability of farms participating in direct sales activities (Brown, 2002; Brown and Miller, 2008; Detre et al., 2011; Park et al., 2014). Moreover, most of studies at farm level lacks of external validity and, to the best of our knowledge. The objective of this analysis is testing whether farmers joining short supply chains do experience better economic performances. To that end, we use Italian Farm Accountancy Data Network (FADN) data, for the years 2008-2010, and a propensity score-matching model (PSM) was implemented in an attempt to estimate average differences, in several farm profitability indexes, between farms participating in direct sales activities and farms non-participating.

Use of PSM is suggested in presence of quasi-experimental study design. In our study farm participation in a peculiar supply chain is not randomly assigned. It depends on a number of other variables. Therefore, the probability for a farms to participate to a SSC is not independent of other farms characteristics which may be in turn related to the measures of profitability. Propensity score matching allows to take into account these observable variables, comparing the outcome of each farm participating in SSCs to the outcome of the non participants. The comparison is performed after netting out the effect of the influence of differences in farms' structures. Once the matching is performed, Average Treatment Effect on the Treated (ATET) computation is computed on the main economic indicators of farm performance.

Empirical results provide support to the belief that participation in SSCs impacts positively economic margins. We use this preliminary empirical evidence to shape future research steps in

this domain, and namely to further investigate the differential impact of participation in SSCs on gross sales and variable costs.

2. Some examples of short supply chains

The growing need of consumers to establish and create a direct relation with food producers have fostered the creation and the development of different and original examples of short supply chain. In this section we present a description of some example of short supply chains, showing how they operate and the level of interaction between the various actors in terms of market size, relationships between consumers and farmers, and cooperation among producers. Market size defines the geographical area of actors participating in SSCs. In the case of box schemes and direct selling, this variable assumes the dimension local insofar as the produce of each farm is sold to consumers living near the farm. By contrast, farmers' markets and SPGs serve consumers/participants who may live a considerable distance from the farms yet within the region. Relationships between consumers and farmers are the hallmark of the organisational structure of the four SSC types, especially the type of interaction which is established between consumer and producer. According to Renting, Marsden and Banks (2003), between consumers and producers participating in SSC three different types of relations may arise, defined in space and time: face-to face, proximate and extended. The term face-to-face is used for relations in which there is a mechanism creating networks between consumers and producers whereby consumers purchase products directly from the producer and the relationship of trust is constructed through direct, interpersonal interaction. The second type of interaction, termed proximate, extends its reach beyond direct interaction and envisages a more complex structural and institutional organisation. The third type, termed extended relations, is used to describe situations in which produce is sold to consumers who are some considerable distance from the production area. This concept may be extended on a worldwide basis for some popular specialities, for example. The case studies we analyzed as examples of SSC, namely farmers' markets, box schemes and direct selling, are all classified as face-to-face interaction. Indeed, in such cases, between consumers and producers a direct relationship is established, due especially to the various encounters and discussions besides the actual purchase of the product. We also tried to evaluate a peculiar form of SSC, namely solidarity purchase groups (SPGs). They present a proximate interaction insofar as they entail a complex organisation based on the creation of a structured network between groups of producers and groups of consumers (Migliore et al. 2013).

Cooperation among producers defines the level of p-p (producer-producer) interaction. In the case of farmers' markets it may be termed medium in that, in some cases, among participating producers a relationship of mutual collaboration may be created. However, in the case of SPGs, this level of interaction is high: participating producers are in contact amongst one another, they take part in various activities and collaborate. Finally, in box schemes and in cases of direct selling, as we are dealing with initiatives of individual farms, the level of interaction among producers may be considered zero. Table 1 summarizes the above analysis.

Table 1. Description of some forms of SSCs

Type of CA	Description	Aims	Market size	Mechanism of relationships between consumers and farmers	Cooperation among producers
Farmers' markets	Farmers' markets are physical markets where local farmers periodically sell their products to consumers. Farmers' markets are generally not housed in a permanent structure and the products sold reflect mainly local culture, tradition and the economy.	Provide an alternative outlet to farmers to support producers' income	Regional	Face-to-Face	Medium
Solidarity Purchase Groups	A solidarity purchase group (SPG) is a community-based network regulated like a club. Consumers who decide to join an SPG share their time and knowledge in the organisation. Consumers of SPGs decide in advance what they want to buy from farmers who serve the community.	Promoting critical consumption and sustainable products.	Regional	Face-to-Face	High
Box Schemes	A box scheme is an operation that delivers fresh fruit and vegetables (usually organic) to local consumers. Generally it works by subscription. Consumers become members and sign up to a number of deliveries of fresh products. In some cases there is a pick up points of boxes of products organised by farmers.	Connecting consumers to food production	Local	Face-to-Face	no cooperation
Direct Selling	Selling on the farm is a particularly direct form of selling farm products. Consumers go into the farm and buy products directly from the producer.	Connecting consumers to food production	Local	Face-to-Face	no cooperation

3. Empirical approach

The modelling approach implemented sought to estimate average differences, in farms competitiveness and profitability, between participants and non-participants in SSCs.

The first methodological step involves the design of the farms' competitiveness and profitability measures through the information provided in the FADN. These measures have to be case-specific and functionally consistent with the aim of the analysis. More specifically we calculated for each farm:

a) *Price costs Margin*: it is a widely used index to measure farmers competitiveness (Boone, 2008): higher intense competition leads to lower margins and lower PCM, while higher margins and higher value of PCM is associated to lower competition. PCM_i for the i -farms can be easily calculated as:

$$(Gross\ sales_i - Variable\ Costs_i) / Gross\ sales_i \quad (5)$$

b) *Profitability index*: an ad-hoc profitability index can be the ratio profits over the gross sales. For the i -farms is calculated as follows:

$$Profits_i / Gross\ sales_i \quad (6)$$

c) *Relative profit differences (RPD)*: it is a measure of competition characterize by robust theoretical foundation and proposed by Boone (2008). Briefly it is a normalized measure of farm profitability according its efficiency. Assuming that farms are ordered such that the economic efficiency of farms is decreasing in i , RPD can be calculated as:

$$RDP_i = \frac{\pi_i - \pi_N}{\pi_1 - \pi_N} \quad (7)$$

Where is π_1 is the profit corresponding to the farm with the highest efficiency, while π_N corresponds to the profit of the least efficient farm. Boone proposed as measure of efficiency the average variable costs. In our analysis we use the *Variable Costs/Gross sales ratio*.

Once obtained a reliable measurement of the outcome, data were treated in the framework of quasi-experimental studies. The latter term comes from behavioural economics and non-statistically oriented literature (Shadish et al. 2002). More explicitly, one of the main features of quasi-experimental studies concerns the so-called treatment effects. An observational study shares, with a purely experimental one, the same purpose but, unlike an experiment, no method of experimental design is implemented to maintain a control group (Guo and Fraser 2010). In this context, treated and control groups (counterfactual) may show large differences in terms of covariates (farm size or farmer education for example), yielding biased estimates of treatment effects. This kind of study is necessary when randomised assignment of treated and non-treated groups are infeasible, unethical, or when researchers need to assess differences between groups under particular marketing strategy settings. The latter motivation is one of the main critiques of social experiments made by econometricians. Heckman and Smith (1995), for instance, argue that randomisation is unfeasible, or non-desirable, when institutions and social environments are part of the decisional process and are therefore relevant when the purpose of the study is to design policy intervention following a behavioural economics analysis (Heckman 1979; Heckman and Smith 1995). In quasi-experimental studies, where the task is to evaluate treatment effects in a non-randomization approach, in order to reduce the multidimensional information (namely farm/farmers variables) to only one score, it is worth invoking the so called propensity score. Since the seminal work of Rosenbaum and Rubin (1983) on propensity score analysis, this method has become increasingly popular in quasi-experimental studies. The propensity score approach has been implemented in many disciplines such as psychology (Jones et al. 2004), medicine (Earle et al. 2001; Gum et al. 2001), education, social work (Barth et al. 2007; Weigensberg et al. 2009), and social welfare studies (LaLonde 1986; Michalopoulos et al. 2004). When participation in a supply chain is not randomly assigned but stochastically depends on a number of observable variables, the propensity score can be implemented as a measure of conditional probability of participation conditional upon the observed variables (farm and farmer

characteristics). Let x be the observable variables, and $p(x)$ the conditional probability of treatment participation (or propensity score):

$$p(x) = \Pr [D = 1|X = x] \quad (1)$$

Given D_i and x_i , the propensity score can be calculated by implementing, for example, a logit regression (Cameron and Trivedi 2005). Once a propensity score estimation is computed, the next step is to match the treated (farms participating to SSCs) to a control (non-participants to SSCs) group based on the estimated propensity score. The intuition behind matching is to generate a new data sample built by only those cases that share a similar likelihood of participating in an SSC. This likelihood is the propensity score. The most common matching algorithm is greedy matching. There are many methods to achieve greedy matching (D'Agostino 1998; Smith and Todd 2005; Guo and Fraser 2010). The methods implemented in this paper follow those implemented in Dehejia and Wahba (1999; 2002). The core idea starts from a widely used measure of treatment effects that can be calculated as treatment evaluation: Average Treatment Effect on the Treated (ATET). In the specific case of our study we consider a group of farms that sell all or part of their products through SSCs. ATET measures the differences, or average gain, from participants and non participants (Heckman and Vytlacil 2007).

In our study, following Dehejia and Wahba (1999; 2002), we estimated a logit model on the probability of participating in the SSC:

$$\Pr[SPG_i = 1|x_i] = \Lambda(x_i'\beta), \quad i = 1, \dots, 653 \quad (2)$$

where $\Lambda(z = x_i'\beta) = e^z / (1 + e^z)$, while the regressors are some farm and farmers characteristics (reported in table 3). Any matching method involves trade offs between the number of matches and the quality of matching, and none is clearly superior to the others. Hence, from a general specification of the ATET, we chose to estimate the radius matching method following Dehejia and Wahba (1999; 2002). In order to verify which variables showed a significant difference between the two groups, a t-test was performed and thus reported in the tables.

The last two columns of the tables presented in the next section (table 4) are benchmark and percentage of benchmark. The benchmark is calculated by regressing, in turn, each of the variables on a constant and on the dichotomous variable that assumes value 1 if a farm participates in a SSC and 0 otherwise. The estimated parameter of the constant is the benchmark value (Dehejia and Wahba 2002). Once this has been obtained, it is possible to calculate the percentage of the ATET compared with the benchmark. It gives an index of robustness of ATET estimates across specifications that can be evaluated in terms of the ratio of ATET and the benchmark estimate.

4. Data

Data used in the analysis comes from the Italian Farm accounting data network (FADN) database¹. Records from farmers belonging to 6 distinct types of farming (TF) specialized in horticulture were collected from the year 2008 to the year 2010 (Table 2).

Table 3 reports the farms structural and economic characteristics and farmers socio-demographic profile involved in the analysis. The age, education level, sex and the entrepreneur status were measured for the farmers. For farms, utilized land area, livestock, land and other capital assets, presence of irrigation, subsidies received and working intensity (hours) were also measured. Finally, several macro-settings variables (at provincial level) were including as proxies of consumer demand (per capita total and food expenditure, population size) and overall facilities (number of direct selling markets, altitude, locational disadvantage). We attempt to include all

1. Data are available from <http://bancadati.inea.it/>

the explanatory variables for describing the farmers decision to join alternative food chain or to estimate the propensity to be treated, where the treatment is the participation to SSCa. The propensity score is estimated using a Logit (Table 4). However, only variables statistically significant at least at 15% were kept in the model to ensure the best model goodness of fit. From the propensity score estimation, we obtain groups with different numbers of treatment and control units, making sure that each group benefits of the balancing property: both the average propensity score and the average for each explanatory variable between treated and controls have to be equal. As a result, only a portion of the original sample is taken into account. The area of common support (similar propensity scores) between treated and control groups is quite good (69%, corresponding to 451 farms over the 653 included in FADN), and the balancing property was satisfied at significance level of $p < 0.001$.

Table 2. Distribution among types of farming and among regions of farmers participating and non participating to alternative food chains.

TF	Mainstream supply chain	SSCs	Total
Specialized Garden greenhouse	372	15	387
Horticulture in greenhouses	7	3	10
Mushrooms specialization	25	2	27
Mixed Horticulture	24	2	26
Specialized in horticultural greenhouses	178	6	184
Specialized in market gardens	15	4	19
Region			
Abruzzo	3	1	4
Basilicata	16	0	16
Calabria	2	0	2
Campania	95	4	99
Emilia Romagna	87	0	87
Friuli venezia giulia	6	2	8
Lazio	92	5	97
Liguria	48	4	52
Lombardia	12	4	16
Marche	4	0	4
Piemonte	13	1	14
Puglia	13	2	15
Sardegna	36	3	39
Sicilia	123	2	125
Toscana	26	1	27
Trentino	9	0	9
Veneto	36	3	39

Three methods of ATET estimations were computed. They all are consistent with each other, confirming direction, significance and magnitude of the estimated ATETs.

5. Results

Table 5 reports the estimates for the average treatment effect on the treated (ATET) based on the propensity score matching method. The estimates strongly support the hypothesis that the farmers participation to SSCs had a positive and consistent impact on the selected measures of farms competitiveness and profitability. More specifically, both results from stratification and kernel matching show a positive effect of the farmers participation on the price-cost margin and on the Profits/Gross sales ratio (+13% and +40% respectively). As for the relative profit differences, the difference in ATET between treatment and control groups are positive (around + 55%) but no statistically significant, regardless of the matching method used. Finally, results from radius matching show significant and positive effect of SSCs participation on the whole set of selected index.

Table 3. Characteristics of farmers and farm used in the analysis

Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
	Mainstream supply chains				SSCs			
<i>Farmers characteristics</i>								
Gender (female)	0.16	0.37	0	1	0.22	0.42	0	1
Education (classes)	3.19	1.34	1	7	3.63	1.31	1	6
Age	56.96	11.90	27	92	55.06	11.87	31	79
Entrepreneur	0.50	0.50	0	1	0.63	0.49	0	1
<i>Farm characteristics</i>								
Utilized agricultural area	7.41	15.54	0.18	165.37	3.98	5.12	0.3	20.87
Livestocks (uba)	0.44	4.98	0	98.7	0.06	0.18	0	0.7
Land Capital	243861	463802	0	3678449	125366	168766	0	659732
Capital assets	266121	497616	-1486	4063644	148737	194781	242	769026
New investments	0.47	0.50	0	1	0.59	0.50	0	1
Irrigation	0.94	0.25	0	1	1	0	1	1
Subsidies	1643	8718	0	157307	609	1535	0	5973
Total working hours	7109	12145	0	123176	3704	1928	1408	9478
<i>Macro-settings variables</i>								
Food expenditure (prov)	461.18	22.74	398.84	557.67	469.04	30.59	408.37	557.67
# Farmers Markets (prov.)	50.97	21.83	9	146	58.81	28.78	15	105
Disadvantaged area	0.65	0.48	0	1	0.47	0.51	0	1



Total expenditure (prov.)	2294	418	1636.94	2941.28	2361	403	1636.94	2903.4
Population (prov)	664276	633438	101396	4042676	895718	890588	128581	3058592
Altimetry (classes)	4.42	0.92	1	5	3.97	0.82	3	5
Year	1.95	0.82	1	3	2.00	0.80	1	3
<i>Outcomes</i>								
Variable costs	133,909	447,998	120	6,284,700	38,840	50,335	2,652	234,633
Fixed costs	23,945	65,677	0	1,089,472	12,221	14,701	270	58,069
Gross sales	235,577	682,709	3,650	9,238,736	103,481	120,960	11,374	422,781
Profits	73,635	236,509	0	3,314,956	48,813	71,812	0	309,905
<i>Indexes</i>								
Price costs Margin								
Profits / Gross sales	0.35	0.24	0	0.984126	0.50	0.34	0	1.9571
RDP	5.61	17.54	0	246.6485	3.64	5.34	0	23.05841

Table 4. Propensity score estimates (logit regression)

Variable	Coef.	std.dev	t-stat	p-value	dy/dx
Altimetry	-0.534	0.171	-3.130	0.002	-1.237
New investments	0.693	0.398	1.740	0.082	1.626
Education	0.174	0.047	3.170	0.002	0.402
Land Capital	-0.120	0.057	-2.090	0.036	-0.278
Capital assets	0.107	0.052	2.070	0.038	0.248
Working hours	-2.071	0.907	-2.280	0.022	-4.792
Food expenditure (prov)	0.010	0.007	1.550	0.120	0.024
Population (prov)	0.041	0.021	1.990	0.047	0.095
_cons	-5.851	3.134	-1.870	0.062	

Table 5. Estimates of ATET with Stratification, Kernel and Radius matching

	ATET	Treat#	Contr#	Std_err	t_stat	Pvalue	Bench	% on Bench.
Stratification Matching								
Price Costs Margin	0.074	32	419	0.030	2.446	0.015	0.541	13.750
Profits/Gross sales	0.142	32	419	0.064	2.205	0.028	0.351	40.448
RDP	1.264	32	419	0.945	1.337	0.182	2.296	55.043
Kernel Matching								
price costs margin	0.072	32	419	0.033	2.153	0.032	0.541	13.316
Profits/Gross sales	0.140	32	419	0.069	2.023	0.044	0.351	39.811
RDP	1.384	32	419	0.925	1.495	0.136	2.296	60.267
Radius Matching								
Price Costs Margin	0.064	32	416	0.033	1.933	0.054	0.541	11.919
Profits/Gross sales	0.138	32	416	0.071	1.949	0.052	0.351	39.255
RDP	1.536	32	416	0.929	1.653	0.099	2.296	66.911

6. Conclusions

In this paper we have presented an empirical study aiming at measuring the effect of farms participation in SSCs on their economic performance. Given the time span and type of farming considered, results indicate that the participation in short supply chains provides higher economic benefits to farmers. Results, however, should be treated with caution. Further investigation should enlarge the time span considered and farming typology. One hypothesis to investigate is the relationship between higher profitability of SSC participants and the cost structure such as: variable input cost and cost of labor. Participation in SSCs seem to increase net profit, on average, more than in farms non-participating in SSCs, but it could be related more to the increase of price-costs margin than to the increase of gross sale. Put differently, farms participating in SSCs may show a more efficient capital allocation, facing lower market competition. Also, more should be investigated in the field of changes in the organization of the farm business since farmers participating in SSCs have to internalize activities (such as marketing and sales) in which they are less experienced with. A further investigation in the reasons behind such a differential impact is thus needed.

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Fair Trade Attitudes and Consumer Behavior in Italy: a Comparative Analysis of two Attitudinal Scales

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Abstract:

This paper aims to provide insights into consumer motivational systems and their relations with fair trade product purchasing behavior. In order to pursue this goal, the effectiveness of two alternative approaches, proposed in the literature and tested in Belgium and Germany, were formally assessed in Italy. The two sets of scales were tested for predicting purchasing behavior by using a sample of Italian consumers. Although both sets of scales showed good internal reliability and statistical evidence of behavioral predictive validity, one of the two sets under assessment is able to depict actual behavior in much greater depth than the other.

Keywords: Fair trade, Attitudes, Italy, Scale validation, Consumer behavior.

1. Introduction

In recent decades, academic interest in ethical consumerism has progressively increased. From a general point of view ethical consumerism can be defined as “the conscious and deliberate choice to make certain consumption choices due to personal and moral beliefs” (Crane and Matten, 2004). According to Cherrier (2007) and Newholm and Shaw (2007), the two most important activities which define ethical consumption are positive choice behaviors on the one hand, and boycotting certain goods or companies on the other. Moreover, ethical consumerism covers two distinct aspects: ecologically friendly and socially conscious consumption patterns. In this study we specifically focus on the second aspect. Within the sphere of ethical consumerism and socially conscious consumption, fair trade products (FT) represent an important segment.

The main goal of the present paper is to add new empirical evidence so as to shed light on motivational systems and their relations with buying behavior of FT products in the Italian case. To pursue this goal two sets of attitudinal scales were formally assessed and used to predict stated buying behavior of FT products on a sample of Italian consumers.

In this context, the objectives of the present paper are: (i) to validate, in the Italian case, both the sets of two attitudinal scales, the first one was conceptualized by De Pelsmacker and Janssens (2007) and the second one, CFC scale, was proposed by Balderjahn et al. (2013); (ii) to compare the predictive validity of the two sets of scales mentioned above in explaining purchase behavior of fair-traded products by means of an ordered probit model.

2. Consumers and ethical issues

In the context of food consumption, several issues have been widely discussed in reference to a large array of attributes and product types used as evidence of growing consumer feeling toward ethical issues linked to moral and social consciousness. Animal welfare, fair prices for farmers, social aspects of production, and preservation of cultural features, are some of the product attributes for which consumer behavior has been analyzed in the context of ethical consumerism.

Several authors have focused on farm animal welfare concerns (see Lagerkvist and Hess, 2009, for a meta-analysis of the literature on consumers' WTP for farm animal welfare). Moore (2006) examined trusting relations between consumers and vendors in farmers' markets, underlining that consumers in the alternative agri-food network share ethical and moral values that include supporting the local area. Willingness to pay more for food products that guarantee a living wage and safe working conditions for farmworkers were also researched in the context of ethical consumption (Howard, 2006). Moreover, Zander and Hamm (2012) analyzed ethical attributes of organic food using among the different ethical attributes, fair prices for farmers, protection of biodiversity and preservation of cultural features.

Within the sphere of ethical consumerism and socially conscious consumption, fair trade (FT) products have been extensively analyzed by the literature in the last 20 years. Andorfer and Liebe (2012) in their overview on the current state of research on individual consumption of FT products analyze 51 papers and, even if some articles deal with consumer preferences and WTP, most examine FT product consumption in terms of consumer attitudes and motivations, extending or modifying Ajzen's (1991) basic model on the Theory of Planned Behavior (TPB) (Ozcaglar-Toulouse et al., 2006; Chatzidakis et al., 2007; Nicholls and Lee, 2006; De Pelsmacker and Janssens, 2007).

Other studies focus on general aspects of consumer attitudes toward FT: Nijssen and Douglas (2008) analyzed the impact of world-mindedness and social-mindedness on FT store image; Goig (2007) focused on the effect of consumers' global cognitive orientation on FT product consumption. Hertel et al. (2009) highlighted the influence of attitudes toward human rights on FT purchasing intentions. Finally, several authors consider the linkages between personal values and consumer behavior (Schwartz and Bilsky, 1990; Rohan, 2000; Doran 2008; Roccas and Sagiv, 2010; Verneau et al., 2014).

De Pelsmacker and Janssens (2007) proposed and tested a complex theoretical model in which buying behavior is determined by the level of knowledge, quality and quantity of information, general attitude toward FT and specific attitude toward FT products. The factors used to collect information on general attitude were skepticism and level of concern, while specific attitude was measured by product interest, product likeability, price acceptability and convenience. The estimated behavioral model for buying fair trade products highlights the direct effects of specific attitude indicators, the direct and indirect effect of general attitudes, and the indirect effects on behavior of knowledge and information.

More recently, Balderjahn et al. (2013) conceptualized and tested a model in which intention and buying behavior are determined by a synthetic indicator of action tendency, called Consciousness for Fair Consumption (CFC), resulting from personal experiences, norms, values and attitudes. The same authors define CFC as "a consumer's disposition to prefer products that have been manufactured and traded in compliance with fair labor conditions" (Balderjahn et al. 2013)

Therefore, the two main approaches to dealing with individual consumption of FT products lie in consumer preferences and WTP on the one hand, and consumption in terms of attitudes and motivations on the other (Andorfer and Liebe, 2012). In both cases fair trade labels have been widely researched in order to analyze their role in addressing consumer preferences and affecting WTP (De Pelsmacker et al., 2005; Didier and Seirux, 2008). Nevertheless, recent research (Chatzidakis et al., 2007; Bray et al., 2011; Dutra de Barcellos et al., 2011; Grunert, 2014) showed that labels on ethical attributes do not currently play a major role in consumer food choices, and suggested that the future use of such labels could depend on the extent to which consumers' general concern about ethical issues can be turned into actual purchase. This well-known gap between consumer attitudes and behavior is still considerable in countries where

consumers are already quite aware and familiar with FT products, like France, and the gap is even greater in the countries of the Mediterranean basin, like Italy, where ethical attributes seem to be less important in affecting buying behavior (MORI, 2000). Indeed, most of the studies on FT have been conducted in the USA, UK and other Northern European countries where consumption of FT products is a well-consolidated practice. On the contrary, very few studies have been conducted in Mediterranean countries, like Italy, where FT is a growing phenomenon but still very restricted (MORI, 2000, Maietta, 2005; Becchetti and Rosati, 2007).

3. Material and methods

In order to shed light on consumer motivational systems and their relations with buying behavior of fair trade products, an ad-hoc analysis was conducted in Italy, where the most important fair trade organization is the General Assembly of Italian Fair Trade (AGICES). In 2013, this network included 87 member organizations, 30,496 individual members, and 257 so-called world shops, representing at least 80% of the whole fair trade and solidarity network in Italy. The most important member organizations, namely Altra Qualità, CTM-Altromercato, Equo Mercato, and Libero Mondo, are also importers, and include several world shops. FT organizations are not evenly distributed in Italy: many are located in the north where five regions (Lombardy, Veneto, Trentino Alto Adige, Emilia Romagna and Piedmont) account for about 80% of the total revenue, followed by those of the Center (Umbria, Lazio and Tuscany) and the South. In the period 2007-11 the value of the production of AGICES members rose by 9%, reaching more than €88m in 2011. Unlike northern European countries, where FT products are marketed especially in modern retail channels, in Italy FT products are still primarily distributed by specialized stores (world shops). Moreover, in this context, the per capita consumption of FT products is still low: €1.50 compared to €11 in the United Kingdom and up to €21 in Switzerland (AGICES, 2013). Like elsewhere in Europe where 47% of Europeans are willing to pay more for their daily shopping if they know that this would benefit developing countries (Eurobarometer, 2011), in Italy there is great potential to expand this market segment supported by a growing willingness to pay more for fair trade products (Annunziata et al., 2011, Maietta, 2005; MORI, 2000).

The main objective of this paper is to validate, with regard to Italy, both the attitudinal scales conceptualized by De Pelsmacker and Janssens (2007) and the CFC scale proposed by Balderjahn et al. (2013). De Pelsmacker and Janssens (2007) built a model for fair trade buying behavior to investigate the impact of fair trade knowledge and attitudes to the fair trade issue, the importance of attitudes to fair trade products and the overall perception of the information about fair trade. The approach of the model is the traditional Knowledge-Attitudes-Behaviour logic. Buying behaviour depends by the general attitude towards the fair trade issue (representing a positive and a negative component). Attitude is influenced and determined by the level of knowledge about this issue. They concluded that knowledge of fair trade, overall concern and skepticism toward fair trade, and perceived fair trade information influence buying behavior directly and indirectly through specific attitudes to FT products. The authors developed valid and reliable scales for each construct. Information about FT was investigated through two constructs: perception of the quantity and quality of FT information. Similarly, for general attitude toward FT they used two constructs: concern/interest and skepticism/lack of belief in FT. Finally, they used four constructs for specific attitudes toward FT products: product interest, product likeability, shopping convenience, and price acceptability.

By contrast, Balderjahn et al. (2013) emphasized the need to conceptualize sustainable consumption as a multidimensional construct according to which consumers differentiate between different aspects of sustainable consumption, such as environmentally and socially conscious consumption. They therefore studied a particularly important aspect of social consumption: the

consumer's consciousness for fair consumption (CFC). Following the studies of other authors (Hustvedt and Bernard, 2010; Sunderer and Rössel, 2012), they investigated CFC as a determinant of demand for FT products. Authors define consumers consciousness as a disposition, influenced by personal experiences, norms, values and attitudes, to prefer products that have been manufactured and traded in compliance with fair labor conditions.

To operationalize CFC, they applied the adequacy-importance approach (Cohen et al., 1972; Mazis et al., 1975) which combines a consumer's belief about the adherence to a specific labor standard with the importance the consumer attaches to adhering to this standard (Creyer and Ross, 1997; Auger and Devinney, 2007; Srivastava and Huddleston, 2007; Auger et al., 2010). They considered six items to measure CFC: compliance with workers' rights; freedom from forced labor; abolition of illegal child labor; non-discrimination in the workplace; compliance with international statutory labor standards; fair wages for workers. De Pelsmacker and Janssens tested their model on a sample of Belgian consumers while Balderjahn et al. used a sample of European university students and employees. While the former model is well documented in the literature (Carrington et al., 2010; Bartels and Onwezen, 2014) the latter, to the best of our knowledge, is still underexplored.

We tested both models through a web-based survey using a three-section questionnaire. The first section collected information about buying behavior, both considering annual average expenditure in FT products and purchasing frequency concerning four FT product types (fruit, textiles, beverages and candy). In the second section the most important demographic and socio-economic characteristics were collected (see tables 1 and 2). Finally, the third section contained the attitudinal scales. While all questionnaires shared the first and second sections, they differ in the third. In the questionnaire called Questionnaire A, the third section was devoted to the De Pelsmacker and Janssens scales. In Questionnaire B, the third section was devoted to the Balderjahn scale on CFC.

The two questionnaires for the survey were web administered using the website of the General Assembly of Italian Fair Trade (AGICES) which promoted the questionnaire in the period September – November 2013. Therefore, the population is likely to be characterized by a good level of knowledge and information about the FT concept and FT products. Questionnaire A or Questionnaire B were randomly administered to the respondents. During the period 668 questionnaires were collected 334 for each survey. Demographics and socio-economic characteristics of the two samples are shown in tables 1 and 2.

*Table 1 – Demographic characteristics **

Demographics	Classification	Percentage	
		Sample A	Sample B
Gender	Male	46.0	38.6
	Female	54.0	61.4
Age	18 – 25	17.5	12.3
	26 – 35	16.1	26.6
	36 -45	24.4	30.7
	46 -55	17.1	16.4
	56 +	24.9	14.0
Household members	1	10.0	12.0
	2	21.2	19.5
	3	21.8	25.4
	4	36.2	31.7
	5+	10.8	11.4
Families with children	< 12 y.o.	23.3	25.4
Geographic area	Central and Northern Italy	55.3	54.9
	Southern Italy	44.7	45.1

*Table 2 – Socio-economic characteristics**

Demographics	Classification	Percentage	
		Sample A	Sample B
Occupation	Students	19.0	17.4
	Housekeepers	5.0	8.1
	Self-employed	19.0	16.2
	Employee	37.1	38.3
	Retired workers	7.0	6.3
	Temporary workers	13.0	13.8
Education	Low level	5.0	4.8
	Secondary school	49.0	49.1
	Degree	46.0	46.1
Monthly income	< €1,000	16.0	14.7
	€1,000 - 2,000	43.0	43.7
	€2,000 – 3,000	25.5	26.6
	> €3,000	15.6	15.0

*Sample A refers to Questionnaire A; sample B refers to Questionnaire B

The relationship of the two sets of scales with actual behavior was originally assessed using annual expenditure on FT products as a behavioral response. In this paper we follow the same

procedure since the measure in question could be considered a specific and real index for actual buying patterns.

The functional relationship between the two sets of scales and actual behavior is thus analyzed using ordered probit regressions based on random utility theory (McFadden, 2001). Ordered probit regression represents a generalization of probit regression and is specifically applied to analyze ordinal data as in this case since annual expenditure on FT products consists of a set (three in our analysis) of cases which can be ordinally measured (Winkelmann and Boes, 2009; Hinote *et al.*, 2009).

The ordered probit model assumes a latent unobserved continuous process (1):

$$y_i^* = \mathbf{X}'_i \boldsymbol{\beta} + e_i, \quad E[e_i | \mathbf{X}_i] = 0, \quad e_i \text{ i.i.d. } N(0,1) \text{ with } i = 1, \dots, n. \quad (1)$$

It underlies the ordinal observed outcome y_i (2):

$$y_i = \begin{cases} 1 & (\text{annual exp. in FT products less than } 10\text{€}) & \text{if } k_0 < y_i^* \leq k_1 \\ 2 & (\text{annual exp. in FT products between } 10\text{€ and } 100\text{€}) & \text{if } k_1 < y_i^* \leq k_2 \\ 3 & (\text{annual exp. in FT products more than } 100\text{€}) & \text{if } k_2 < y_i^* \leq k_3 \end{cases} \quad (2)$$

where $k_0 = -\infty$ and $k_3 = \infty$; k_1, k_2 are unknown threshold parameters to be estimated in order to indicate the range of the normal distribution associated with specific values of the stated response variable y_i^* . \mathbf{X}_i is a $1 \times m$ vector of explanatory variables and $\boldsymbol{\beta}$ is a $m \times 1$ vector of unknown parameters expressing the existing relationship between the behavioral response of consumers and the predictors.

Two different models were estimated using the two samples from the same population, and then compared to ascertain which fitted the observed data more accurately. The first model includes, among the factors influencing the behavioral response, traditional socio-demographic variables and the scales provided by De Pelsmacker and Janssens (2007), to measure both specific and general attitudes toward FT products. The second model includes among the predictors, traditional socio-demographic variables and the measure of the consciousness for fair consumption – CFC, (Balderjahn *et al.*, 2013).

Estimated coefficients ($\boldsymbol{\beta}$) will show the direction and magnitude of the statistical associations between the explanatory variables (\mathbf{x}) and the probability of observing a higher classification of the consumption frequency, $P(y_i=j)$.

3. Results

The two samples used in the analysis show statistically equivalent values for ages, educational levels, and other socio-demographic variables. By means of Hotelling's T-squared test we cannot refute the hypothesis that the vectors of means are equal for the two samples (Table 3). Thus the two samples might be considered sampled by the same population.

Table 3 - Hotelling's T-squared on equality of means across the two samples.

Variable	Description	Sample A		Sample B	
		Mean	Std.Dev	Mean	Std.Dev
HH members	HH members	3.132	1.240	3.174	1.353
Children	Number of children	0.386	0.738	0.368	0.755
Education	Education level (classes)	3.401	0.625	3.404	0.601
Income	Income (classes)	2.419	0.916	2.398	0.949
Expenditure	Expenditure in FT (classes)	2.320	1.515	2.108	1.581
Age	Age	40.099	12.863	39.713	13.160
Sex	1 = female; 0 = male	0.614	0.488	0.536	0.499

H_0 : Vectors of means are equal for the two groups; $Prob > F(7660) = 0.37$

3.1 Scale validation

The first aim of the present research was to validate the De Pelsmacker and Janssens (2007) scales on FT attitudes and the CFC scale proposed by Balderjahn et al. (2013). For all the items of both sets of scales, translation and back translation implemented by an English mother tongue and an Italian mother tongue respectively, were compared. To assess the validity and reliability of the scales proposed by De Pelsmacker and Janssens (2007) and Balderjahn et al. (2013) in the Italian context, a confirmatory factor analysis was performed, using Mplus 5.5 (Muthén and Muthén, 2007).

As regards the scales proposed by De Pelsmacker and Janssens (2007), the shopping convenience construct was ignored because it was not validated by the authors. Moreover, we did not consider the knowledge and information constructs, since we submitted the questionnaire through the AGICES website. Furthermore, a filter question was introduced about knowledge of FT products, allowing or preventing questionnaire completion. Thus, it may be hypothesized that the respondents had a good knowledge of FT and FT products.

Regarding **Attitude to fair trade in general**, the final solution shows two negatively correlated factors, in line with the results of De Pelsmacker and Janssens (2007) with satisfactory fit indices: χ^2 (df); 40.984 (18), $p < 0.0001$, CFI = 98, TLI = 96, RMSEA = 0.063 (0.037 - 0.088), SRMR = 0.03. As regards the standardized coefficients of saturation they range from 0.55 to 0.73 for the Skepticism scale and from 0.68 to 0.80 for the Concern scale. As regards validation of **Attitude to fair trade products**, the sub scale on price acceptability consisting of four items in the De Pelsmacker and Janssens (2007) version, showed standardized coefficients of saturation ranging from 0.02 to 0.80. Moreover, the Cronbach α was too low (0.54). The item "it is a pity that a fair price appears to be a higher price" was dropped and a three-item scale was adopted. The final solution shows three positively correlated factors, in line with the results of De Pelsmacker and Janssens (2007) with satisfactory fit indices: χ^2 (df); 28.105 (24), $p < 0.256$, CFI = 99, TLI = 99, RMSEA = 0.0023 (.000 - 0.052), SRMR = 0.029. Standardized coefficients of saturation range from 0.74 to 0.82 for the Product Interest scale, from 0.80 to 0.92 for product likeability and from 0.49 to 0.81 for the Price acceptability scale.

Finally also the **Consciousness for fair consumption (CFC)** scale was validated. The CFC scale presents good fit indices: χ^2 (df); 5.16 (3), $p < 0.159$, CFI = 99, TLI = 98, RMSEA = 0.047, SRMR = .014. Standardized coefficients of saturation range from 0.84 to 0.93. The main results are summarized in Table 4.

Table 4 - Attitude to fair trade Model Fit*

Dimension	χ^2 (df); p	RMSEA	90 Percent C.I	Probability RMSEA <= .05	SRMR	CFI	Construct name	TLI	Expected sign	Mean	Std. dev	α	
Attitude to FT in general	40.984 (18); $p =$ 0.0001	0.063	0.037 0.088	0.189	0.033	98		96					
							Skepticism		-	2.522	1.303	.82	
							Concern		+	5.722	1.279	.79	
Attitude to FT products	28.105 (24); $p =$ 0.256	0.023	0.000 0.052	0.930	0.029	99		99					
							Product likeability			+	4.479	1.403	.89
							Product interest (r)			+	6.008	1.341	.83
							Price acceptability (r)			+	3.484	1.467	.67
Consciousnes for fair consumption (CFC)	5.176 (3); $p =$ 0.159	0.047	-	-	0.014	99	Consciousness for fair consumption (CFC)	98	+			.94	

*Five indices are presented for each confirmatory factor analysis model: c^2 (chi-square), RMSEA (Root mean square error of approximation), SRMR (Standardized Root Mean Square Residual), CFI (Comparative Fit Index), TLI (Tucker-Lewis index). c^2 values with a probability greater than .05 are indicative of adequate fit values. This index, however, tends to be strongly affected by sample size (Barbaranelli, 2007). For this reason, we have to consider other indices too. An RMSEA of less than 0.05 is a good fit and less than 0.08 is an acceptable fit (Browne and Cudeck, 1993); CFI and TLI values are considered satisfactory when equal to or greater than .90 (Bentler, 1995); SRMR values equal to or below 0.09 are considered satisfactory (Hu and Bentler, 1999). The last two columns show how the sign for each construct should be interpreted and Cronbach's α for each construct.

3.2 Predictive power

The second objective of the research was to compare the predictive validity of the scales proposed in the two studies in question. We therefore assessed the effectiveness of attitudinal scales, demographic and socio-economic characteristics in predicting Italian consumer behavior.

In line with De Pelsmacker and Janssens (2007) and Balderjahn et al. (2013), annual expenditure on FT product was chosen as the dependent variable. We split annual expenditure in three classes (see table 5). Because all respondents buy fair trade products, we don't introduce a expenditure class equal to 0 euro. The functional relationship between the independent variables and self-reported behavior is analyzed using ordered probit regressions based on random utility theory (McFadden, 2001).

Table 5 - Fair trade consumer spending

Consumption in €	Sample A		Sample B	
	#	%	#	%
1- less than 10	114	34.13	93	27.84
2- from 10 to 100	152	45.51	156	46.71
3- more than 100	68	20.36	85	25.45



Table 6 shows the maximum likelihood estimates of the two ordered probit models. Socio-demographic variables not significant at the $p < .05$ were eliminated from the models, starting with the least significant variable. The first model aims to measure the relations between FT consumption and both specific and general attitudes toward FT products, as provided by De Pelsmacker and Janssens (2007), while the second model aims to assess the significance of the information provided by Consciousness for Fair Consumption – CFC (Balderjahn et al., 2013). As regards the socio-demographic variables, among a large set of predictor variables tested in the empirical analysis, including gender, age and educational level of respondents, our results provide statistical evidence that FT consumption depends only on the income of the respondents (*positive relation*), the number of household members (*negative relation*) and the area of residence (respondents from southern Italy show a lower propensity to consume FT products). With regard to the two sets of scales employed in the analysis, regardless of the magnitude of the coefficients, the estimated signs are consistent with the hypotheses formulated in table 5. Specifically, model 1 results show that four out five constructs provided by De Pelsmacker and Janssens (2007) are able to predict the consumption pattern of FT products: only “Skepticism” does not significantly affect consumption behavior. A Higher level of Concern and Product likeability vis-à-vis fair trade influence the consumption of FT products positively. “Product interest” and “Price acceptability” affect consumption positively, too. Results from model 2 provide statistical evidence of the value of CFC (Balderjahn et al., 2013) in understanding FT product consumption. Specifically, the higher the consciousness for fair consumption, the higher the probability of observing FT product consumption. Having estimated both the models, the predictive contribution and statistical significance of the information provided by the two sets of scales were assessed by comparing McFadden’s pseudo R^2 across the two estimates: the scales provided by De Pelsmacker and Janssens (2007) (pseudo $R^2 = 0.19$) are assessed to explain the variance much better than the CFC construct does alone (pseudo $R^2 = 0.10$). This result seems to provide further evidence of the multidimensional nature of the attitude to FT: the five scales from De Pelsmacker and Janssens (2007) are able to depict behavior better than the CFC as a single predictor, as formulated by Balderjahn et al. (2013).

Table 6 - Ordered probit estimates

Sample A	Coef.	Std. Err.	P>z	Sample B	Coef.	Std. Err.	P>z
Concern	0.136	0.073	0.064	CFC	0.050	0.007	0
Product interest	0.263	0.061	0				
Product likeability	0.231	0.059	0				
Price acceptability	0.118	0.047	0.012				
Southern Italy	-0.335	0.149	0.025	Southern Italy	-0.246	0.148	0.095
HH members	-0.094	0.051	0.067	HH members	-0.075	0.055	0.175
Income	0.121	0.071	0.087	Income	0.144	0.070	0.040
$/k_1$	0.016	0.53		$/k_1$	1.342	0.368	
$/k_2$	1.59	0.536		$/k_2$	2.763	0.384	
Log likelihood = -283.95				Log likelihood = -319.22			
Pseudo $R^2=0.1897$				Pseudo $R^2 = 0.0982$			

4. Discussion

Even though the use of De Pelsmacker and Janssens' model is well documented in the literature (Carrington et al., 2010; Bartels and Onwezen, 2014) their model has not been adopted to evaluate scale reliability and predictive power in other countries or cultural and socio-economic contexts. The same can also be said for the more recent model developed by Balderjahn et al. (2013). Moreover, as mentioned above, attitudes toward FT and FT products have been little researched in Italy. Becchetti and Costantini (2010) analyzed the effect of FT in Italy. Becchetti and Rosati (2007) conducted a survey to identify the determinants of expenditure in FT products and the relationship with traditional factors, like income and intrinsic motivation-related factors. Annunziata et al. (2011) performed market segmentation on a sample of 300 consumers in Campania using, amongst other variables, also general attitude toward fair trade. Cicia et al. (2010) analyzed consumer preferences for FT coffee in a district of Lombardy, while D'Alessio et al. (2007) discussed the role of social capital *à la* Putnam in order to explain different consumer behavior in three different regions of southern and northern Italy. They found that, in regions with higher values of social capital indexes, ethical motivations tend to prevail.

Unlike the studies cited above, we adopted a sample that included consumers from all Italian regions. Our results confirm the different behavior of FT consumers in northern and southern Italy, with a lower consumption in southern Italy.

All the scales on general and product attitude tested in the De Pelsmacker and Janssens model confirmed their impact on consumer behavior, showing significant coefficients with the expected sign, with the only exception of the variable on skepticism which relates to attitude to FT in general. On this specific point, it could be argued that in the present study the sample was chosen among consumers already informed about the meaning of FT and FT products. Moreover, the survey was web-administered and promoted by the AGICES website. It is therefore very likely that respondents share a high degree of information and knowledge about fair trade, while in the De Pelsmacker and Janssens sample the respondents were not necessarily fair trade or ethical buyers. Since skepticism is highly correlated with information and knowledge (De Pelsmacker and Janssens, 2007) and our sample is highly homogeneous with reference to information and knowledge, the skepticism variable may not work.

Also CFC scale was confirmed through its impact on intentions to purchase of fair trade products. Another aspect that differentiates our investigation is the use of socio-demographic variables that we included to capture the effects of income and family composition but also to highlight the differences in consumer behavior in northern and southern Italy: our findings confirm the higher propensity to participate in the FT market in northern Italy, besides highlighting the positive effect of income on FT product expenditure and the role of household size. Smaller families show higher expenditure in fair trade products, probably due to lower constraints when allocating family income.

Unlike the two original studies of De Pelsmacker and Janssens and Balderjahn et al., where the two sets of scales were mainly used for inferential purposes, in this paper the predictive power was formally investigated. For this purpose, we adopted the empirical framework proposed by Verneau *et al.* (2014). The authors used discrete choice models with different specifications in order to compare the predictive power of an attitudinal scale with classic socio-demographic variables. In our case, two different but statistically equivalent samples were used to compare the two attitudinal scales. Since the data generating process was the same for the two groups of samples, we assumed that the difference in predicting behavior between the two models depends on the predictive power of the two set of scales. The estimation outcome revealed the superiority of the De Pelsmacker and Janssens approach in predicting actual behavior in comparison with that of Balderjahn et al., at least in our experimental framework.

4.1 Limitation and further application

A possible shortcoming of the two surveys is the potential vulnerability to response effects. Indeed, the dependent variable is obtained from a self-report measure that appears more similar to the intention than the behavior itself, and in such a variable there may be biases that affect the current results. Moreover, this problem seems to be particularly relevant to the case of ethical consumption behavior (Vermeir and Verbeke, 2006; McEachern and Carrigan, 2012). Even if other research has observed similar measurement results whether based on actual behavior or on self-reports (Morwitz et al., 1993), we took account of Social Desirability as a control factor. However, the Social Desirability scale is not significant in either model and this seemingly unexpected result could be due to the fact that our survey adopted a web-based questionnaire. Indeed, it is not yet clear what experimental condition could be associated with the most valid self-report data (i.e. web administered versus pencil-and-paper conditions). Nevertheless, there is growing evidence that both Self Deception and Impression Management are affected by experimental instructions (Paulhus, 1984; Paulhus and John, 1998; Booth-Kewley et al., 2007). Therefore it is not possible to exclude that the lack of significance in both models of Social Desirability may depend on the type of administration.

Future applications could use data on actual purchase behavior in order to avoid any possible bias due to self-report measures. Even if it is well established a significant interaction between personal values and fair trade consumption, a further area for more detailed research would also be the use of Schwartz values as an antecedent of attitudes toward Fair Trade consumption (Doran, 2009). Finally, it seems useful to explore in greater depth the different behavior, which, at least in the Italian case, has been observed in different parts of the country. To do so, the use of social capital indicators and macroeconomics indexes could help explain the differences emerging among consumer groups by geographical area.

5. Conclusions

The main goal of the present paper was to add new empirical evidence in order to gain insights into consumer motivational systems and their relations with buying behavior in Italy. To pursue this goal two different sets of attitudinal scales were assessed and used to predict stated buying behavior on a sample of Italian consumers.

Three main conclusions stem from the results. First, in terms of the validation of both the attitudinal scales conceptualized by De Pelsmacker and Janssens (2007) and the CFC scale proposed by Balderjahn et al. (2013), all the indices confirm the validity of the dimensions and constructs. Only in the case of the dimension Attitude toward FT products was it necessary to drop one of the four items of construct price acceptability.

The second conclusion is related to the comparison of De Pelsmacker and Janssens (2007) and the CFC scales in predicting purchase behavior by means of an ordered probit model. The De Pelsmacker and Janssens scales seem to perform better in predicting behavior. Moreover, in both models, demographic and socio-economic variables play the same role, confirming the approximate equivalence of the two samples. Finally, the negative coefficient of southern Italy highlights the need for more detailed analysis on the Italian case using regional macroeconomic and social capital indicators.

The third and final conclusion refers concerns the possibility of using the results of our research to implement market segmentation strategies to target specific communication policies toward consumer segments most likely to purchase FT products.

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Personal Values and pro-social behaviour: the role of socio-economic context in fair trade consumption

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Abstract:

The present study aims at investigating the role of socio-economic context as intermediate mediator between personal values and fair trade consumption in Italy. In particular, it wants to answer to two main questions. First, do the level of economic development, the quality of life and the social environment influence the purchase of fair trade (FT) products? Secondly, does socio-economic context interact with the Schwartz' set of values in affecting the pro-social behavior? To assess the role of socio-economic context on FT consumption, data were collected by means of a web administrated questionnaire and two Principal Component analyses were carried out, one on the values' scale, and the second one on a set of socio-economic variables referred to the regional level. Then, factors results were used in an ordered probit model to test the functional relationship between fair trade behavior, motivational types, socio-economic context and demographic characteristics of the respondent. Results provide evidence that the value system has an effect on the consumption of fair trade products. The economic wealth of the context is relevant, too. Unlike what was expected, no effect is proved for the social and cultural capital. The socio-demographic characteristics of the participants, income and gender showed a marginal positive effect.

Keywords: Schwartz's Values, Fair trade, socio-economic context

1. Introduction

Since the sixties personal values occupied a central position in social science disciplines, including consumer behaviour, and several authors faced the problem of the values' definition and their use (Maslow, 1954; Rokeach, 1973; Becker, 1976; Hetcher, 1993; Kahle, 1983; Veroff et al., 1981).

Several ways are available to define and measure personal values. Among the most frequently used are the Rokeach Value Survey (RVS) (Rokeach 1973) and the List of Values (LOV) developed at the University of Michigan Survey Research Center (Kahle 1983; Veroff, et al., 1981; Beatty et al., 1985). More in detail, Rokeach developed a set of eighteen *terminal values* that relate to desirable end-states of existence and another set of eighteen *instrumental values* relating to desirable modes of behaviour that can lead to particular end-states. LOV is a reduced measurement instrument providing a list of nine terminal values and doesn't include instrumental values, overcoming in this way the difficulty of ranking two times 18 different values (Kahle, 1983; Veroff et al., 1981). In 1992 Schwartz defined ten basic values that can be described by their motivational goals: self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, universalism and benevolence. According to his point of view values are abstract guide in the human life and they are able to fulfil three essential needs: i) those of individuals as a biological organism; ii) requisites of social interaction; iii) and the survival and welfare needs of the group (Schwartz, 1992). Schwartz represented the 10 values in a circular spatial way organized in two pairs of different and opposite dimensions: Openness to change

versus Conservation; Self-transcendence versus Self-enhancement. Values that are close in the circular structure are similar in terms of their underlying motivations.

The relationship between values, attitudes and behaviour has been widely investigated (Bernard et al., 2003, Dreezens et al., 2005; Homer and Kahle, 1988; Luzar and Cosse, 1998; Saher et al., 2006; Thøgersen and Ölander 2002) and the flow of causality that seems to emerge from different studies is from values through attitudes to behaviour, so that values have an impact on attitudes, which in turn influence behaviour (Homer and Kahle 1988, Maio and Olson, 1994). However, the relation between values and behaviour seems to be indirect through mediator variables. Among the different mediators proposed to improve the relationship between values and behaviour in the food area is the Food-Related Lifestyle (FRL) construct defined as "...the system of cognitive categories, scripts and their associations which relate a set of products to a set of values", (Grunert, 1993; Grunert et al., 1997; Brunsø and Grunert, 1995).

The hypothesis that FRL could be used as mediator in the relationship between values and food-related behaviours was firstly tested in two studies (Brunso et al., 2004a; Scholderer et al., 2003), using the so-called LOV instrument (List Of Values) (Kahle, 1983). Both studies confirmed the role of the FRL construct as mediators. Brunsø, Scholderer and Grunert (2004b) used the more sophisticated and complex Schwartz Value Survey (SVS). Their analysis confirms the influence of values on attitudinal constructs such as FRL, having found meaningful relationship between Values and FRL in Spain and Germany.

A plethora of empirical studies analysed the way behaviour is affected by values in food choices (Goldsmith et al., 1995), and one of the most researched areas is ethical consumerism. Willingness To Pay (WTP) for wine with sustainable characteristics was studied and related to Schwartz personal values by Mueller et al. (2011). The authors found that the valuation of sustainable attributes is positively related to consumers' personal values *Conservatism* (tradition, conformity) and *Self-enhancement* (power, achievement). Nevertheless, according to the authors, personal values are only weak predictors of differences in choices behaviour.

The nature of attitudes towards genetically modified (GM) food was analyzed by Honkanen et al. (2004) who found that universalism and hedonism values influence the intention to buy GM food, with attitude as mediator. Studying Fair Trade products, Doran (2009) proved significant interactions between personal values and fair trade consumption and underlined while Klein et al. (2011) identified three groups of consumers according to buying frequency and found that openness-to-change and universalism values are more important for FT consumers, while conservation and power have a higher priority for FT "no consumers".

Shaw et al. (2005) investigated the nature of values influencing consumer' decisions in purchasing fair trade products and highlighted that the Schwartz's set of values does not account for all of those values that are important in ethical decision making, underlining the need for the addition of the values *capitalism* and *consumer power* as important values to ethical consumers.

The psychological processes that shape the effects of values on behaviour are strongly affected by the social context in which people operate. These processes are therefore culturally bound. Studies on values and behaviour have been conducted in a large variety of cultures trying to assess the equivalence of values, and then the invariance of theoretical constructs, across countries (Davidov et al., 2008). The findings of these researches justify the use of human value scale in different countries and allow assessing similarities and differences of value priorities in relation to other variables across countries. Based on that, socio-economic context could be a relevant factor affecting personal values and behaviours and it could explain differences not only across countries, but within countries, too.

Few studies were conducted in the Mediterranean Countries, like Italy, where Fair Trade (FT) is a growing phenomenon but still very restricted (MORI, 2000; Maietta, 2003; Becchetti and Rosati,

2007). The present study aims at investigating the role of socio-economic context as intermediate mediator between personal values and fair trade consumption in Italy, where a strong discrepancies exist among regions. In particular, it wants to test how the level of economic development, the quality of life and the social environment influence the purchase of fair trade (FT) products and how they interact with the Schwartz' set of values affecting the pro-social behaviour.

2. Data and methods

In order to improve the understanding of consumers' motivational systems and their relations with buying behavior of FT products, an ad-hoc analysis was conducted in Italy. Data on fair trade consumption and information on personal values were collected by means of a web administered questionnaire submitted through the website of the General Assembly of the Italian Fair Trade (AGICES), the most important Italian fair trade organization. In 2013, this network includes 87 organization members, 30,496 members, 257 world shops and represents at least 80% of the total of the Fair Trade and solidarity movement in Italy (AGICES, 2012; 2013). The most important organization members are importers too and include several world shops. They are: Altra Qualità, CTM-Altromercato, Equo Mercato, Libero Mondo. The diffusion of FT organizations in Italy is not homogeneous. Many are located in the northern regions where five regions account for about 80% of the total revenue, followed by those of the Centre and of the South. In the period 2007-11 the value of the production of the AGICES members raised by the 9%, reaching, in 2011, more than 88 million of euro. Unlike northern European Countries, where FT products are marketed especially in Modern Retail Channels, in Italy FT products are still eminently distributed by specialized stores: world shops. Moreover, in this context the per capita consumption of fair-trade products is still low: €1.50 compared to €11 in the United Kingdom and up to €21 in Switzerland (AGICES, 2012; AGICES, 2013). Like in Europe, where 47% of Europeans are willing to pay more for their daily shopping if they know that this would benefit developing countries (Eurobarometer, 2011), in Italy, there is a great potential to expand this market segment supported by a growing willingness to pay more for fair trade products (Annunziata *et al.*, 2009; Maietta, 2003; MORI, 2000). The questionnaire consisted in three sections. First section collected information about buying behaviour both considering annual average expenditure in FT products and frequency of purchasing on four fair trade product typologies (fruits, textiles, beverages and candy). In the second section the ten value types of the Schwartz's structural model were measured to know how important each value was for the respondents. The importance of the values is rated on a Likert scale between 1 (not at all important) and 7 (very important). In the third section the most important demographic and socio-economic characteristics were collected (age, sex, education, job, income level, region). Five hundred and eighty-six responses were collected. Because of the electronic submission and the specific channel used in the survey (the AGICES website), respondents aren't a representative sample, but they are distributed well enough to catch information coming from all the Italian regions, even if with a higher percentage (59%) of interviewees localized in South Italy. Demographic and socio-economic characteristics of the sample are shown in table 1.

Table 1. Socio-economic characteristics of the sample

Characteristics	Classification	Number	Percentage
Age	18 - 25	81	13.8
	26 - 35	155	26.5
	36 - 45	158	27.0
	46 - 55	112	19.1
	56 and more	80	13.7
	Total	586	100.0
Gender	Male	236	40.3
	Female	350	59.7
Occupation	Students	101	17.2
	Housekeepers	30	5.1
	Self-employed	102	17.4
	Employee	224	38.2
	Retired workers	41	7.0
	Temporary workers	88	15.0
Education	Low level schools	16	2.7
	Secondary	266	45.4
	Degree	304	51.9
Income	< 1.000 €	78	13.3
	1.000 - 2.000 €	250	42.7
	2.000 - 3.000 €	153	26.1
	> 3.000 €	105	17.9
Household members	1	71	12.1
	2	124	21.2
	3	131	22.4
	4	200	34.1
	5 or more	60	10.2
Presence of children less than 12 years old	No	447	76.3
	Yes	139	23.7



To assess the role of socio-economic context on fair trade consumption the analysis was divided in two steps. In the first one, two Principal Component analyses were carried out, one on the values' scale, to get the main motivational types linked to the personal values, the second one on a set of variables referred to the regional level, to identify overall indicators of the social and economic context. In the following step, factors results were used in an ordered probit model to test the functional relationship between fair trade behaviour, motivational types, socio-economic context and demographic characteristics of the respondent. The ordered probit regression is based on the random utility theory (McFadden, 2001) and is used to analyze responses expressed as ordinal rankings. The ordered probit model assumes a latent unobserved continuous process where the latent variable is influenced by explanatory variables such that:

$$y_i^* = \mathbf{X}'_i \beta + e_i, \quad E[e_i | \mathbf{X}_i] = 0, \quad e_i \sim N[0,1] \text{ with } i = 1, \dots, n. \quad (1)$$

and underlies the ordinal observed outcome y_i . The relation between y_i^* and y_i is assumed to be function of cutoff points (k) such that:

$$y_i = \begin{cases} 1 & \text{if } k_0 < y_i^* \leq k_1 \\ 2 & \text{if } k_1 < y_i^* \leq k_2 \\ 3 & \text{if } k_2 < y_i^* \leq k_3 \\ 4 & \text{if } k_3 < y_i^* \leq k_4 \end{cases} \quad (2)$$

where $k_0 = -\infty$ and $k_4 = \infty$; k_1, k_2, k_3 and k_4 are unknown threshold parameters to be estimated in order to indicate the range of the normal distribution associated with specific values of the stated response variable y_i^* . \mathbf{X}_i is a $1 \times m$ vector of explanatory variables and β is a $m \times 1$ vector of unknown parameters expressing the existing relationship between the behavioural response of consumers and the predictors. In our empirical model y_i is the expenditure class of fair trade products (table 2), while the \mathbf{X}_i is the vector given by the motivational types and context indicators obtained in the PCAs and by the respondents' demographic characteristics.

Table 2. Dependent variable definition

	absolute frequency	relative frequency
Expenditure 0€	114	19.45
0€ < expenditure <10€	63	10.75
10€ < expenditure <50€	167	28.5
expenditure >50€	242	41.3

3. Results

Principal component analysis (PCA) is useful in reducing larger dataset by extracting from the original variables few complex factors that synthesize the information of variables that are strongly correlated among them. Two PCAs have been separately applied on the respondents values' scores and on regional socio-economic indicators. Table 3 and 4 show the PCAs results. Factor loadings matrices represent the correlation among the extracted components and the original variables and help to understand the components' meaning.

In PCA on values' scores (Table 3) three principal factors have been extracted. The first one, accounting for 33% of the deviation from the sample, has large positive coefficients associated with *Power, Achievement, Stimulation* and *Hedonism* values. Values in the first components

synthesize value types that are adjacent in the circular value structure. As stated by Schwartz (1992), “Power and Achievement both emphasize social superiority and esteem. Achievement and Hedonism both express self-centeredness. Hedonism and Stimulation both entail a desire for affectively pleasant arousal.” Then, the first component synthesizes Self-enhancement and Hedonism motivational orientations.

Self-direction, *Universalism* and *Benevolence* enter to characterize the second component (18% of the explained variance). Even in this case values are adjacent in the Schwartz value circle and express compatible values: “self-direction and universalism both express reliance in one’s own judgement and comfort with the diversity of existence; universalism and benevolence are concerned with enhancement of others and transcendence of selfish interests” (Schwartz, 1992). The second component can then be interpreted as *Self-transcendence and self-direction* motivational orientation.

The third component (14% of the explained variance) synthesizes *Security*, *Conformity* and *Tradition*, three values that in the Schwartz’s value structure identify the *Conservation* dimension, values that emphasize order, self restriction, preservation of the past the resistance to change.

PCA on socio-economic indicators identifies two major dimensions that can differentiate Italian regions (Table 2). The first one explains the 59% of the variance and represents the level of *Economic wealth and quality of life*. In fact, the component is positively correlated to the income per person and the export propensity, while is negatively linked to the poverty index and to the number of crimes per 10.000 inhabitants. Regions with positive values of the component are characterized by a higher level of income per person, a higher export capacity, a lower poverty index and crime level. The vice versa occurs when regions have negative value of the component. The second component (27% of the variance) is positively related to economic and social infrastructures’ index, to innovation capacity and to cultural and social facilities. Then, it identifies the dimension of regional *Social and cultural capital*.

Table 3. PCA on Schwartz’s values scores: factor loading matrix

	Self-enhancement + Hedonism	Self-transcendence +self direction	Conservation	Communalities
S_DIRECTION	0.394	0.484	-0.010	0.389
POWER	0.636	-0.152	0.397	0.585
UNIVERSALISM	-0.041	0.691	0.069	0.483
ACHIEVEMENT	0.710	-0.066	0.213	0.553
SECURITY	0.306	0.207	0.532	0.420
STIMULATION	0.606	0.199	-0.205	0.449
CONFORMITY	0.142	0.153	0.596	0.399
TRADITION	0.052	0.366	0.495	0.381
HEDONISM	0.662	0.235	0.087	0.501
BENEVOLENCE	0.054	0.670	0.223	0.501

KMO=0.76; Bartlett’s χ^2 statistics: 1693, p-value <0.001

Table 4. PCA on regional socio-economic indicators: factor loading matrix

	Economic Wealth and quality of life	Social and cultural capital	Communalities
Poverty index	-0.953	-0.290	0.993
Crimes per 1000 inhabitants	-0.924	0.128	0.871
Income per person	0.964	0.242	0.988
Structural and cultural facilities index	0.156	0.942	0.911
Economic and social infrastructures' index	-0.182	0.949	0.934
Export propensity	0.902	-0.228	0.865
Innovation capacity index	0.250	0.871	0.821

KMO= 0.66; Bartlett's χ^2 statistics 6349, p-value <0.001

Components of both PCAs and variable on personal income, sex and age were used as explanatory predictors in the ordered probit model to explain the expenditure level of fair trade products. Table 5 shows the descriptive statistics of the variables, while in Table 6 estimates of the ordered probit model are presented. As motivational orientations are concerned, the model confirm the expectations on the signs of the relation: Self Transcendence and Direction, which summarizes the three values Benevolence, Universalism and Self-Direction, shows a positive and strong main effect on FT spending. This result confirms the hypothesis and seems perfectly in line with the results obtained by Doran (2009). Also the main effects of Self-Enhancement and Conservation, which are negative, confirm the hypothesis and, one more time, go in the same direction of Doran analysis (Doran, 2009). Regarding the socio-demographic characteristics of the participants, income and gender showed a marginal positive effect: respondents characterized by higher expenditure in fair trade products, are more likely to be women, and higher incomes are associated with higher FT consumption. The socio-economic context does have an effect on the fair trade consumption, but this effect is exclusively linked to the *Economic wealth and quality of life* factor, while the level of *Social and cultural capital* does not influence the FT consumption.

Finally, to evaluate the potential role of mediator played by the socio-economic context, the interactions between the two factors "Economic wealth and quality" and "Social and cultural capital" and the components extracted from the values have been taken into account. Contrary to our expectations, Social and Cultural Capital dimension doesn't affect FT expenditure, neither as main effect nor in the interaction.

Regional Economic wealth has both a direct and indirect effect on the fair trade consumption, this second one by means of the interactions with the *Self-transcendence* and *Conservation* orientations. In both cases the interaction shows the same sign of the main effect determined by the two components. Therefore, the socio-economic context effectively mediates the relationship values-behaviour, and the result of the interaction amplifies the main effect.

Table 5. Descriptive statistics

	Mean	std.dev	Min	Max
Expenditure	1.92	1.14	0.00	3.00
Self-enhancement	0.00	1.00	-2.75	2.13
Self-transcendence	0.00	1.00	-3.99	1.39
Conservation	0.00	1.00	-2.72	2.00
Economic wealth	0.00	1.00	-0.85	1.66
Social and cultural capital	0.00	1.00	-2.54	2.53
Income (1 if income > 3000€ per month, 0 otherwise)	0.44	0.50	0.00	1.00
Sex (1 if female, 0 male)	0.60	0.49	0.00	1.00
Age	40.24	12.88	18.00	81.00

Table 6. Ordered probit estimates

Variable	Coeff.	t-stat	p-value
Self-enhancement	-0.159	-2.66	0.008
Self-transcendence	0.282	4.74	<0.001
Conservation	-0.157	-2.41	0.016
Economic wealth	0.209	4.21	<0.001
<i>Economic wealth x Self-enhancement</i>	0.029	0.51	0.609
<i>Economic wealth x Self-transcendence</i>	0.129	2.08	0.038
<i>Economic wealth x Conservation</i>	-0.144	-2.27	0.024
Social and cultural capital	-0.054	-1.15	0.249
<i>Soc.cult. capital x Self-enhancement</i>	-0.010	-0.17	0.862
<i>Soc.cult. capital x Self-transcendence</i>	0.034	0.52	0.603
<i>Soc.cult. capital x Conservation</i>	0.010	0.15	0.884
Income	0.168	1.71	0.087
Sex	0.175	1.72	0.085
Age	0.002	0.46	0.642

4. Conclusions

The paper had two main objectives. First, it aimed at exploring the relevance of Schwartz' value model in the fair trade consumption. Second, it wanted to analyze the effect of the socio-economic context on the consumption behaviour and the interaction of such a context with the Schwartz's value system. Results provide evidence that the value system has an effect on the consumption of fair trade products and the expenditure is higher when values such as universalism, benevolence and self-direction characterize people motivational orientation, and the more they are open to change. Economic wealth is relevant, too. It interacts with self-transcendence pushing in the same direction and increasing fair trade behaviour. Unlike what was expected, no effect is proved for the social and cultural capital. The socio-demographic characteristics of the participants, income and gender showed a marginal positive effect.

This result indicates that the approach followed in the study has a significant strategic value. The ethical labels are increasing in modern food market but currently do not play a major role in consumers' food choices, and future use of these labels will depend on the extent to which consumers' general concern about ethics can be turned into actual behaviour. The understanding of how to analyse and to segment consumers could be a first step to enhance the products with high ethical value.

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Organizing the co-production of health and environmental values: the constitutional experience of the Italian Solidarity Purchasing Groups

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Abstract

The study interprets the Solidarity Purchasing Groups (SPGs) as actors, which connect the provision of food to the members with the co-production of two set of common pool resources (Ostrom V. *et al.*, 1961; Ostrom E., 2010): health and environmental goods. Firstly we briefly present the characteristics of SPGs as discussed in literature. Then we delineate the conceptualization of SPGs practices in terms of co-production. The emerging picture suggests an interpretation in terms of organizational dimensions based upon constitutional processes (Grandori, 2010) that emphasize the re-definition of the rank of the resources engaged and the characteristics of the decision-making processes. Evidences from an empirical analysis related to the Italian case are proposed.

Keywords: Coproduction, Solidarity Purchasing Groups, Constitutional processes.

1. INTRODUCTION

A Solidarity Purchasing Group (SPGs) is a group of citizens who sets up an organization aimed at providing food to the members also planning the production process with the farmers. SPGs are example of food provision organizations interconnecting consumers and producers. In many social and geographical areas these groups are rapidly increasing in importance. The objective of the paper is to address the question of whether SPGs can be thought of as social actors coproducing (Ostrom V. *et al.*, 1961; Ostrom E., 1996) health and environmental services by through the provision of food to the group's members.

SPGs European experiences were analyzed under various disciplinary perspectives and gave raise to a rich and complex picture. SPGs aim at providing the members with safe food in a context of direct contact with the producers, sharing an ethic and sustainable approach to the production process and to the use of the resources (Renting *et al.*, 2003; Goodman, 2003). These groups animate the emerging of new dimension of citizenship (Renting *et al.*, 2013) and act as system innovation drivers to the extent that theirs reconfigure the boundaries between political action and consumption, public organizations and business, citizenship and private interests, lay actors and experts (Brunori *et al.*, 2012). SPGs reconnect producers and consumers, engaging the consumers in designing and managing products and production processes (Mount, 2012). In this context, SPGs are basically understood as organization providing food to their members through simple systems of direct relationships with the farmers. Nonetheless, a comprehensive understanding of the SPGs activities and roles requires to taken into account the multiple aspects of food. The production, the circulation and the consumption of food actually tackle multiple dimensions of the human life (Mintz, DuBois, 2002) and interconnects the production and circulation systems with the nutrition system (Sobal *et al.*, 1998). Some aspects of the food can be thus considered as a mean linking the nutrition outcomes with the way of using the resources in a given cultural framework. The SPGs are organizational bodies tackling this linking path. To address this field, our approach connects the achievements of the institutional

analysis (Ostrom E., 1996) with the theory of the economic organizations (Grandori, Furnari, 2008; Grandori, 2010) arguing that, beyond food provision, SPGs organize the co-production of health and environmental values by undertaking specific constitutional processes (Grandori, 2010) in a given action situation (Ostrom E., 2005). The conceptual framework is presented in the paragraph 2. In brief, the argument is that SPG's organizational practices (Grandori, Furnari, 2008; Jone, Murphy, 2010) map the actions into expected outcomes (Ostrom E., 2005) and give rise to organization constitutional processes (Grandori, 2010). The cultural dimensions of the food, its healthy and environmental characteristics influence the practices channeling the alignment of the constitutional ranking of the resources with health and environmental values. We interpret the alignment in terms of private-public co-production (Ostrom V. *et al.*, 1961; Ostrom E., 2005). The method of empirical analysis is illustrated in the paragraph 3 and the results are discussed in paragraph 4. In the last paragraph we present some final remarks, underline some limits of the study and delineate the lines of the future research.

2. Conceptual Framework

2.1 Notes from literature: complementarity and symbolization

SPG are forms complementary to the large circuits based on complex trading architectures (Marsden, Sonnino, 2006). The literature on alternative food networks (AFN) largely contributed to a detailed understanding of the phenomenon with a focus on actors goals (Renting *et al.*, 2003). Key characteristics of the AFN are: the anchoring in a particular local; the orientation towards economic viability; the interest for the ecological sustainability and social justice. SPGs are held as organizational innovations emerging in the transformation of the Agribusiness (Marsden, 1999), based on a network principle of organization (Powell, 1990; Grandori, Soda, 1997). The great variability of the experiences in food networks basically entails processes of re-localization of economic activities and practices (Sonnino and Marsden, 2006). This requires a more complex conceptualization emphasizing the role of the concepts of both network and territorial embeddedness (Hess, 2004).

Brunori *et al.* (2012, p. 4) contend that the conceptualization of SPGs is based on the establishment of new social relationships as alternative food production initiatives (hybrid networks that includes new actors – mainly consumers - and excludes others) and on the change of rules and norms of production, consumption and selling, building new technologies and infrastructures. Secondly, a multidimensional patterns of actions arises that gives rise to a multidimensional path of change and innovation in which the consumption is re-located within the context of the whole social life and system of relationships. In the SPGs the focus of the actors is not on the characteristics of food *per se*, but rather on the integration of the food characteristics in higher level of symbolization where the food entails multiple use values (Holloway *et al.*, 2007) shaping the interest of SPGs for further goods (Holloway *et al.*, 2007; Kirrwan, 2006).

2.2 Cultural characteristics, health and environmental values

Food is thus conceived not only according to its own nutritional characteristics in the light of the technological quality, but in the light of a cultural perspective (Mintz and Du Boi, 2002). The cultural view in turn gives the floor to the identification of material features of the food that became really scarce in the contemporary food supply. For example, the connection with a given territory, the historical roots, the knowledge of the production process, the awareness of the intrinsic health characteristics have been progressively dissipated in the long-run course of the industrialization of the agriculture. To meet the nutritional needs of an increasing population disconnected by the production sites came at the cost of raising the scarcity of those critical characteristics of the food. Food companies and public authorities are aware of these conse-

quences and undertook actions aimed at coping with them. The importance of the corporate social responsibility or the policies for the geographical indications is at least partially explained by the necessity to give back to food some its meanings. Under the point of view of a SPG, this scenario has many dimensions.

Nutrition and cultural characteristics are intertwined in the production, trade and consumption. Although the nutrition properties are the primarily characteristics of the food, scholars recognize that several aspects of human life deal with food and eating. The production and the consumption of food play a central role in the human societies (Mintz and Du Bois, 2002). The seminal research of Fernand Braudel (1979) showed how the food is a prominent part of the building up of human life and societies and how the cultural structures can be associated to types of food and eating practices. Mintz and Du Bois (2002) point out the double nexus between social and food and eating changes and suggest that food systems pertain to broad societal processes including symbolic value creation and social construction of memory. The cultural dimensions of food ground and contextualize the consumption practices and allow the actors to make the food a term of interaction and, in turn, to finalize the social interaction toward the achievement of specific food production (Fonte, 2013; ROE SOCIOLOGIA RURALIS 2006; Warde, 2005).

The social and the nutrition systems connections, on the other hand, associate individual health and eating practices (Sobal *et al.*, 1998). People and scholars addressed the connection between food and health under different perspectives. Organic consumers, for example concentrate on the types of food and production methods; vegetarian consumers associations focus on diets and on the engagement of the producers; alternative food networks stress the relation between food and health searching to sustain it by fostering direct contact among consumers and producers (Goodman, Dupuis, 2002). From a different perspective, the research on the nutraceutical novelties emphasizes the advantage of the specialization of healthy characteristics of the food (Malla *et al.*, 2007). These different approaches call for specific organizational arrangements spanning from the vertical integration often chosen in nutraceutical food supply to the network requirements identified as a basis of short circuits. Food consumption and production systems are furthermore associated to the environmental values (Murdoch *et al.*, 2000). The embeddedness of these systems supports their sustainability (Morris and Kirwani, 2011). Sustainable capabilities are often grounded on local organizational dimensions (Bougherara *et al.*, 2009, Renting *et al.*, 2003) and in the search for specific quality features (Dupuis *et al.*, 2009).

2.3 The SPG's action situation: rules and practices

The cultural aspects are not only distinctive characteristics of the food, but they also create the condition to vehiculate specific meanings in the context of the consumption and production activities. This point is relevant to develop the analysis of the organization dimension of the SPG. A SPG is basically constituted by an agreement that entails the members and – in many European experiences - national level SPGs networks. The SPG defines specific agreements with farmers and other producers, normally after a long selection process. The selection is strongly aimed to search the capability to produce healthy, environmental and ethically sustainable food. We interpret the SPG as a group of individuals engaged in an action situation in the sense of E. Ostrom (2005).

The structure of an action situation includes: the set of the participants; the positions to be filled by the participants; the potential outcomes; the set of the allowable actions; the function that map action into realized outcomes; the control that an individual has in regard to this function; the information available to participants about an outcome and their linkage; the costs and the benefits assigned to action and outcomes (Ostrom E., 2005, p. 32). The structure of the specific action situation of an SPG can be easily drawn from data available from literature (Brunori *et al.*

2011; Martino *et al.*, 2013). The *Participants* of the group are citizens, farmers, other producers involved, but also other SPGs which could be in touch with the group and could contribute to the information gathering about product and processes or to strategic decisions. The *Positions* in the group are usually: Member of SPGs Assembly, who is just the citizen who decided to join the group; the Product manager, who has in charge to collect the purchasing orders from the members, to channel the orders toward the farmers and to contribute to the logistic of the distribution. The President of the group represents officially the group and normally leads it with the assistance of a board and under the directions of the assembly. There is variable balance in the decision making process between the assembly and the board, also because of the history of the group and prominent values of the members (Martino *et al.*, 2013). The SPG participants undertakes several activities which are managing the relationships with SPGs network, managing the Assembly, selecting suppliers, Making purchasing orders, managing products flows, managing the Group, managing the communication within the group, organizing and managing further social activities. According to Ostrom (2005) in the action situation positions, participants and activities are linked to the potential outcomes that in the case of SPG are food availability, social relations, health and environmental values.

Setting the participant standing requires to define the set of the authorized actions and limits to action (Ostrom, 2005), it requires to distribute critical rights among the participants and then it activate the constitution of the organizational structure (Grandori, 2010). The distribution of the rights (Grandori, Furnari, 2008) is aimed at achieving the finalization of organizational bodies toward the expected outcomes. Grandori (2010) showed that actors organize their activities by taking into account how their resources are complementary focusing on the specification of: a) the pooled resources; b) the actors or types of actors providing them; c) the rights over resources which are pooled and which are not; d) the mechanism locking resources in while providing the partners with exit rights and modes.

The figure 1 illustrates the resources and the actors engaged in SPG activity.

Figure 1: SPG – Resource and actors

Pooled resources	SPG	<ul style="list-style-type: none"> • Tacit knowledge (technology) • Codified technology (technology, law) • Network relationships
	Farmer	<ul style="list-style-type: none"> • Tacit knowledge (technology) • Labour • Land and equipment
Actors	<ul style="list-style-type: none"> • Member • SPG • SPGs Network • Farmers 	

The constitutional processes setting up the organization requires to rank the resources with respect to the potential uses (Grandori, 2010). We address this point taking into account the practices activated by the group. To consider the practices contribute to understand the constitution of the economic spaces (Jones and Murphy, 2010, p. 381). Practices integrates discursive and regulatory aspects (Jones and Murphy, 2010) that have an impact on the SPG activities and relationships. We assume that the group practices implement the connection between actions and expected outcomes. We refer to practices activated by the group member provided their position in the action situation. At the basis of the organizational design there is the resource ranking

with respect to the potential uses in which they can be engaged. To provide food on small scale ground, with desirable health and environmental features, is the use to which the organization of the SPG is aimed. The quality and the complementarity of the resources (Grandori, 2010) of the SPG and of the producers are thus shaped with respect to these purposes, requiring an intensive process of discovering of the resources uses and of designing the production processes. The practices of SPGs members embody meanings and identity in the sense of Jones and Murphy (2010). According to Emirbayer and Goodwin (1994, p. 1438), social networks are “phenomenological realities” or “networks of symbols”.

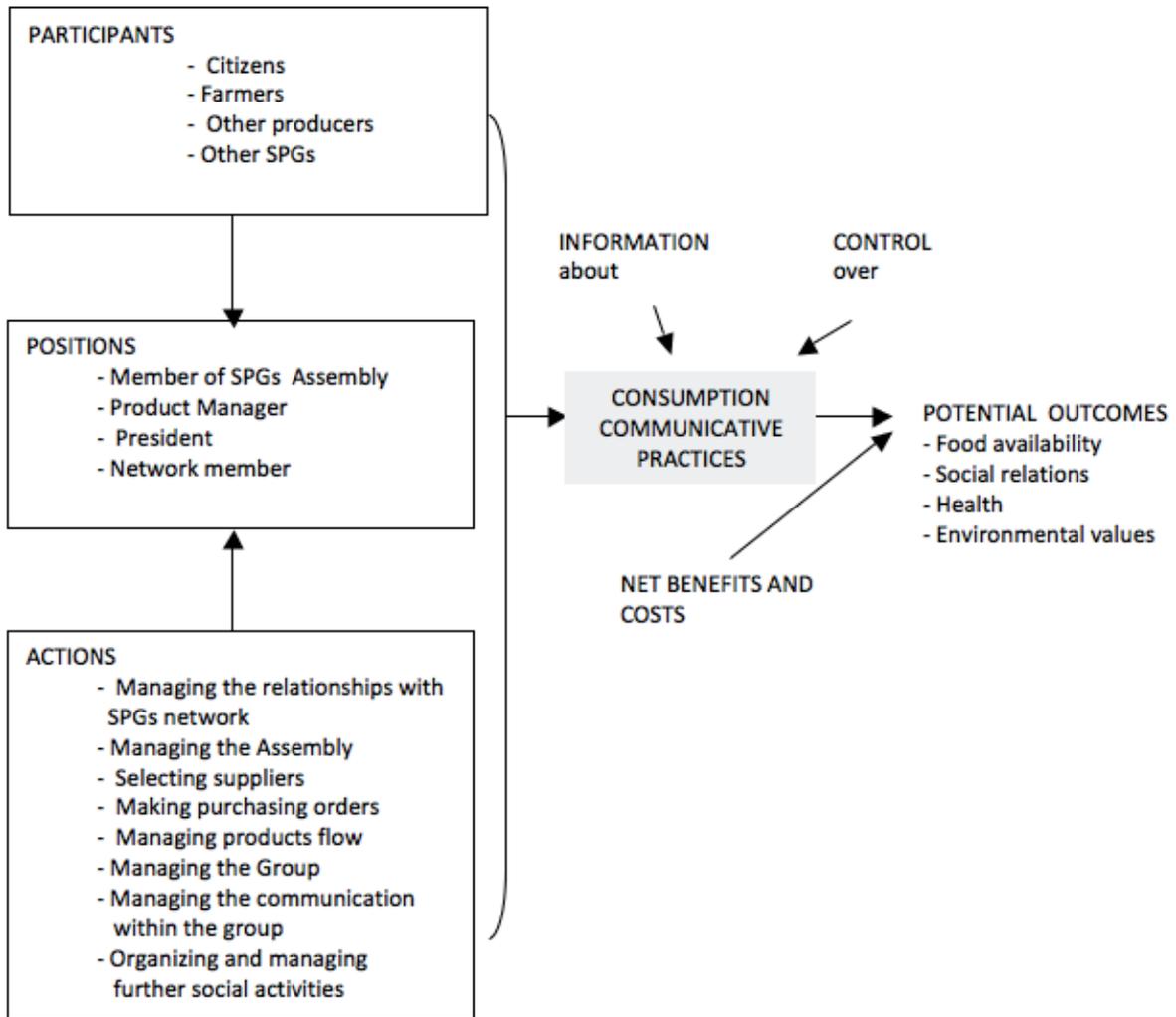
Sahakian and Wilhite (2014) identify the agentive aspects of the practices with respect to: a) *bodies*, including the cognitive aspects and the physical dispositions; b) *material agency*, characterized by double nexus between the technology of the consumption and the practices; c) *social dimensions*, including values, norms and institutions. All these practices pillars sustain the agency of the SPGs member and of the group in itself. Systematic communication practices (Brunori *et al.*, 2011) are able to influence the perception of the food characteristics as well as the way to use the productive resources shaping cognitive processes and thus ranking the resources. The double causal nexus between practices and technology sustain the ability to design the technology according to the expected outcomes. Communication practices and the network context level also contribute to the stability of the practices (Sahakian, Wilhite, 2014 p. 30) and then sustain the systematic connections within the action situation. Practices then engage the cognitive resources of the members and resources owners in order to channel them toward the expected uses.

Under an organizational point of view (Grandori, 2010), the practices of the SPGs members have to be interpreted with respect to the constitutional processes that: a) rank the resources to be used; b) establish the relationships among the members and among the networks and the groups.

Resources ranking is always to some extent coupled with some ranking of the context (Grandori, 2010, p. 357). In the case of the SPGs this point play a critical role in defining the social and economic purposes of the activities and then in effectively ranking the resources engaged. The provision of food and the specification of the characteristics of the processes and the products play in a context of network relationships that – to some extent formally – connect each SPG to a National level network of SPG and also connect the SPG to the farmers and producers selected to provisioning purposes. The correspondence (and the autonomy) of the networks of relationships and symbols defines the food chains as context negotiated. In such a geographical, social and symbolic space, the processes of structuring relationships interact with processes of cultural systems creation: networks are thus socio-economic systems supporting processes of connection and disconnection and ranking the context in terms of expectations of each SPGs and farmers. Correspondingly, the practice undertook connect actions and expected outcome in the action situation.

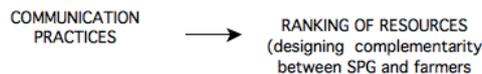
To this purpose the group sets up the agreement among citizens and producers and substantiate it by through communication practices engaging the members and orienting the group activities. The Figure 2 summarizes the previous analysis.

Figure 2: The structure of the Action Situation of Solidarity Purchasing Group



2.4 The conjecture

The structuring capability of the practices (Jones and Murphy, 2010), through the ranking of the resources of the farmers and of the SPG- is explicitly aimed at constructing systems of activities whose expected outcomes are the provision of food and of health and environmental protection as joint products of the food and ecological embeddedness (Holloway *et al.*, 2007; Morris and Kirwani, 2011):



Health is considered as a common goods of specific communities (Commission on Social Determinants of Health, 2008). Analogously, many environmental resources are recognized having the nature of common goods (Bravo, De Moor, 2008). The membership of the SPG is allowed to anyone is interested to join the group. However, the size of the group cannot be enlarged without limits due to managerial diseconomies (Penrose, 1963). A further constraint is determined by the

sharing of cultural values. Both these constraints act as drivers of excludability. Furthermore, the availability of the health and environmental characteristics strictly determined by the amount of the types of food provided. These characteristics are also connected to the amount of food and this gives rise to a subtractability issue. The health is achieved in the stage of consumption; the amount of food consumed correspond to a given effect on the environment. Then we consider the health and environmental characteristics as common good managed by the SPG. For each member, however, both of these characteristics are provided also by the Public administration. Therefore we conjecture that the SPGs co-produce health and environmental values. The concept of co-production was originally developed by political scientists with respect the supply of utilities in the context of metropolitan areas (Ostrom V. *et al.*, 1961) and refined by Elinor Ostrom (1996, p. 1079)

If a complementarity exist between the public and the private resources that sustain the production of given good or service by the contribution of private and public actors, then they can efficiently organize the co-production. Seeking to provide healthy and sustainable food to the members, an SPS is able to allocate its resources in a complementary way with the public agencies providing health and environmental protection.

3. Method of the empirical analysis

We aimed at testing by the empirical analysis the hypothesis is whether SPGs can be thought of as social actor engaged in the co-production of health and environmental services. The test is carried out by two steps. First we aims at identifying how the groups value the objectives related to health and environment. We expect that these objectives are highly evaluated, as a consequence one could expect that the ranking of the resource will be aligned to ranking of the objectives. Secondly, we analyzed the effect of the action situation variables on the values elicited. As the organizational practices have an impact on resources ranking in the action situation, we expect that the position and practices have a positive effect on ranking the resources toward the health and the environmental objectives.

The data were collected by a mail questionnaire submitted to 900 Italian SPGs contacted by through the e-mail addresses available by through the ReteGas (<http://www.retegas.org/>) a national level network of SPGs, in the period September-December 2013. 126 questionnaires have been filled (response rate 14%).

The instruments includes several blocks of questions beyond the general characteristics of the group. A set of question concerns with the SPG management structure (Coordinator, Management, Assembly, Product manager). We considered three fields of activities suggested in literature (Martino *et al.*, 2013): food provision, dressing provision and culture. The types of decision and the decision makers considered are the following (Figure 2):

Figure 2: Decision makers and type of decisions

Positions	Types of decision
<ul style="list-style-type: none"> - Network - Coordinator/President - Management - Member - Product manager - Assembly 	<ul style="list-style-type: none"> - Management of relations - Entry/Exit members - Activity of the group - Product basket definition - Selection of producers - Planning of Production - Planning of products purchasing - Purchasing orders - Logistic

We required the respondents to evaluate the importance of the decisions according to a seven points (Likert scale):

HEALTH CONCERNS

- To select farmers able to supply safe foods (SAFETY)
- To define the production process (DIRECTING)
- To select “no residuals” food (NORESIDUALS)
- To select “no preserving additives” food (NO PRESERVING ADDITIVES)
- To select foods for kids (FOOD FOR KIDS)

ENVIRONMENT CONCERNS

- To select the farmer on geographic basis (ZONE OF PRODUCTION)
- To choose food from close areas (CLOSENESS OF PRODUCTION AREA)
- To enhance the transportation logistic (LOGISTIC ENHANCEMENT)
- To select products from traditional genotypes (TRADITIONAL GENOTYPES)

CONVENIENCE, ETHICS AND TRADITION

- To choose low price food (LOWPRICE)
- To choose foods produced according to ethic guidelines (ETHIC)
- To choose traditional foods (TRADITION)
- To choose elaborated foods (ELAB)
- To choose continuously available food (AVAILABILITY)

The respondents were required to assign a value to the objectives. The data analysis was carried out by firstly examining how the respondents evaluate the three block of concerns mentioned. We expect that the Health and Environmental concerns are ranked at higher level than the further concerns. Then we estimate a Generalized Linear Model (GLM) for each of the Health and Environmental concerns. The exogenous variables are the following:



Table 1: Exogenous variable of Generalized Linear Models

Variables	Symbol	Variables	Symbol	Variables	Symbol
Positions		Communicative practices		Communicative practices	
President	Pres	Members		Public authorities	
Management	Manag	<i>Direct contact</i>	Memco	<i>Direct contact</i>	Authcont
Assembly of the members	Assembly	<i>Phone</i>	Membph	<i>Phone</i>	Authph
Product manager	Proda	<i>Mail</i>	Membra	<i>Mail</i>	Automa
Types of provision		President		SPG Network	
Provision of food	Food	<i>Direct contact</i>	Prescont	<i>Direct contact</i>	Netcont
Provision of clothing	Cloth	<i>Phone</i>	Presph	<i>Phone</i>	Netph
Provision of culture	Culture	<i>Mail</i>	Presma	<i>Mail</i>	Netma
		Farmer			
		<i>Direct contact</i>	Farmaco		
		<i>Phone</i>	Farmph		
		<i>Mail</i>	Farmma		

The goals of this step of analysis are to identify the influence of the positions process and of the communicative practices on the group’s evaluation of co-production goals.

4. Empirical analysis

4.1 Coproduction of Health and Environmental services

According to Schifani and Migliore (2011), in Italy the SPGs were mainly diffused in Northern Italy until 2005. Nevertheless in recent years the presence of SPGs grew up at the rate of 52% in 2008-2010 and of 38% in 2009-2010. Schifani and Migliore point out that the 60% of the Italian SPGs were concentrated in the northern regions of Italy, 26 % in those of the Centre, and only about 14% were located in the South and Islands. The regions where there is a greater presence are Lombardy (190 GAS), Tuscany (105), Piedmont (84), Veneto (68), Emilia Romagna (62), Lazio (62) and Sicily (32) (Schifani and Migliore, 2011).

The SPGs normally design agreements that finely identify the task of each participants. This point can be easily showed by drawing from the existing literature. Martino *et al.* 2013 discusses some features of the SPGs organization that can be summarized according the grid proposed by Grandori (2010).

Environmental Graphics 1-2 we reported the evaluation made by the respondents about the Health and Environmental concerns. The evaluation of *Further requirements* of the food is reported in the Graphic 3. The coordinates of vertical axis illustrate the relative frequencies of the Likert scale values assigned. The outcomes for the *Further requirements* are really less concentrated (note the case of *Low price*). . It is straightforward to see that the evaluation of the respondents concentrates on the highest values (2 and 3) for both Health and Environmental concerns. The table 2 illustrates the distribution of the values assigned by the respondents. The median value is 3 for *Safety*, *Noresiduals*, *Nopreserving additivies* and 1 for *Directing* and *Food for kids*.

The table 4 illustrates the models for the environmental concerns. The *positions* variables have not an impact in the case of *Zone of Production*. *Prescont* increases the value of the objective by 59.8%; also *farma*, *automa* and *netcont* have positive effects, while *netph* reduce the value assigned by 54.0%. Only *autph* and *netph* have an impact, but with opposite sign, in the case of *Closeness of production area*, suggesting that this objective is mainly taken into account by the public authorities. *Manag* has a negative impact in the case of *Environmental impact* (-28.1%). Among the communication practices *IMabph* and *famrcon* have a positive, similar effect, while *Presph*, *autohph* and *automa* negatively influence the value assigned to the objectives. In the model for *Logist enhancements Prodman* increases by 28.6% the value assigned, *Membpg*, *Presph Farmph* have a positive impact while *Presph* have strong negative effect. *Presph* and *Membph* have strong opposite effects on the value assigned to the objective *Traditional genotypes*, also *Farmph* and *Netnma* have positive effects.

It is worth to note that the objective of low price is not so important as could be expected.

Our interpretation is that the groups sampled feel themselves engaged in the provisioning of healthy and environmental sustainable foods. Ethical objectives are also important. On these basis the groups constitution and activities are necessarily intended to organize the supply of foods seeking to enrich the role of the health and environmental characteristics of the food. As the values of the objectives are larger for Health and Environmental concerns, then one should expect that the groups will tend to rank the group and the farmer resources in order to align their utilization with such objective. The evidence also contributes to motivate how these dimensions animate the SPGs' "food discourse".

4.2 Practices influence on Health and Environmental concerns

The second step of our testing strategy is to analyze the effects of the action situation variables on the values assigned by the respondents or, in other words, on the alignment between the ranking of the resources and of the objectives. The table 3 illustrates the GLM models estimated for the Health concerns. The dependent variables are the evaluation assigned to each concern (*Safety*, *Directing*, *No residuals*, *No preserving additives*, *Food for kids*). In the model for *Safety* the *Managis* is the only position variable that influence the evaluation expressed by the respondents; it has a negative impact, reducing the average value by -28.49%. As for the *Communication practices* variable, while the mail contact by the members (*membma*) and the phone contact of the president (*presph*) strongly reduce the values assigned to *Safety* (-78.93% and -69.37%, respectively), the contacts by phone of the members and by farmers mail, have a strong positive influence (48.51% and 69.37%). The associate direction of the production process – farmers and SPG – is accounted by the model for *Directing*. In this case, the variable *Assembly* has a negative impact (-0.8826), while both *farmph* and *netma* have a positive effect on the value expressed. These evidences partially contradict the current view that emphasizes the importance of the associate direction, suggesting a role for the whole group (the assembly being the institutional body that expresses the guidelines of the direction. Our results point out that the association is rather a matter of communication with the farmer and of SPGs network communication. The role of the communication flows stemming from the SPGs Network is relevant also in the case of the *No residuals* model: *netma* increases the average value by 0.6967. Accordingly, the influence of *farmph* is equal to 0.3144, while the communication from the public authorities (*automa*) negatively influence the average value (-0.324). The model for *No preserving additives* is of particular interest. All the communication practices entailing the farmers positively influence the average value, with the prevalence of the mail. Also member, authority and network have a positive influence (54.28%, 71.67% and 45.92%, respectively). The communication of president and authority by mail have a negative influence. In the case of

Food for kids, the decisions of the product manager are positively and strongly influential. The farmer communication have an opposite influence.

In sum, we contend that positions negatively influence the evaluation of the Health concerns, except than in the case of President in Directing and Food for Kids. Our interpretation based on the assumption that the position are the picture of the original agreement and these can or cannot coherently sustain the design of the objective. While action situation are dynamic in nature and often interconnected (Osrom E. 2005, 56-57), the internatl coherence of the organization is grounded upon the codes definition (Brunori, Rossi, 2000) sustained by the communication practices. Therefore while the communication practices may have an impact upon the resources ranking – confirming the hypothesis of co-production – the position may require ad adaptation to the intensity of the group objectives. The constitution processes investigated are substantiated by communication practices.. The communication practices appear to be influential, even though according to an articulated picture. The farmer's practices mainly and also the SPGs Networks have a positive effect, while the remaining actors seem have a variable effect.

The table 4 illustrates the GLM estimates about the environmental concerns. In the model of *Zone of Production* the variable *Prescon* has an impact of 0.598 on the average value and *Farma* has an impact of 0.428. The network communication practices have a direct positive impact (*netcont*: 0.356) and a negative impact for phone contact (-0.51). The latter has also a negative impact on the *Closeness of the zone of production*, while *autoph* has a positive impact (0.668). The value of *Environmental impact* is negatively influenced by *Manag* (-28.1%). In terms of communication practices *membph*, *presph*, *farmph*, have all a positive influence, while we found a negative impact for *autma* and *netcon*. The impact of the presence of the Product Manager is positive in the case of *Logistic enhancements*; both *memphandfamph* have a positive influence. The communication practices of the member, the president, the farmer and the network have a strong positive influence on *Traditional genotypes*.

The evidence confirm the complexity of the picture drawn of positions abd organizational practices. Bth these factors influence the definition of the objective. To the extent to which these objectives relate tot health and environment, we conclude that the constitution if process of SPG are oriented toward co-production. The prominence of organizational practices over the position effect also correspond to the reflexive momentum animating the constitution of the group. We refer namely to the actor reflexivity (Giddens, 1983) and coherence (Brunori, Rossi, 2000).

Table 3: Co-production of health - Generalized Linear Models estimates

Variables	SAFETY			COPRODUCTION			NO RESIDUALS			NO ADDITIVES			PRESERVING			FOOD FOR KIDS		
	Coef.	z	P>z	Coef.	z	P>z	Coef.	z	P>z	Coef.	z	P>z	Coef.	z	P>z	Coef.	z	P>z
Pres	-0.2130039	-1.25	0.211	0.2715706	0.44	0.661	-0.0268212	-0.12	0.902	-0.3033103	-1.28	0.201	-0.3908579	-0.82	0.41			
Manag assembly	-0.284981	-2.29	0.022	-0.5725067	-1.47	0.141	-0.0954709	-0.62	0.532	-0.273968	-1.38	0.168	0.1718141	0.61	0.544			
prodman	-0.2106561	-0.86	0.391	-0.8826412	-1.86	0.063	-0.2811428	-1.1	0.269	-0.0143218	-0.06	0.954	-0.5072095	-1.17	0.241			
Cloth	0.0325809	0.25	0.801	0.3167609	0.79	0.432	0.1279314	0.8	0.421	0.0142824	0.07	0.946	1.113.583	2.75	0.006			
Culture	-0.1435469	-1.14	0.253	0.3921936	1.25	0.211	0.0653762	0.44	0.662	0.1293236	0.78	0.433	0.0626227	0.21	0.832			
membrcon	-0.1152863	-0.97	0.33	0.0241136	0.08	0.933	0.028146	0.18	0.858	0.1768931	1.01	0.312	0.0564056	0.2	0.841			
membrh	0.0161229	0.1	0.922	0.4174993	0.91	0.363	-0.2670622	-1.49	0.137	-0.0144297	-0.07	0.948	-0.6445441	-1.55	0.12			
membrma	0.4851377	2.81	0.005	-0.3778033	-0.87	0.387	0.3143348	1.53	0.125	0.5428772	2.14	0.032	0.4704724	1.12	0.262			
prescont	-0.7892881	-3.47	0.001	1.274.585	1.39	0.164	0.2139318	0.34	0.73	-0.4186178	-1	0.423	0	0.65	0.514			
Presph	-0.108909	-0.58	0.561	-0.5880611	-1.09	0.274	0.0852665	0.41	0.679	-0.4429935	-1.78	0.075	0.2583824	0.63	0.526			
Presma	-0.6205153	-2.81	0.005	0.0111168	0.02	0.982	-0.3368951	-1.36	0.173	-0.6029901	-2.14	0.032	-1	-1.26	0.207			
farmcon	0.3907297	1.53	0.126	0.1888718	0.29	0.771	0.274375	0.94	0.346	0.5725138	1.84	0.065	0.0927609	0.2	0.845			
Farmph	0.2749867	1.43	0.152	0.2225569	0.77	0.441	0.3359385	1.48	0.139	0.5336804	2.29	0.022	-0.0053413	-0.02	0.983			
Farmma	0.110077	1.01	0.314	0.5317218	1.61	0.108	0.3144377	2.47	0.014	0.3769986	2.17	0.03	0.5444403	1.8	0.072			
authcont	0.6937211	2.94	0.003	-0.1336194	-0.35	0.723	0.2366123	0.89	0.376	0.7558061	2.96	0.003	-0.4961016	-1.65	0.098			
Authph	0.0483398	0.38	0.702	-0.3223889	-0.78	0.437	-0.0506303	-0.28	0.779	-0.0851475	-0.42	0.678	-0.0159279	-0.05	0.96			
Automa	-0.2994882	-1.41	0.16	0.093865	0.2	0.841	0.0448208	0.19	0.852	0.4592669	1.89	0.058	0.6456791	1.55	0.122			
netcont	0.0522227	0.37	0.708	0.1851479	0.56	0.578	-0.3240211	-2.04	0.042	-0.315374	-1.62	0.106	-0.6880566	-2.13	0.033			
Netph	-0.1403861	-0.62	0.535	0.412036	1.13	0.259	-0.2686838	-0.94	0.349	0.0662191	0.23	0.816	-0.1174716	-0.33	0.743			
Netma	-0.2101398	-1.43	0.154	0.2018837	0.46	0.648	0.1743061	0.73	0.468	-0.4958827	-1.5	0.134	1	1.21	0.227			
_cons	0.2688265	0.89	0.375	0.9130199	1.64	0.101	0.6967145	2.06	0.04	0.7166746	2	0.045	0.5776376	1.39	0.164			
	3.348.613	7.73	0	-0.7725375	-0.58	0.564	1.707.508	2.23	0.026	1.487.064	2	0.084	-0.2400505	-0.23	0.818			
Obs	108			105			107			106			103					
LogPseudoLik	95.99			-181.67			-112.85			-124.79			-166.23					
AIC	235.57			407.3			271.7			293.59			376.46					
BIC	294.58			405.72			330.5			352.19			434.42					

Source: the Authors

Table 4: Co-production of environment - Generalized Linear Models estimates

Variables	ZONE OF PRODUCTION			CLOSENESS OF PRODUCTION AREA			IMPACT ENVIRONMENTAL			ENHANCEMENT LOGISTIC T R A D I T I O N A L					
	Coef.	z	P>z	Coef.	z	P>z	Coef.	z	P>z	Coef.	z	P>z			
Pres	0.412	1.08	0.28	0.203	0.59	0.56	0.13	0.57	0.57	-0.104	-0.41	0.68	-0.144	-0.31	0.75
Manag	-0.018	-0.09	0.93	-0.109	-0.46	0.64	-0.281	-1.66	0.1	-0.108	-0.44	0.66	-0.392	-1.24	0.21
Assembly	-0.103	-0.34	0.73	-0.188	-0.72	0.47	-0.047	-0.18	0.86	-0.306	-1.17	0.24	-0.293	-0.88	0.38
Prodman	-0.251	-0.9	0.37	0.08	0.32	0.75	0.052	0.32	0.75	0.286	1.73	0.08	0.304	1.05	0.3
Cloth	0.097	0.58	0.56	0.03	0.16	0.87	-0.062	-0.39	0.7	0.137	0.75	0.45	-0.037	-0.16	0.88
Culture	-0.187	-0.88	0.38	-0.178	-0.77	0.44	0.034	0	1	0.05	0.24	0.81	-0.079	-0.36	0.72
Membecon	-0.301	-1.05	0.29	0.204	0.84	0.4	-0.101	-0.48	0.63	-0.067	-0.38	0.7	-0.073	-0.24	0.81
Memlph	-0.114	-0.52	0.61	0.162	0.57	0.57	0.483	0.82	0.41	0.712	2.31	0.02	1.280	3.57	0
Memmba	-0.157	-0.5	0.62	1.214	0.91	0.36	0.823	0.82	0.41	1.093	0.87	0.39	-0.104	-0.16	0.87
Prescont	0.598	1.85	0.06	0.114	0.35	0.72	0.227	0.92	0.36	0.144	0.72	0.47	0.152	0.5	0.62
Presph	-0.218	-0.87	0.38	-0.49	-1.36	0.17	-0.639	-2.17	0.03	-1.135	-3.53	0	-1.254	-3.31	0
Presna	-0.123	-0.33	0.74	0.128	0.33	0.74	0.451	1.44	0.15	0.568	1.64	0.1	0	0.6	0.55
farncon	-0.077	-0.39	0.7	0.209	0.99	0.32	0.469	1.94	0.05	0	1.2	0.23	0.314	1.15	0.25
farnph	0.094	0.48	0.63	0.159	0.77	0.44	0.219	1.52	0	0.472	2.17	0.03	0.464	1.68	0.09
farnma	0.428	2.06	0.04	-0.175	-0.59	0.55	0.36	1.37	0.17	0.26	0.79	0.43	0	0.39	0.7
authcont	-0.227	-1.2	0.23	-0.186	-0.81	0.42	0.101	0.66	0.51	-0.068	-0.31	0.75	-0.173	-0.5	0.62
authlph	0.019	0.1	0.92	0.668	2.28	0.02	0.288	1	0.14	0.304	1.04	0.3	0.027	0.06	0.95
automa	0.725	3.77	0	0.08	0.37	0.71	-0.282	-1.38	0	-0.037	-0.19	0.85	0.051	0.18	0.86
netcont	0.356	1.63	0.1	0.325	1.29	0.2	-0.221	-1	0	-0.351	-1.2	0.23	0.093	0.24	0.81
netlph	-0.54	-2.13	0.03	-1.301	-3.46	0	-0.046	-0.2	0.84	-0.541	-1.43	0.15	-0.103	-0.23	0.82
netma	-0.232	-0.61	0.54	0.311	0.85	0.4	0.291	0.82	0.41	0.378	0.75	0.45	1.535	3.67	0
_cons	1.909	2.62	0.01	0.456	0.32	0.75	0.839	0.76	0.45	0.185	0.14	0.89	0.151	0.13	0.89
Obs	106			107			107			106			105		
LogPseudolik	-135.82			-145.17			122.49			-141.15			-160.08		
AIC	315.65			334.34			288.99			326.29			364.16		
BIC	374.24			383.14			347.80			314.89			422.50		

Source: the Authors

If the SPG manage common pools resources, their decision process is expected to have a polycentric nature (Ostrom E., 2010). This is illustrated in Table 5.

Table 5: Contributions of each decision makers to each type of decision (% cases)

Decision Maker	Type of decision									
	Management of relations	Entry/Exit members	Activity of the group	Product basket	Selection of producers	Planning of Product	Planning of products	Purchasing orders	Logistic	Average
SPG Network	16.9	2.1	5.0	4.3	7.1	1.7	6.4	4.5	10.6	6.5
President	20.1	19.4	12.6	9.1	10.8	7.9	11.8	10.3	14.8	13.0
Managment	8.1	13.6	11.9	12.3	12.3	7.9	11.4	7.4	14.3	11.0
Group Member	33.1	42.6	35.6	33.2	28.6	62.9	29.3	36.8	42.3	38.3
Product Manager	5.6	2.9	3.8	8.3	13.8	5.6	19.2	31.4	0.0	10.1
Assembly	16.2	19.4	31.0	32.8	27.5	14.0	21.9	9.5	18.0	21.2

Source: the Authors

It is straightforward to see how each decision maker influence each type of decision. Furthermore, it appear also evident how this influence is variable according to type of decisions. The Network and the President mainly influence decisions related to the life of the group, while the other decision makers are more engaged in the management of the group activity.

5. Final remarks

The study concentrates on the Solidarity Purchasing Group. Focusing on the Italian experience, we aimed at examining the SPGs as emerging organization that engage themselves in the provision of food, but also concentrate on specific dimension of food. Health and environmental protection are thus among the intended outcomes of the SPG-public authorities coproduction. Accordingly the groups tend to assume a polycentric architecture of the decision making process. The communicative practice have a basic role in setting the arrangement sustain the SPG. We adopt an organizational point of view and conjectured that the practices of the SPG contribute to design the rank of the resources needed and their complementarity. The constitutional processes undertaken by the SPGs and the farmers are influenced by the health and environmental expectations. Under an analytical point of view, the study emphasizes the possibility of connecting the institutional analysis of the co-production (Ostrom, 1996) with the constitutional analysis of the organization. One of the limit of the study is the incomplete investigation of the connection on the terrain of the food provision. Furthermore, a more comprehensive empirical analysis would be necessary.

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SESSION THREE
CAP 2014-2020 and rural development



Ex-post evaluation of the impact of rural development policy using farm-level data. An example from the 2000-2006 program in the Lazio Region.

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Abstract

The paper illustrates a methodology for ex-post valuation of Rural Development policies. The approach is a 3-step procedure based on the analysis of farm-level data from the VI and VI Agricultural Censuses and from the regional database of rural development payments in the Lazio Region. In the first step, the strategic positioning of each firm was evaluated in 2000 and 2010 using Census data, following the methodology in Russo and Sabbatini (2005). Then regional data are used to identify and discriminate farms that received rural development payments. Finally, a difference in difference analysis compares variations in the strategic payments between the two groups (recipients and non-recipients). The analysis supported the hypothesis of a positive effect of rural development payments on competitive capability, while the effect on integration is ambiguous. The data support the hypothesis of a selection effect, as beneficiaries showed a significantly higher competitive capability at the beginning of the period than non beneficiaries. JEL Q18

Keywords: Rural development, valuation

The quantitative evaluation of rural development programs is an open question for academics and policy makers (Bradley *et al.* 2010). The recent report by the European Court of Auditors (Special Report 12, 2013) questioned the effectiveness of the public intervention and concluded that the current monitoring indicator data on results are not reliable enough to prove that the “EU budget allocated for rural development policy are well spent”. A consensus is achieved that more work is needed for a evidence-based and result driven agricultural and rural development policy (Hodge and Midmore 2008; Shaxon 2011).

This paper presents an empirical evaluation of the effectiveness of the 2000-2006 Rural development plan in the Lazio Region using farm-level data. The micro-economic from the V and VI Agricultural Censuses have been linked to an administrative dataset of the rural development payments. The resulting informative base allowed us to assess the impact of payments at individual level and then use a *difference in difference analysis*.

The micro-economic approach to policy evaluation is well known in the literature (e. g., Buyess *et al.* 2011); the contribution of this paper lies in the unique panel data from two censuses (2000 and 2010) and in the original performance indicator, based on the analysis of the emergent strategy of individual farms (Russo and Sabbatini 2005, Sabbatini 2008).

The objective of the analysis is to assess if the rural development payments achieve a statistically significant impact on the strategic positioning of Lazio farms and to describe such impact.

Methodology

The paper develops a *difference in difference analysis* of a panel of 46.021 farms from the Lazio region. The dataset is composed of data from the V and VI agricultural censuses and from the administrative archives of rural development payments from the 2000-2006 Rural Development Plan.¹ The study sample is defined by the intersection set of the two censuses: a deterministic match identified the farmers that are in both datasets. The sample represents the 47,6% of the

1. The data are courtesy of the Department of Agriculture of the Lazio Region, which provided an anonymous dataset based our specifications.

number of farms in the 2010 Census. The sample is not representative because it excludes all farms that for whatever reasons were registered under different farmer name. Those exceptions include relevant cases such as farm transmission, generation turnover or collection errors. Although the sample is not representative, the sheer size of it allows us to draw conclusions of general interest. Table 1 summarizes descriptive statistics of the sample.

Table 1: Descriptive statistics

Provincia		Farms (n.)	UAA 2000 (ha)	UAA 2010 (ha)	Avg. age (years)	Female farm. (%)	Ax. 1 benef. (%)	Ax. 2 benef. (%)	Ax. 3 benef. (%)
Viterbo	Mount.	-							
	Hills	9.861	7,0	7,7	64	28,9	3,1	0,5	13,2
	Plains	1.046	15,1	16,6	63	20,7	4,2	0,3	6,6
Rieti	Mount.	1.579	7,2	9,8	64	28,8	9,9	1,5	9,1
	Hills	2.862	3,5	3,5	65	27,0	3,0	0,5	11,8
	Plains	-							
Roma	Mount.	993	4,3	5,6	66	25,3	2,4	0,1	2,9
	Hills	7.202	4,0	4,2	64	27,8	3,5	0,3	6,1
	Plains	949	14,7	12,8	63	22,3	7,3	0,5	8,1
Latina	Mount.	343	1,1	2,2	62	31,8	0,9	0,0	0,0
	Hills	4.596	2,2	2,4	63	28,5	1,7	0,0	1,4
	Plains	4.529	3,9	4,2	59	26,8	8,1	0,2	2,1
Frosinone	Mount.	3.975	2,0	2,8	64	31,9	1,6	0,1	3,0
	Hills	8.086	2,9	3,0	64	38,4	1,9	0,1	2,5
	Plains	-							
Lazio	Total	46.021	4,6	5,1	64	29,9	3,5	0,3	6,3

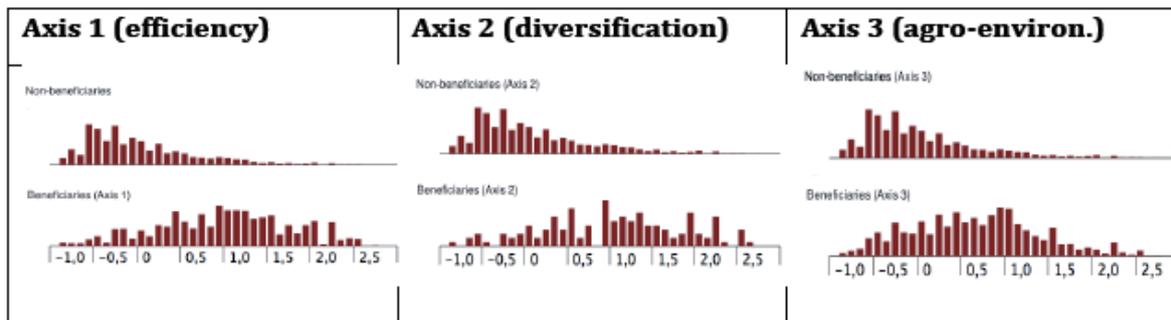
The difference in difference analysis compares the variation in a set of performance indicators between two groups: one is subjected to a *treatment* (the study group) and the other one is not (the control group). To the purpose of this paper, the treatment is the receiving of a rural development payment. The performance indicators are the *Index of competitive capability* (ICC) and the Index of interaction with the external environment (IIE). The two indicators are obtained from the classification algorithm of the strategic typology by Russo and Sabbatini (2005) and are calculated from the values for each farm of the first two factors from the iterated multiple correspondence analysis. The first factor is the ICC and it is associated with farm economic and physical size, market orientation and human capital. The farms with high values of ICC are not necessarily more competitive, but on average are expected to be more likely to face competition. The IIE is obtained from the second factor, which is associated with high level of relational goods, the adoption of PDO or PGI label, cooperative membership and off-farm employment. Farms with high values of IIE build value from the interaction with the external social and economic environment. Farms with low values of IIE focus on on-farm operations. The combination of the ICC and IIE defines the farm strategic positioning. Table 2 reports mean values of the ICC and IIE by province.

Comparing individual data from the 2000 and 2010 censuses it is possible to measure the difference in the values of the performance indicators IIC and IIE before and after receiving rural development payments (treatment). The variation in the values of the farms that did not obtained payments are used as counterfactual (control group). This structure of difference in difference analysis allows us to measure the impact of rural development policies on farmers' strategic positioning. For a more detailed analysis, the payments have been broken down according to the three axes of Lazio 2000-2006 programme: efficiency (axis 1), diversification (axis 2) and agro-environmental payments (axis 3).

Table 2: Mean values of ICC and IIE

Provincia		ICC 2000	ICC 2010	Var. ICC	IIE 2000	IIE 2010	var. IIE
Viterbo	Mount.						
	Hills	0,139	-0,142	-0,281	0,170	-0,040	-0,210
	Plains	0,565	0,041	-0,524	0,280	-0,167	-0,447
Rieti	Mount.	0,191	0,021	-0,171	-0,062	-0,176	-0,114
	Hills	0,070	-0,268	-0,338	0,158	-0,001	-0,159
	Plains						
Roma	Mount.	-0,162	-0,303	-0,141	0,102	-0,088	-0,190
	Hills	0,001	-0,297	-0,298	0,174	-0,058	-0,231
	Plains	0,472	0,077	-0,395	-0,047	-0,285	-0,238
Latina	Mount.	-0,354	-0,416	-0,062	0,239	0,004	-0,235
	Hills	-0,031	-0,392	-0,361	0,260	0,011	-0,250
	Plains	0,331	0,034	-0,297	0,082	-0,150	-0,231
Frosinone	Mount.	-0,227	-0,460	-0,234	0,129	-0,069	-0,199
	Hills	0,042	-0,336	-0,378	0,036	-0,136	-0,171
	Plains						
Lazio		0,074	-0,234	-0,309	0,132	-0,079	-0,211

Figure 1: Sample distribution by values of ICC: Beneficiaries and Non-beneficiaries (Relative frequencies, year 2000)



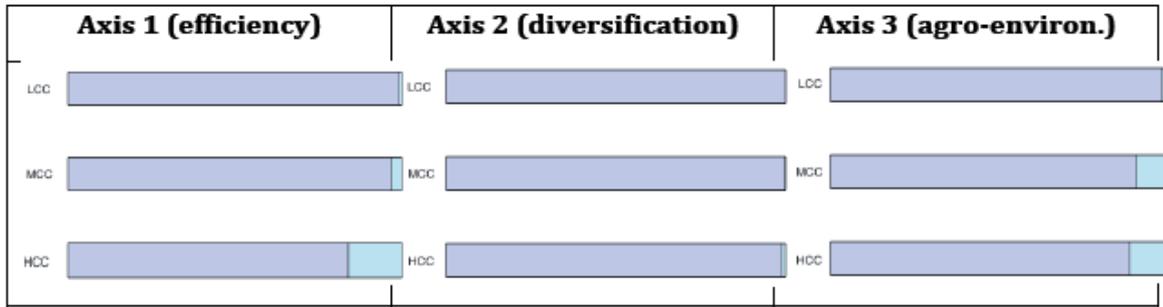
Results

The explorative analysis of the data set suggests a possible association between the value of the ICC before the treatment and the probability of receiving rural development payments. Figure 1 reports histograms representing the relative frequencies of beneficiaries and non-beneficiaries by class of ICC. The graphs suggest that the distribution of the two groups might be different. A formal t-test on the average ICC values of the two groups allows us to reject the null hypothesis of equality of the means at 99% confidence level.² This outcome has major implications. It suggests that farms with higher competitive capability might have easier access to rural development policy. Breaking down the sample based on the ICC, we obtain three classes: low, medium and high competitive capability denoted as LCC, MCC and HCC respectively (Russo and Sabbatini 2005). Figure 2 reports the relative frequencies of beneficiaries and non-beneficiaries for each ICC class. A χ^2 test allows us to reject the null hypothesis of absence of association between the two variables.³

2. The t statistic for the test on Axis 1 was $t(46019) = 59,361$, for Axis 2 was $t(46019) = 16,862$, for Axis 3 was $t(46019) = 8,413$.

3. The $\chi^2(2)$ statistics for the three cases are 3.013,8; 175,3 and 1.321,823 for Axes 1, 2 and 3 respectively.

Figure 2: Relative frequencies of beneficiaries and non-beneficiaries by ICC class (year 2000)



The association between the value of IIE at 2000 and the access to rural development payments is not supported by empirical evidence at 99% confidence level. Only in the case of Axis 1, the beneficiaries showed a significantly lower average value of IIE. These results suggest that it is advisable to control for the starting values of the ICC when testing for association between rural development payments and changes in the strategic positioning.

Figure 3: Relative frequencies of beneficiaries and non-beneficiaries by class of variation of ICC and class of ICC (2000)

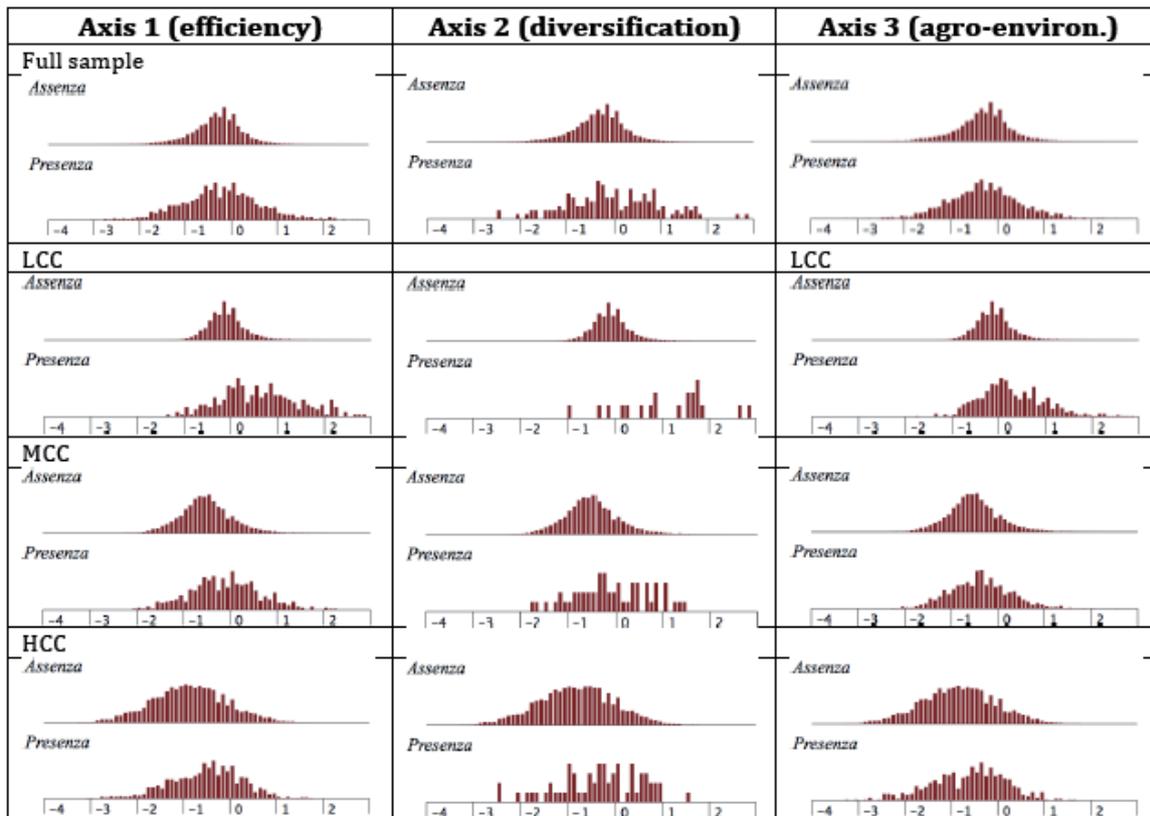
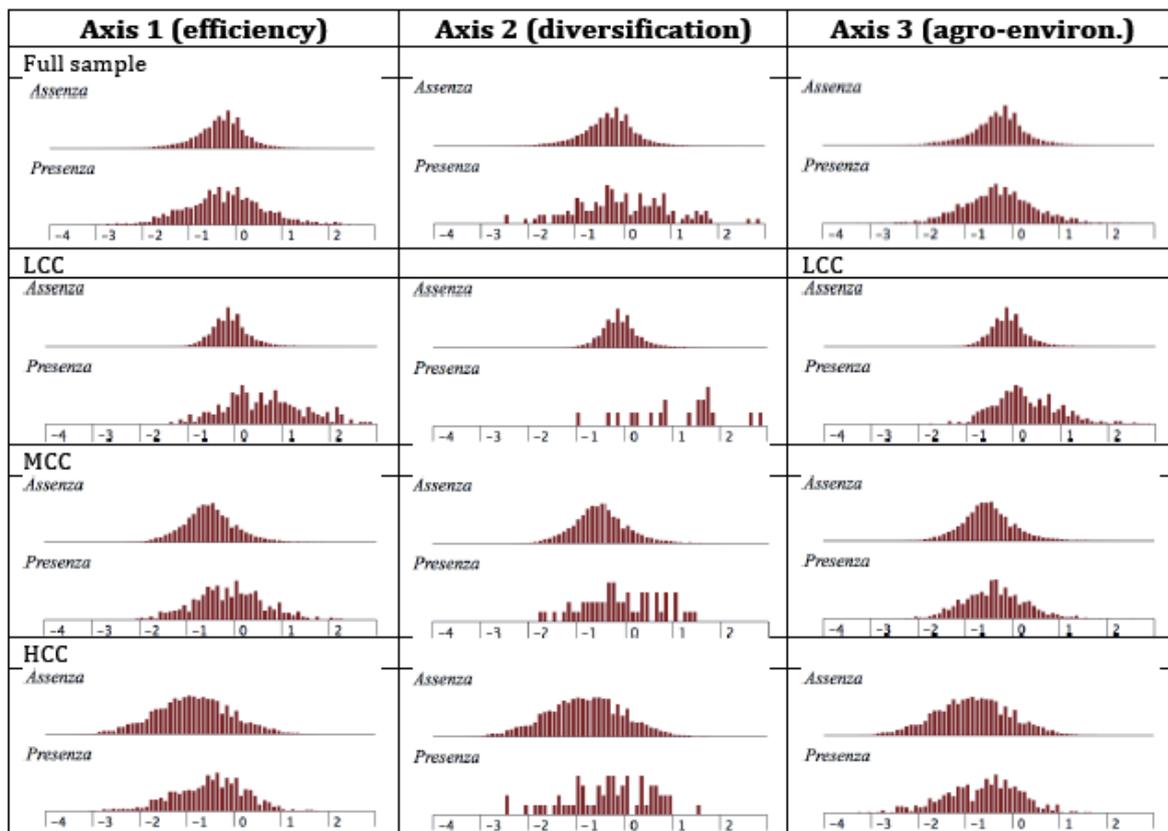


Figure 3 reports the distribution of the relative frequencies of beneficiaries and non-beneficiaries by class of variation of ICC (2010 vs 2000) and ICC class. The empirical analysis supports the

assumption that rural development payments have – on average – a positive effect on the competitive capability of farms. Between year 2000 and 2010, the average ICC value decreased by 0.312 for the non-beneficiaries and by 0.221 for the beneficiaries. The difference is statistically significant at 99% confidence level. Rural development payments are associated with a slower decline of the competitive capability, compared to the national trend.⁴

The effects of rural development payments on the IIE are more ambiguous. Figure 4 illustrates the distribution of the variations in IIE for beneficiaries and non-beneficiaries. The data allow us to reject at 99% confidence level the null hypothesis of equality of means between the two groups only as far as Axis 1 is concerned. When Axes 2 and 3 are considered, the differences in mean values are not statistically significant.

Figure 3: Relative frequencies of beneficiaries and non-beneficiaries by class of variation of ICC and class of ICC (2000)



Sample segmentation according to ICC classes confirms the ambiguous results. The effect of rural development payments on the IIE mean value of LCC farms is not statistically significant for any Axes. The mean IIE value of MCC farms is significantly lower when they receive payments from Axis 3 (the t statistic is 5,614) and it is not significantly different for Axis 1 and 2. Rural development payments from Axes 1 and 3 have a significant and positive effect on the IIE of HCC farms. Axis 2 payments are not associated with any significant effect on mean values. Table 3 summarizes the test results.

4. By construction, the ICC is normalized with respect to the Italian average in each year. Consequently, a negative variation over time can be interpreted as a decline of the relative competitive capability with respect to the ?

Table 3: Summary results of the t-tests comparing the mean values of variations of ICC and IIE (2000-2010) of beneficiaries (μ_B) and non-beneficiaries (μ_{NB}).

	Axis 1	Axis 2	Axis 3
LCC	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: fail to reject H_0 , $\mu_B = \mu_{NB}$	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: fail to reject H_0 , $\mu_B = \mu_{NB}$	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: fail to reject H_0 , $\mu_B = \mu_{NB}$
MCC	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: fail to reject H_0 , $\mu_B = \mu_{NB}$	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: fail to reject H_0 , $\mu_B = \mu_{NB}$	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: reject H_0 , $\mu_B < \mu_{NB}$
HCC	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: reject H_0 , $\mu_B > \mu_{NB}$	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: fail to reject H_0 , $\mu_B = \mu_{NB}$	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: reject H_0 , $\mu_B > \mu_{NB}$
total sample	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: reject H_0 , $\mu_B > \mu_{NB}$	ICC: reject H_0 , $\mu_B > \mu_{NB}$ IIE: fail to reject H_0 , $\mu_B = \mu_{NB}$	ICC: fail to reject H_0 , $\mu_B = \mu_{NB}$ IIE: fail to reject H_0 , $\mu_B = \mu_{NB}$

The null hypothesis H_0 is equality of the mean values. The confidence level is 99%

Table 4 reports a simple, reduced-form regressions of the variations in ICC and IIE on a set of explanatory variables including: dummy variables identifying the beneficiaries of payments, the initial strategic positioning (the values of ICC and IIE at year 2000), demographic variables (age, gender and education) and a set of dummy variables describing the spatial location of the farm (province and altitude).

Table 4: Regression of variations in ICC (ΔICC) and IIE (ΔIIE) on a vector of explanatory variables

	dep. variable: ΔICC adj. R ² : .4281 F-stat: 2027.6 p.val: 0.000				dep. variable_ ΔIIE adj. R ² : .4754 F-stat: 2453.9 p.val: 0.000			
	coefficient	robust std. error	t-stat	p.val.	coefficient	robust std. error	t-stat	p.val.
Axis 1	0.437	0.019	23.560	0.000	-0.176	0.011	-16.360	0.000
Axis 2	0.430	0.067	6.416	0.000	-0.073	0.031	-2.363	0.018
Axis 3	0.281	0.012	23.270	0.000	-0.004	0.008	-0.507	0.612
ICC_2000	-0.635	0.005	-137.900	0.000	-0.072	0.003	-23.540	0.000
IIE_2000	-0.092	0.004	-21.300	0.000	-0.813	0.005	-179.200	0.000
Gender	-0.068	0.005	-14.910	0.000	-0.005	0.004	-1.123	0.261
Age	-0.010	0.000	-37.720	0.000	-0.016	0.000	-69.850	0.000
Mountain	0.044	0.006	7.613	0.000	-0.013	0.006	-2.101	0.036
Plains	0.151	0.008	18.080	0.000	-0.149	0.006	-24.120	0.000
Bachelor Degree	0.039	0.015	2.589	0.010	0.119	0.015	7.854	0.000
High School	0.015	0.011	1.317	0.188	0.093	0.010	8.866	0.000
Middle School	0.025	0.010	2.414	0.016	0.016	0.010	1.628	0.104
Elementary School	0.014	0.009	1.470	0.142	-0.039	0.009	-4.495	0.000
VT	0.140	0.006	22.480	0.000	0.066	0.006	10.990	0.000
RI	0.114	0.008	14.310	0.000	0.073	0.007	9.751	0.000
RM	0.067	0.006	10.900	0.000	0.028	0.006	4.694	0.000
LT	0.030	0.007	4.414	0.000	0.065	0.007	9.671	0.000
Constant	0.254	0.022	11.630	0.000	0.925	0.020	46.980	0.000

The regression results suggest that, after controlling for initial conditions, demographic variables and farm location, rural development payments have a significantly positive association with variations in the ICC. Payments from Axis 1 are associated with a negative trend of IIE, while data do not support the hypothesis of significant associations with Axis 2 and 3 at 99% confidence level.

Conclusions

The analysis concludes that the 2000-2006 rural development policies of Lazio region had a significant impact and contributed to improve competitiveness. Beneficiaries achieved on average larger (or less negative) increments of ICC than non-beneficiaries with similar characteristics. Yet, critical issues emerged. The data suggested a selection effect: farmers with higher ICC in 2000 were more likely to benefit from payments, especially from axis 1. This confirms the well-known result paradox: the farmers those “need less” public supports are more likely to achieve it. Moreover, the access barrier for the least competitive farms indicated that the rural development policy were more effective in favoring and strengthening the strategies of already competitive farms than helping inefficient producers to invest in competitive capacity.

Noticeably, the estimated effect on the ICC of payments from Axis 3 is significantly lower than the other two Axes. This result is consistent with expectations, because agro-environmental payments did not require farmers to adopt business-development plans.

The effect of rural development payments on the IIE is ambiguous. The econometric model suggests that after controlling for starting conditions, demographics and spatial location, Axes 2 and 3 have no significant effect. The overall net effect of the payments from Axis 1 is negative, meaning that such transfers might give incentives to business model that are focused on on-farm operations. Only the HCC group showed the ability of using payments to develop integrated business models.

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Are the RDP objectives coherent with the distribution of funds? A case study in Tuscany

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Abstract:

The new CAP reform provides an overall reduction of total resources in 2020 both for the first Pillar, and for the Rural Development Policy. In this context, considering the difficulties of the primary sector, an efficient allocation of the resources becomes increasingly more important. This study seeks to offer a contribution in this sense, setting itself the goal of assisting the public decision-maker in the ex-ante and/or ex-post evaluation of the coherence between the set objectives and the effective distribution of funds. We considered the Agri-environmental payments (Measure 214) of the Rural Development Programme 2007-2013 of the Region of Tuscany as a case study, in order to compare the territorial distribution of financing to the goals of the public decision-maker. The probability of farms being funded by RDP Agri-environmental payments is tested applying a binomial logistic regression model. The methodological approach utilised can constitute a useful tool to help the public decision-maker's decisions and evaluations also for other RDP Measures of the new 2014-2020 programme.

JEL: Q12, Q18

Keywords: RDP Programme, CAP, logit model, Agri-environmental payments, Measure 214

1. Introduction, aims and scope

In the new CAP reform a fixed 24% of total resources is assigned to the rural development policy. However, taking into account the decline of overall CAP resources (at constant prices), the budget for the rural development policy shifts from the 13.89 billion euros of 2013 to the 12.092 billion euros of 2020, with a percentage reduction of 12.9%, analogous to that of the I Pillar. Therefore, considering the difficulties of the sector and the new financial balances, an efficient allocation of the II Pillar resources becomes increasingly more important.

More specifically, the primary condition for an efficient management of funds is to respect the coherence between the objectives of the public decision-maker and the effective disbursement and distribution of funds.

This study seeks to offer a contribution in this sense, setting itself the goal of creating a dynamic tool capable of assisting the public decision-maker in the ex-ante and/or ex-post evaluation of the coherence between the set objectives and the effective distribution of funds.

It also intends to identify possible corrective measures to the policy adopted, aimed at increasing the connection of financing with the requests of the decision-maker.

To attain this result, we have used an illustrative case study in order to compare the territorial distribution of financing to the goals of the public decision-maker, and we have identified the characteristics with the greatest probability of influencing the allocation of RDP funds for the Measure under analysis. Thus, it has been possible to provide indications of specific policies to improve coherence between the distribution of funding and the established objectives.

The case study proposed in this paper specifically concerns the Agri-environmental payments of the Rural Development Programme 2007-2013 of the Region of Tuscany, and the analysis is

concentrated, in particular, on Measure 214. We have chosen the latter inasmuch as it represents the measure that has obtained the highest value of financing compared to the other Measures of the Tuscan RDP.

Agri-environmental payments are part of Axis 2 (“Improvement of the environment and the countryside”), whose primary objectives are to preserve biodiversity, protect and spread agroforestry systems of a high natural value, protect shallow and deep water resources, reduce greenhouse gas emissions and preserve the territory from abandonment (Region of Tuscany, 2011). This Measure encourages and finances the introduction or maintenance of organic farming and integrated agriculture.

Measure 214 provides for a contribution per hectare in order to compensate the farmers for the greater production costs sustained in practising sustainable production methods. This contribution differs according to the typology of soil use.

The goal of the public decision-maker, in this case, is to favour sustainable agricultural production on the entire regional territory. Therefore, the allocation of the Agri-environmental payments should be distributed uniformly over the region’s UAA.

Furthermore, the RDP concerning the Measure under consideration gives no indication of a particular crop to favour over others or a geographical area to privilege, nor does it mention farm size and characteristics.

2. Literature on Agri-environmental payments

Considering literature, several studies have analysed the features of the farms and farmers that are more likely to participate in the Agri-environmental schemes or to receive RDP funding.

In this sense, Pascucci *et al.* (2011, 2013) evaluate the features of farms, farmers, and the territory that mainly influence the decision of farmers to participate in the Rural Development Programme, separately for Axis I and Axis II. Concerning the regional features, the authors reveal that farmers located in regions with a marked prevalence of natural areas, and a large budget allocated towards Axis II, are more likely to participate in Agri-environmental schemes. Apart from the territorial features, the farm characteristics are also important. In fact, a positive effect on farm participation is represented by small farm size and low level of mechanisation.

Similarly, Scozzafava *et al.* (2014) analyse the influence of the farm variables on the probability of gaining access or not gaining access to the RDP measures, identifying (pointing out) different farm profiles that imply independent and parallel development strategies.

The results obtained by Pascucci *et al.* (2013), are in line with Vanslebrouck *et al.* (2002), who analysed the environmental policies in Belgium. They found that the features of both the farmers and policy makers are important for participation in Agri-environmental schemes. However, farmers’ attitude towards the environment and small farm size are significant determinants of the acceptance of Agri-environmental policies.

Other works highlighting the features of farms and farmers assess the real and contingent propensity of farmers to participate in the biodiversity conservation and Agri-environmental measures programs (Vossink and Wenum, 2003). According to these authors, the participation is better explained by the production environment and familiarity with conservation programmes than by farmer or field features. Similarly, other authors analyse which farm and farmer’s elements could most influence the decision to adhere to the Agri-environmental measures. In this regard, young farmers with a high level of education are more likely to participate in Agri-environmental schemes (Giannakis, 2014; Hynes and Garvey, 2009; Damianos and Giannakopoulos, 2002).

Furthermore, the relationship with neighbouring farmers and their opinions on environmentally friendly practices all have significant effects on participation in RDP Measure 214 (Defrancesco *et al.* 2006, 2008).

Finally, other authors evaluate the effects that the farms participating in Agri-environmental schemes produce on the territory with respect to the policy objectives established. In this sense,

Dupraz et al. (2002) highlight the socioeconomic impacts of farms participating in RDP Measure 214. In particular, these farms conduct positive Agri-environmental actions, such as landscape maintenance, and the protection of biodiversity.

Unlike the papers cited until now, which normally process FADN sample data, the analysis performed in our study considers the universe of censused farms, merged with the database of ARTEA (paying agency of the Region of Tuscany for the RDP Programme).

Thus, our results are particularly useful for the legislator, inasmuch as they are based on processing a quantity of detailed and updated information that does not come from a sample but, rather, from the total number of farms.

3. Data and method

The study utilises the 6th General Census of Agriculture (2010) and the ARTEA database as its source of data. Our case study refers to the Region of Tuscany.

The Census of 2010 was conducted and coordinated by Istat (Italian Institute of Statistics), and provides a complete panorama of agriculture and farm structures in Tuscany.

From ARTEA, the “Tuscan Regional Agency for Agricultural Payments”, we take into account the farms funded by the Agri-environmental payments in the period between 2007 and 2013.

3.1 Overview: Tuscan agriculture and farms funded

An overview of the primary sector in Tuscany reveals a total of 72,686 farms censused in 2010. The average Useable Agricultural Area (UAA) per farm is 10.37 hectares, while the median UAA is 2.5 ha. The total farm UAA of the Region is 754,344.83 ha (6% of the total Italian UAA). The average age of the manager was 60, the median age 61.

Concerning the farm localization, most of the farms (70%) are located in the hills, 18% in the mountains, and the remaining 12% in plains areas.

The prevalent typology of agricultural holdings (TAH)¹ is permanent crops, followed by field crops (Figure 1).

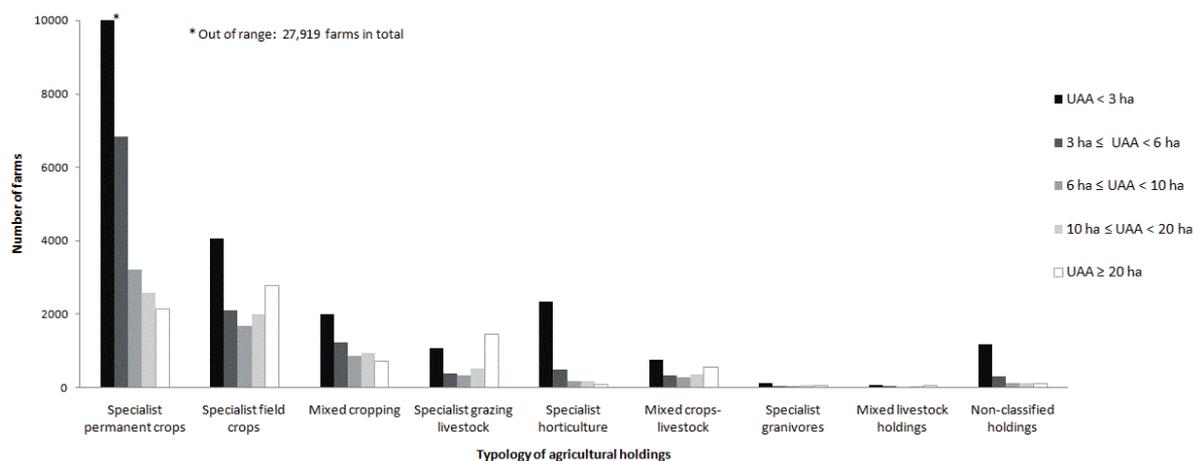


Figure 1. Farm size by prevalent Typology of agricultural holdings (regarding all the censused farms). Source: our elaboration from Census data

Of the total 72,686 farms censused in Tuscany, only 4,389 (6%) have benefited from RDP Measure 214 funding, considering the period between 2007 and 2013.

1. Classification of farm holdings based on determining the economic weight of the various production activities and their combinations.

The size of farms that on the average gain access to financing is higher than the regional average and median farm. In fact, the average of UAA per farm is 41.72 hectares, while the median UAA is 16.74 ha. The average age of the beneficiary manager is 51, the median age 50.

Permanent and field crops are the principal typology of agricultural holdings of the farms that have had access to the Agri-environmental payments, followed by the farms specialised in livestock.

Figure 2 records the percentage of UAA per municipality of the farms that have benefited from Measure 214, in relation to the total municipal UAA. The darker colour indicates the municipalities with a greater benefiting surface with respect to the total.

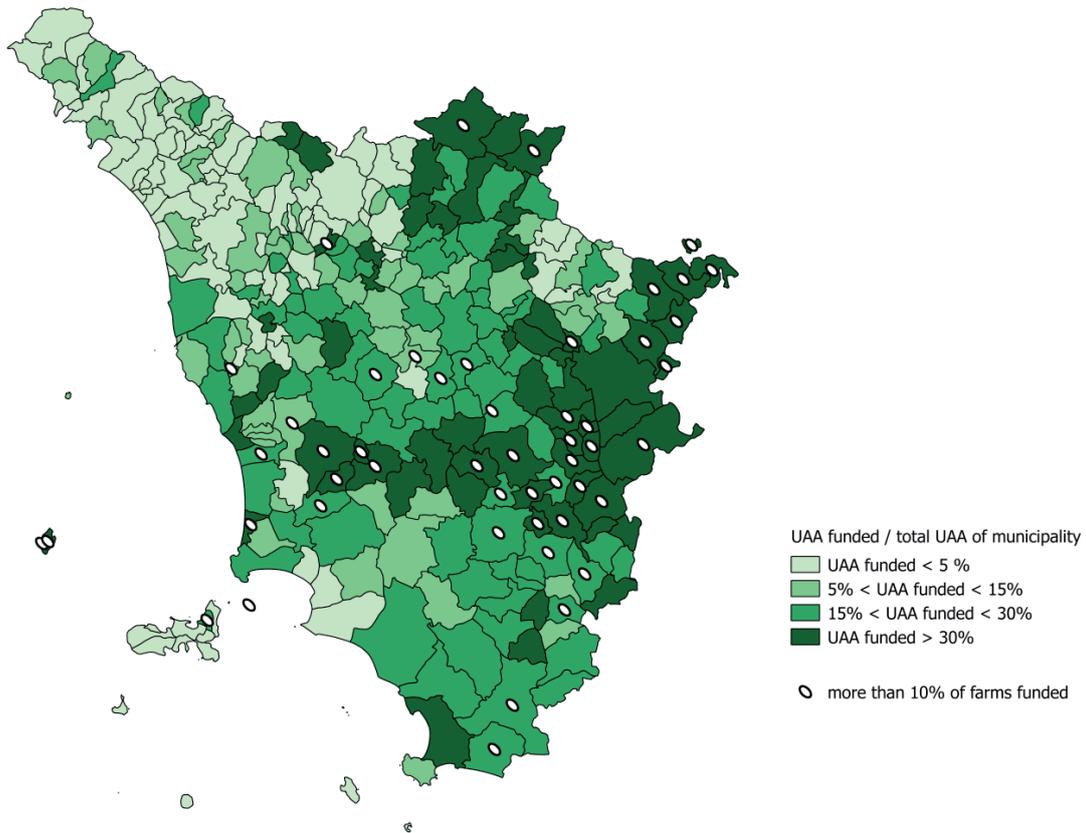


Figure 2. Percentage of UAA per municipality of the farms that have benefited from Measure 214, in relation to the total municipal UAA (and percentage of farms funded).

Source: our elaboration from Census and ARTEA data

In Figure 2 we can note that the Agri-environmental payments are not efficiently distributed over the regional UAA. Therefore, the objective of a distribution coherent with the resources, planned by the public decision-maker, has not been followed through.

More specifically, in three areas of the Region – one large area located in the north (in the Provinces of Massa-Carrara, Lucca and Pistoia), and two other areas located in the Province of Grosseto (southwest), and in the Province of Arezzo (east) – the beneficiary UAA with respect to the total UAA of the municipality is lower than 5%.

These areas probably host numerous farms that did not apply to participate in the Measure and have characteristics that negatively influence the receipt of Agri-environmental payments.

In order to better understand which farm characteristics positively influence gaining access to RDP funding, we have therefore applied a binomial logistic regression model.

3.2. Logit model and the explanatory variables

The probability of farms being funded by RDP Agri-environmental Measures is tested, applying a binomial logistic regression model.

The dependent variable (the outcome Y) is represented by the farms that receive the RDP 214 payments, and it takes two values: one and zero. The event $Y = 1$ is assigned to the farms that receive funding; on the contrary, $Y = 0$ if they do not receive payments.

Analytically, $P(X)$ is the probability of $Y=1$ (Cramer, 2003):

$$P(X) = \frac{\exp(\alpha + \beta X)}{1 + \exp(\alpha + \beta X)} \tag{1}$$

If Z is a linear function of a single regressor, or it is a function of several regressors, the probability logistic function is defined by Pl , with l for logistic or logit (Greene, 2008; Cramer, 2003):

$$Pl(Z) = \frac{\exp(Z)}{1 + \exp(Z)} \tag{2}$$

so that, similarly to the regression equation, the formula (1) can be rewritten as:

$$P(X) = Pl(\alpha + \beta X) \tag{3}$$

Table 1 lists the model's explanatory variables, represented by X . These variables, extrapolated from the Census and from the ARTEA database, have been considered useful to better represent the farm location, the farm structure and the features of the manager.

The two databases are merged by using as key variable the tax code of the farm manager or the VAT number of the farm.

Table 1. List of the explanatory-variables considered in the model

	Description	Source
Dependent variable: Farm funded	1 if farm receives RDP Measure 214 funds (period 2007-2013)	ARTEA
	0 if farm doesn't receives RDP Measure 214 funds	
<i>Farm location</i>		
Hill	1 if farm is located in the hill 0 if farm is located in the mountain or in the plain	Census
Declining rural area (RDP zoning)	1 if farm is located in declining rural area 0 if farm is located in other RDP zoning	RDP 07-13
<i>Farm size and Typology of Agricultural Holdings</i>		
Large farm	1 if the farm size ≥ 35 ha	Census
Field crops / total UAA	% of field crops with respect to the total UAA	Census
Grazing livestock (TAH)	1 if specialising in livestock	Census
	0 if specialising in other TAH	
<i>Quality of production and agronomic practices</i>		
PDO	1 if PDO products	Census
DOC-DOCG wine production	1 if farm produces DOC-DOCG wine	Census

Agritourism	1 if agritourism in farm	Census
Multifunctional activities	1 if farm carries out school or handicraft activities	Census
Grassing UAA / Total UAA	% of grassing UAA with respect to the total UAA	Census
Conservative agronomic practices	1 if farm carries out conservative agronomic practices	Census
Irrigated UAA / Total UAA	% of irrigated UAA with respect to the total UAA	Census
<i>Farmer features</i>		
Young manager	1 if manager <= 40 years old	Census
Professional farmer	1 if manager is a professional farmer	ARTEA
High level of study	1 if secondary school or university 0 if primary school	Census
Training courses	1 if manager is attending training courses	Census
<i>Farm Labour</i>		
Extra-farm activities > Farm activities	1 if manager extra-farm activities > farm activities	Census
Extra-labour	working days	Census
<i>Economic results and modern farm</i>		
	1 if the sale of products > 50% of the total farm revenues	
Sale of farm products > 50% tot. revenues	0 if direct payments (CAP) or revenues from related activities > 50% of the total farm revenues	Census
Farm with internet site	1 if farm has an internet site	Census
Management accounting	1 if farm performs accounting	Census

For each explanatory variable, the logit model calculates the probability that this variable determines the granting of Agri-environmental payments.

4. Results

Table 2 reports the results of applying the logit model for Measure 214.

Table 2 Logit Model results for RDP Measure "Agri-environmental payments"

	Coeff.	Std.Error	Sign
<i>Farm location</i>			
Hill	0.6484	0.0475	***
Declining rural area (RDP zoning)	0.0357	0.0368	
<i>Farm size and Typology of Agricultural Holdings</i>			
Large farm	0.7502	0.0473	***
Field crops / total UAA	0.0040	0.0005	***
Grazing livestock (TAH)	-0.0164	0.0644	
<i>Quality of production and agronomic practices</i>			
PDO	0.3181	0.0414	***
DOC-DOCG wine production	0.4121	0.0443	***
Agritourism	0.3666	0.0556	***

Multifunctional activities	0.6465	0.1278	***
Grassing UAA / Total UAA	0.2150	0.0736	**
Conservative agronomic practices	0.0314	0.0671	
Irrigated UAA / Total UAA	-0.0512	0.0909	
<i>Farmer features</i>			
Young manager	0.1838	0.0441	***
Professional farmer	1.9050	0.0467	***
High level of study	0.5232	0.0388	***
Training courses	0.2837	0.0535	***
<i>Farm Labour</i>			
Extra-farm activities > Farm activities	-0.3136	0.0724	***
Extra-labour	-0.0001	0.0000	**
<i>Economic results and modern farm</i>			
Sale of farm products > 50% tot. Revenues	0.0076	0.0420	
Farm with internet site	0.3368	0.0530	***
Management accounting	0.7569	0.0549	***
(Intercept)	-5.3700	0.0654	***

We have analysed the model's explanatory capability utilising the *McFadden's pseudo R²* index, which uses log likelihood statistics. The value of the index is equal to 0.29.

From the results of the model, we can highlight which characteristics of the farms and of farmers positively influence the receipt of Measure 214 funding. In this regard, we find that the type of crops influences the receipt of Agri-environmental payments, unlike the results obtained by Wossink and Wenum (2003). In fact, the field crops have a greater probability of being funded compared to permanent crops or other soil utilisation.

Furthermore, unlike Pascucci et al. (2011, 2013), the large farm size encourages farmers to participate in Agri-environmental schemes. This result appears rather predictable given that participation in this measure is less convenient for the small farms, due to transaction costs and also because as payment is tied to surface area, it does not permit scale economies which could induce the farmer to modify his crop and agronomical practises.

The results of the model also show that farms with quality and diversified products, that conduct other activities in addition to the production of primary goods, have a greater probability of being financed than undiversified farms with a non-certified production.

Moreover, concerning farmer characteristics, processing of data shows a positive effect among young managers with a high level of education, who keep themselves updated on the problems of the sector and on the possibilities of improvement. On the contrary, elderly managers with a low level of education and not updated on the challenges offered by the market attain opposite results. These results confirm the studies of Giannakis (2014), Hynes and Garvey (2009), and Damianos and Giannakopoulos (2002), which reveal that young and well-educated farmers are more environmentally aware and more excited about innovation, such as Agri-environmental schemes, with respect to older farmers who are more conservative and sceptical. Furthermore, managers who run a farm full time are more interested in participating in the Agri-environmental Measure than in other forms of activity, such as on a part-time basis or as a hobby. More specifically, *Table 3* schematically reports the farm features that have a greater probability in determining (or not determining) the Agri-environmental payment grants.

Table 3 – Farm features that determine the granting of Agri-environmental payments

Positive features	Negative features
Farm located in the hill	Farm located in the mountains or in the plain
Large farm	Small and mid-size farm
Main production: field crops	Main production: permanent crops and livestock breeding
Quality production (PDO, DOC, DOCG)	Absence of quality-certified products
Agritourism and related activities	No other activities in farm
Young, dynamic and professional farmer with high level of study	Old farmer, with low level of study, which doesn't attend training courses
Modern farm, with internet site and management accounting	Farm without internet site

This information can be very useful, as it allows decision-makers to understand which type of farm is going to be supported with public money.

Knowing what conditions favour access to financing for the RDP Measure 214 can thus prove strategic for the public decision-maker in the phase of programming (ex ante) the new rural development programmes and, in a broader perspective, in analysing the coherence between the pre-established objectives and the effective expenditure of public money.

5. Conclusions

The II Pillar of the CAP is a specific intervention tool to support the dynamics of rural development.

Knowing ex ante the profile of farms with greater chances of receiving public funds enables us to understand which territories have to be more supported.

This analysis can therefore be considered as a first step towards developing an ex ante and/or ex-post evaluation system capable of supporting the decision-maker in programming RDP interventions.

The methodology proposed in this article was utilised as a case study to analyse the coherence between the objectives of Measure 214 and the effective distribution of financing to the farms on the territory.

More specifically, in order to improve the coherent distribution of the Agri-environmental payments, we can point out for the policy makers three drivers of intervention, which are represented by: i) the size characteristics of farms; ii) the crop characteristics; iii) the management characteristics.

The methodological approach utilised can constitute a useful tool to help the public decision-maker's decisions and evaluations also for other RDP Measures, especially in light of the new 2014-2020 programme.

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The Access to Public Payments (RDP) and the Socio-Economic Structure of Farms: a Comparison between Urban and Rural Areas in Tuscany

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Abstract

Over the last decades the soil has been subject to high consumption of land due to several reasons such as residential purposes, production, infrastructure etc. This competition for the soil use is greater in urban than in rural areas due to the urban sprawling. However urban agriculture plays a key role in providing services in terms of local farming and management of urban areas. This paper aims at investigating the existing differences between rural and urban areas of Tuscany focusing on the socio-economic farm household characteristics and on the amount of public payments received. Two different sources of data have been used, the 2010 agricultural census and the regional database of public payments. Results show statistically significant differences in terms of farm size, labour and land productivity and amount of RDP payments received. .

JEL classification: Q10,Q12,Q18

Keywords: urban areas, micro data, soil consumption

1. Introduction

Since past decades, the urban agriculture has been studied by several disciplines such as agricultural economics, rural sociology and regional sciences (Galli et. al, 2010). A rapid urbanization process occurred worldwide. Moreover, the transformations of the work and leisure activities; residential mobility, but also the creation of large shopping areas, warehouses, and industrial premises in urban and peri-urban areas contribute to decrease the farm land availability. Thus the soil is subject to a high consumption of land for residential purposes, production and infrastructure

Following these pressures the national regulatory framework has formulated a draft law on soil consumption (D.D.L. 12/13/2013 “Containment of land consumption and reuse of soil built”). Also at the regional level the process of approval is going to be approved through the law 282/2013 (Reform the L.R. 1/2005 on the rules of governance of the territory) which lay down specific guidelines with the aim of enhancing the territorial heritage and counteract soil consumption by promoting the multifunctional role of rural areas.

Actually the competition for land is greater in urban and peri-urban areas than in rural areas, due to the urban sprawling process which increase the land demand for non-agricultural alternatives (Feitchinger and Salhofer, 2013). At the same time, the role of urban agriculture in providing ecosystem services (Chometon, 2009) and management of urban areas (Loudiyi, 2008) is highlighted by the literature. Actually, in these areas, agricultural activities may play a key role in delivering several recreational opportunities, increasing the living standards and ecological conditions (Planchat-Héry, 2008). Premat (2005) defines urban agriculture as “all activities located within (intra-urban) or on the periphery (peri-urban) of a settlement, city or metropolis, independently or collectively developed by people for self consumption or commercialization purposes; involving the cultivation or raising, processing and distribution of a diversity of products that in

turn contribute to mobilize considerable material and human resources to that area". The urban agriculture represents an opportunity to revitalize and regenerate urban spaces and along with other initiatives and activities play an important role in contributing to the future sustainability of cities (Deelstra and Girardet, 2000).

To maximize the effectiveness of RDP funds, the Tuscany Region has classified regional territory into four different zones. Each municipality has been classified based on inhabitants' density and territorial concerns. Then the municipalities can be considered a) Urban poles; b) Rural areas with intensive agriculture; c) Intermediate rural areas; d) Rural areas with development problems. Using the regional classification, this paper aims at investigating the agricultural main differences between the farms located in rural and urban areas of Tuscany. Indeed given the importance of urban agriculture to decrease soil consumption and provide ecosystem services, the structure and the capabilities of farms located in urban areas of Tuscany investigated and compared to rural ones. Further the difference in the access to public payments is also addressed to provide some insight for the following rural policy 2014-2020.

2. Methodology

In order to analyze the agricultural system in urban and rural areas of Tuscany different source of data are utilized: the 2010 data Agriculture census, the ARTEA database and the zoning database provided by the regional rural development program (RDP). The 2010 Agriculture Census data provides information at the farm and family level such as the farm size, the level of the standard output, the off farm opportunities etc. The ARTEA database includes the payments received by each farm stemming from the second pillar such as the farm submissions related to farm renewal or to farm diversification. Finally the zoning database provided by the RDP includes five different zones of Tuscany according to their geographic characteristics.

The ARTEA and the Agriculture census databases have been merged through the fiscal code of the farm owner. Once the final database including over 45.000 Tuscan farms receiving public payments has been created, the sample has been split in different subsets: the one including farms located in urban area according to the RDP and the ones including farms located in rural areas. The resulting sample composed by farms located in urban areas includes over 12.000 farms has been compared to the farms located in rural areas. Finally, the difference in the type and amounts of public payments received by each group is analyzed and associated to an analysis of the farm structure in rural and urban areas. The comparison of the main differences among the farms located in alternative zoning is computed statistically by computing t-test.

3. Results

This section provides comparison of farm structures¹ and access to RDP policy for Tuscany farmers located in different zoning. Firstly are presented differences on main structural and economic indicators (table 1, table 2 and table 3) and then differences access to RDP measures (table 4, table 5, table 6 and table 7). As showed by table 1 farms located in urban areas represent 17% of all farms operating in the Tuscany region covering 12% of the regional Utilized Agricultural Area (UAA) with 90.546 hectares and 10% of the Total Agricultural Area (TAA) with 129.922 hectares.

1. The adopted definition of farm structure stems from ISTAT. It is a technical and economic unit, composed by land, even non-contiguous plots, where agricultural activities and livestock are put in place by a farm operator.

Table 1. Number of farms and area according to the zoning

	Urban areas		Rural areas		
			Intensive areas	Areas in transition	Declining areas
Number of farms	12,632 (17%)	7,331 (10%)	24,777 (34%)	17,546 (24%)	10,400 (15%)
Utilized agricultural area (ha)	90,546 (12%)	37,113 (5%)	249,339 (33%)	279,197 (37%)	98,148 (13%)
Total agricultural area (ha)	129,922 (10%)	52,289 (4%)	405,580 (31%)	478,916 (37%)	228,412 (18%)
Working days	3,020,299	1,716,777	5,787,630	4,728,140	2,534,403

Source: own elaboration on 2010 census data

Table 2 illustrates the differences between the urban and rural farms according to the RDP zones which are validated through a t-test in table 3. Specifically the average farm size of urban farms in terms of UAA and TAA is significantly lower than the rural ones and the use of labour (Average Working days/UAA) is more intensive than in rural areas. Regarding the land productivity, expressed by the ratio between the standard output per UAA, we note that this value (8.970 euro per hectare) is significantly higher for urban farms. This is due to the localization in plain areas which allow intensive agricultural practices, the proximity to markets and presence of other hypothetical off-farm activities which may raise the land productivity. Conversely, the labor productivity, expressed by the ratio between the average standard output and the number of working days per farm, is significantly lower for farms located in urban areas. This may be due to less efficient use of labour and to the higher share of part-time and hobby farms. Hence preliminary results confirm the findings of the existing literature showing a significant divergence in the farm households' strategy between farms located in rural and urban areas.

Table 2. Structure of farms located in urban and rural areas (farm level data)

Indicators	Urban areas	Rural areas				Total rural areas
		Intensive areas	Areas in transition	Declining areas	Areas with development problems	
Average UAA (ha per farm)	7.16	5.06	10.06	15.91	9.43	11.05
Average total agricultural area per farm (ha)	10.28	7.13	16.36	27.29	21.96	19.40
Average Standard output per farm (euro)	32,618	25,771	34,062	43,548	17,752	32,997
Average Working (days/UAA per farm)	2.23	2.23	1.24	0.86	2.15	1.41
Average Standard output/UAA per farm (euro per hectare)	8,970	9,772	4,107	3,138	3,166	4,352
Average Standard output/ working days per farm (euro)	174.72	143.05	234.18	241.71	175.63	215.12

Source: own elaboration on 2010 census data

Results show that differences between rural and urban areas in the farm size, labor and land productivity at the farm level are statistically significant, whilst the standard output dimension is not (see table 3).

Table 3. Comparison between the farm structure of rural and urban areas (t-test)

	<i>t-test</i>	Degree of freedom	<i>p-value</i>
Average UAA per farm	-11.7854*	19126	2.2e-06
Average total agricultural area per farm	-12.4255*	27570	< 2.2e-16
Average Standard Output per farm	-0.1279	15555	0.8825
Average Working days/UAA per farm	8.4287*	16228	< 2.2e-16
Average Standard output/UAA per farm	14.7429*	19420	< 2.2e-16
Average Standard output/working days per farm	-2.4783*	33555	0.013

Source: own elaboration on 2010 census data

Once verified the existence of differences between rural and urban farms, the access to RDP payments has been investigated to assess whether a difference in RDP access is due to the spatial location of the farm. Hence, location in urban or rural areas can affect the quality of extension services, the farm specialization and the market opportunities, that are determinants to the participation in RDP measures. Table 4 confirms that the attitude of participation to voluntary measures diverges across urban and rural areas. Specifically 9.2% of farms located in urban areas received an RDP payment associated to an average value of 1.518 euro over the period 2007-2012. Only the farms included in intensive rural areas receive lower payments than urban farms. Furthermore in line with rural areas, urban farms seem to show a low RDP dependency since only 16% of their rents stems from these type payments. The only exception is represented by areas with development problems where the dependency from the public payments increases to 25%.

Table 4. Average RDP payments (2007-2012) per farm according to the RDP zoning²

	Urban areas	Rural areas				
		Total rural areas	Intensive areas	Areas in transition	Declining areas	Areas with development problems
Share of farms	9.2%	12.4%	8.2%	11.5%	14.5%	14%
Average payment per farm	1.518	2.609	1.090	2.313	3.286	3.245
Average payment/Standard output per farm	0.17	0.17	0.15	0.14	0.16	0.25

In order to assess whether the difference between the average values related to the RDP payments of urban and rural areas is statistically significant table 5 runs the t-test on the previous variables. Results confirm that the average RDP payment per farm is significantly different across rural and urban areas. Whilst standardizing these values by the UAA, the standard output and the working days no statistically significant difference is found.

2. The average are referred to the universe of farms surveyed by ISTAT according to the different RDP zones.



Table 5 - Comparison between RDP payments of rural and urban areas (t-test)

	t-test	Degree of freedom	p-value
Average RDP payment per farm	-8.5643*	21.518	< 2.2e-16
Average payment/ Standard output per farm	-0.013	21.172	0.991
Average payment/UAA per farm	-0.4722	58.599	0.6368
Average payment/working days per farm	0.6285	13685	0.5295

Source: own elaboration on ARTEA database

Splitting the RDP payments according to the four existing axes we note that farms in urban areas received a lower amount of RDP payments if compared to intermediate rural areas and with development problems (see table 6). Actually urban farms capture respectively 12% and 11% of RDP payments stemming from axis 1 and 2. The t-test compares the average payments stemming from the four axes to the average regional values. Results show that farm located in urban areas show significant lower values from the regional average.

Table 6. Average annual RDP payments (2007-2012) per farm split by axes

	Urban areas	Intensive areas	Areas in transition	Declining areas	Areas with developing problems	Average regional value
Average payment Axis 1 (euro)	796 t test 4.1013* (sd 9430.17)	662 t test -5.49* (sd 7453)	1.103 t test -0.59 (sd 9763)	1.443 t test 3.57* (sd 11265)	1.472 t test 3.22* (sd 10521)	1.140
Average payment Axis 2 (euro)	708 t test -5.4507* (sd 7189)	323 t test -17.77* (sd 3533)	1102 t test 0.88 (sd 8158)	1488 t test 6.67* (sd 8550)	1161 t test 1.29 (sd 8257)	1.056
Average payment Axis 3 ^b (euro)	0	101 t test -2.93* (sd 3090)	92 t test -7.51* (sd 2408)	336 t test 3.18* (sd 5347)	580 t test 4.70* (sd 8070)	208
Average payment Axis 4 ^c (euro)	0	0	10.9 t test 0.21 (sd 540)	10.9 t test 0.2 (sd 494)	24.83 t test 1.84 (sd 809)	11

Source: own elaboration on ARTEA database

Splitting the universe in beneficiaries and non beneficiaries we note that 1.173 farms of the urban areas (9.2% of all urban farms) and 7.447 farms localized in rural areas received some sort of RDP payments over the period 2007-2012. The comparison between beneficiaries and not beneficiaries show statistically significant better structure in terms of land size, economic dimension and land productivity (see table 7) of beneficiaries in both areas. Focusing on non beneficiaries farms of urban areas which cover almost 80% of urban UAA (71.899), they represent problematic areas needing an increasing attention from the policy maker to avoid their exit. Actually, urban agriculture can be a key of renewal of the city, combining the production of local food quality and production/reproduction of neo-rurality, land management and landscap-

3. Urban farms cannot receive payments stemming from axis 3

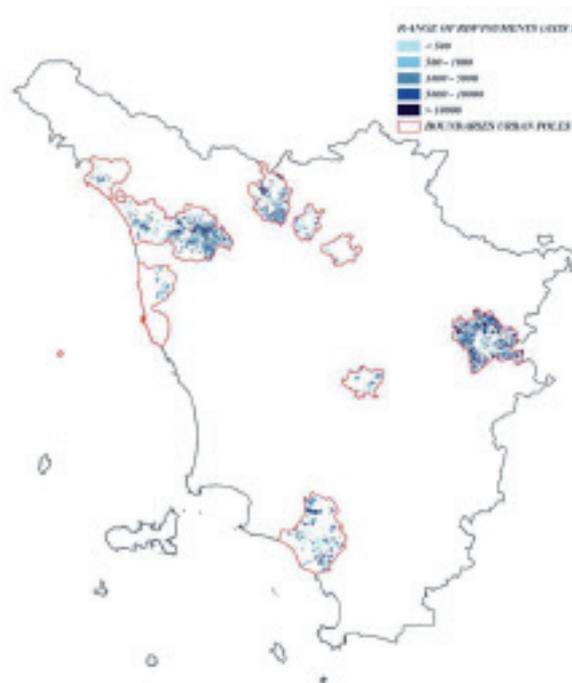
ing. The peri-urban areas (defined as the territories of neo-rurality) represent the zone where experiment models of regeneration can be applied, also through multifunctional agriculture. This in turn reduce the soil consumption and support the supply of ecosystem services increasing the quality of life of citizens such as: improving ecological connectivity and level of biodiversity; protection of hydrogeological structure; preserve the identity characteristics of landscape; etc.

Table 7. Structure of urban farms split by beneficiaries and non beneficiaries⁴

Urban areas				
	beneficiaries	Non beneficiaries	t-test	P-value
UAA	15.89	6.27	10.9510*	<2.2e-16
Standard output per farm	81.220	27.643	6.3927*	2.205e-10
Land productivity	11.653	8.695	3.6327*	0.0002
Labour productivity	304.91	161.28	3.4742*	0.0005
Rural areas				
UAA	24.03	8.54	36.00*	<2.2e-16
Standard output	74.332	27.361	20.75*	<2.2e-16
Land productivity	6.867	4.923	2.66*	0.0077
Labour productivity	310.00	194.00	3.03*	0.0024

Source: own elaboration on ARTEA database

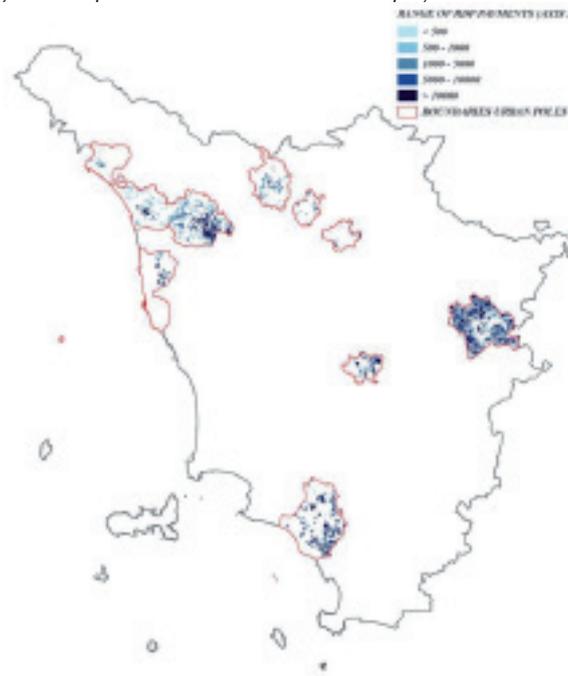
Figure 1. Spatial distribution of RDP payments for Axis 1



Source: own elaboration

4. Urban farms cannot receive payments stemming from axis 4

Figure 2. Spatial distribution of RDP payments for Axis 2



Source: own elaboration

Finally, we show the spatial distribution of public payments received by farms located in urban areas, this elaboration is made with Qgis 2.2⁵. We note some differences: in the provinces of Lucca, Pisa and Arezzo prevails concentration of financial resources of the axis 1 (figure 1). Whilst in the south of Tuscany (province of Siena and Grosseto) where larger farm operate and the area is characterized by a great landscape value, protected and vulnerable areas, there is a high concentration of payments of the axis 2 (figure 2).

4. Conclusions

This contribution aimed at analyzing the differences in the structure and in the access to public payments of farms located in urban and rural areas through a t-test. The Farms located in urban areas show a significant lower farm size and an higher land productivity due to location in plain areas and proximity to markets and to the specialization in intensive agriculture. Regarding the access to RDP payments results show a lower amount of RDP payments associated to farms located in urban areas. This result may be explained by the lower share of on-farm income on the total farm household income due to the higher diffusion of part time farming and to the higher land fragmentation which push to off-farm activities given their localization. Actually, whilst farms located in these urban areas have wider opportunities, farms located in rural areas, characterized by larger farm size and a higher access to RDP payments, perceive higher barriers to increase their farm income through diversification. Further almost 80% of urban UAA is covered by non beneficiaries with weaker structures. These farms are more likely to exit the agricultural sector. In order to prevent the abandon or the destination to other uses of the land, the supply of several services such as short supply, social farming may be put in place. This issue needs a deeper attention by the policy maker in order to avoid the farm exit of urban areas. Hence due to the divergence between rural and urban areas, the policy maker should supply differentiated

5. Software GIS opensource for georeferenced elaboration of statistical database.

public payments according to the different needs of the zones designated by the RDP. Especially public funds should be integrated due to cross characteristics of urban agriculture related to several aspects: environment, social aspects, culture etc. A first attempt to address this issue may be institution of Community Local Led Development, local group aimed at elaborating integrated project financed by multi-sectorial funds. Future research could assess the effect of agri-environmental policy in urban and peri-urban context through general equilibrium models (Coison et al. 2014, Mary et al. 2013)

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New urban-rural relations in Tuscany: what consequences for land uses and food security in a long term perspective

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Abstract:

The paper aims to investigate how urban-rural relationships could affect land uses and food security in a long term perspective in Tuscany region. So, the Tuscany case study has three specific purposes: identifying the rural-urban patterns in the region and highlighting the most relevant relationships able to influence land uses and food security; analysing the emerging trends concerning demographic linkages, urban morphology, agricultural production, land use and soil consumption, as well as the possible disruption factors; speculating about the possible scenarios at long term. The case study of Tuscany has to be considered an example of Mediterranean region as a part of the wider research project “Agrimonde-Terra” which was promoted by the French organizations INRA and CIRAD as a foresight exercise for providing scenarios to 2050 and highlighting the challenges to be faced at global scale.

keywords: food security, urban-rural relationships, soil consumption and land uses

1. Introduction

This paper on the case study about new urban-rural relationships in Tuscany region is a part of the wider research project “Agrimonde-Terra” that will finish at December 2014¹. Moving from the proliferation of studies concerning the food security issue at global level, this project was promoted by the French organizations INRA and CIRAD as a foresight exercise that explores how food security could be ensured taking into account possible changing in land uses at global scale, providing scenarios to 2050 and highlighting the challenges to be faced. In the ongoing phase², the research has two foci and two distinct research groups are charged with them: new relations between urban and rural areas and new forms of organization of agriculture.

As a case study of the broadest global scale survey, Tuscany has been considered an example of Mediterranean region for examining how new relations between urban and rural areas will affect the future perspectives about food security and land use. So, this much targeted case study has followed a research pathway answering to two main questions. On one hand it needs to identify what rural-urban pattern is in the region and focus what kind of relationships among the areas are able to influence land uses and food security. On the other hand, building future scenario at long term is based upon the analysis of the emerging trends and the identification of some possible disruption factors – limited to those depending on the urban-rural relationships - and finally on the discussion about how they could or couldn't change those trajectories.

A growing attention has been paid to the issue of urban rural linkages in Europe in the last years as the Commission of the European Union has promoted several studies³ and debates by which it has traced a progress from an approach more dichotomous to another that aims to overcome the divide and look at urban-rural linkages in a new light of positive relationships for proactive partnerships. In some measure this will be taken into account in the final discussion, even if public policies and governance issues are at the fringe of this much focused paper.

1. www.agrimonde.org (accessed 2014/6/30)

2. After a first phase, in July 2012 started the ongoing second phase whose conclusion will be in December 2014.

3. For a long time the European Commission paid a special attention to the relation city-countryside, from 2000 to nowadays.

2. Methodology

Following the conceptual map of the research's path, specific methodological approaches have to be used.

The main point concerns the identification of the urban-rural pattern in a Region whose capital has circa a tenth (366 thousand) of regional population and taking into account that Regional administration is organised in ten provinces and 287 municipalities, the large part of whom (87%) has less than 20.000 inhabitants and only 37% of population lives in cities having more than 50.000 inhabitants. This typical polycentric urban development finds its origins in the era of medieval towns and even today it corresponds to local identities deeply rooted. However people results more concentrated along the two geographical axes of development: the Arno Valley where is located metropolitan area of Florence-Prato-Pistoia (1,5 million people), and the large part of manufacturing firms is situated; the north coastal belt (between Massa-Carrara and Livorno provinces) where are concentrated the most important installations of heavy industry. According to OECD criteria, the provinces of Arezzo, Siena and Grosseto (the whole south region) are corresponding to rural areas, so that 50% of Tuscan territory is rural.

We are aware of the actual complexity of regional rural milieu, which is misrepresented by the criteria proposed below as it leaves out especially the mountain areas and more in general all the 'inland areas' as recently classified (Ministry of Cohesion Policy, 2012) that are crossing all the provinces. Nonetheless it needs focus on the principal aim to identify at regional scale an urban-rural dynamic of interlinks and relations. Anyway a sub-regional analysis of the urban-rural dynamics is needed, considering that also the notion of the space where those relations occur overcome the physical feature and get a "functional" dimension (OECD, 2013:70) that allows identifying "functional regions" that may not coincide with administrative boundaries. The typologies of functional regions and their spatial dynamics may be reduced to three categories (OECD, 2013:24) which are useful for our purpose too: metropolitan regions, where the most important city is the gravitational centre for the region in an extensive sense; regions where a network of small and medium-sized cities are functionally linked; sparsely populated areas with market towns, which are predominantly rural and with a low population density. In order to identify at sub-regional level some urban-rural areas (URAs) they were used various elements for judging. First of all it was considered the distribution of population in the region and the prevalent urban morphology, as well as an appropriate consideration of that Tuscan economic development that has outlined several different trajectories, following specific vocations of the various local systems, so drawing a "territorial mosaic" (IRPET, 2005). Besides there are a number of criteria used by several rules adopted to implement policies. The most relevant are, on one hand, the criteria to identify rural zones for implementing the Rural development program in the period 2007-2013 and eligible zones to implement LEADER program, on the other hand several regional laws and decisions: as first that for identify the metropolitan area in correspondence of Florence, Prato and Pistoia urban system⁴ several years before the recent national law of reordering administrative assets of the state⁵; the rules that recognize the system of "wide areas" as the territorial unit for the planning action of the Region⁶; the map of local economic systems (SEL) based upon the analysis of commuting flows linked to labour market. Not least, it has taken into account the analysis⁷ which leads to the map of the "inland areas" in Tuscany,

4. Regional law march 29, 2000.

5. Law n. 56, April 7 2014 "Rules on metropolitan cities, abolition of provinces, union and merging of municipalities".

6. The "wide area" is established as supra-provincial unit for the regional plan of development in 2003-2005 and in the following year. The wide areas are not administrative organizations but a form of institutional coordination for better multi-level governance at sub-regional scale. Three "wide areas" are recognised: the metropolitan wide area (provinces of Firenze, Prato, Pistoia), the North-west wide area (provinces of Massa Carrara, Lucca, Pisa e Livorno) and Centre-south wide area (provinces of Arezzo, Siena, Grosseto).

7. It was carried out at national level by the Ministry of territorial cohesion in 2012 and led to the "national strategy for inland areas" which is included into the Partnership Agreement for 2014-2020. <http://www.dps.gov.it/it/arint/>

to put in evidence the zones less accessible with reference to the issue of services delivering. Anyway the resulting URAs, although conceived to highlight their own functional relationships, are overlapping with their administrative boundaries because of the scale of the research doesn't request a deeper analysis.

This statement helps to understand the specific relations and dynamic we are interested to focus, so the second point is to identify what kind of relationships are able to affect land uses and food production. It seems useful to consider both those interactions which are carried out thanks to the geographical proximity, such as commuting and people movements for accessing to services or amenities; and those others coming from an "organised proximity" (Torre A., Rallet A. 2005, Copus A. 2013) such as a part of economic transactions. A recent OECD study (2013:22) on the relationships between rural and urban areas has reduced to a strict number the different typologies. Among them, demographic linkages, economic transactions, delivery of public services are the most relevant for this paper's topic. Therefore, for each URA identified they are examined: population density, urban morphology and people movement; infrastructures for transport, health, school and innovation but also the realisation of new infrastructures to make available water for people and economic activities; in the wide field of economic transaction they are taken into account not only the food production activity in the area and the main agro-food products, but also other farm's activities, especially agro-tourism and private services accessibility.

In order to argue the possible development of the main variables involved, they are reconstructed the historical series of population dynamics, employment, agro-food production and international commerce of food products. The trends are elaborated on the base of National Institute of Statistic data concerning the topics above. Data about International commerce come from a more specific database (www.coeweb.istat.it). About land use and soil consumption are utilised data coming from Tuscany region and from a recent research on this topic (Fanfani, Dodero 2011). On rural development in the region it has been consulted recent economic literature on this topic. Possible scenarios are elaborated on the basis of both the variables trend and the possible disruption factors which may change the historical-based path, also considering the possible constraint to urban sprawl coming from the new regional regulation.

3. Results and discussion

The three URAs and their main settlement patterns

From the analysis it emerges that three different URAs may be recognized in correspondence of functional areas⁸ having each own main socio-economic feature and in each of which a city or a system of main cities is the core and the economic engine of the area. What it results is a mosaic of different specialised areas: the "metropolitan", the "intermediate" and the "rural".

The Metropolitan Area of Florence (MA), which including also the provinces of Prato and Pistoia, collects 41% of region inhabitants (1,5 million people) in a surface equal to 21% with a density population index of 311. During the years of industrialization an arising complex of economic and social dynamics contributed to shape a network of secondary cores so that the urban expansion is been accompanied by the transformation of a large part of countryside in urban or peri-urban. The increasing urbanisation process has involved the belt which interconnects the neighbourhood of the three capital cities. As Fanfani and Dodero (2011) have observed, a more intensive process occurred in this metropolitan area where the rate of soil consumption (21,8%) is higher than at regional level (7,4% in IRPET, 2010) and the morphology high fragmented: it has worsened the effects on land use and deconstructed the landscape. In the north countryside (Mugello area) there is a cluster of dairy cattle and beef linked to a transformation plant in Florence and distributed in the entire Region. Furthermore in Mugello area an important weir has

(accessed 2014/6/30)

8. Even if, considering the scale and the purpose of the research, in this paper it is assumed those areas coincide with the administrative boundaries of the provinces (TL3) interested.

been built so that the water resource is ensured for the entire MA for many decades to come. In the low Arno Valley and along the north coastal belt it is identified an intermediate area (IA) which interests the provinces of Lucca, Livorno, Pisa, Massa-Carrara and it is featured by a mix of industrial and rural zones. This 1,3 million people (36%) area occupy 29% of regional territory with a density of 203. Its core is an “urban ellipse” (Fanfani, Dodero, 2011) in the low Arno Valley, whose most important city is Pisa. Its main characteristic is the large number of small-sized town and villages which are interconnected among them in a large network, so that a more intensive soil consumption rate (12,50 %) has been observed in comparison with the regional data (Fanfani and Dodero, 2011). In this area many clusters of industrial production are concentrated but at the same time many specific agricultural productions are kept. Rural zones in IA can benefit of the accessibility to high-level services provided by Pisa⁹. In IA's rural zones much diversified activities are conducted so that many types of products are offered, above all oil and wine of high quality as well as positive effects come from diversification of rural economy and tourism oriented activities in countryside. The rural area (RA) that includes the provinces of Arezzo, Grosseto and Siena is the half part of Tuscan surface in which resides 830 miles inhabitants, equal to 23% of Region and density of 72. In RA three sub-zones are distinguishable in correspondence with the three main market towns that are the capitals of each province and particularly Siena which is the most important centre of high qualified services¹⁰. In RA, the pressure on soil consumption is a risk only in peri-urban of those main municipalities and along the coastal line, where speculation phenomena are made possible. Agriculture in this area provides a very important quantity of commodities (cereals and tomatoes) and specialties in a lot of chains (livestock, dairy, wine, oil, cereal, vegetables) linked with typical products of the territory and often identified by designations of origin. Agritourism is the main way of productive differentiation in the farms, mostly pluri-active, allowing the revitalization of small towns and their economic activity (handcraft, commerce). Conversely, water is yet an unresolved problem for both agriculture and human activity such as for local population and tourists. The second result is the construction of an adaptive scenario based on recent trends, highlighting the main possible disruption factors.

Demographic and employment trends

At regional scale trends built from 1981 or 1991 demonstrates that there is a steady population growth¹¹, even if in the last decade 2001 there was an upturn with an average growth of 5%. The main indicators of population structure describe a typical post-modern society characterized by aging and birth rate decreasing so index of total replacement went down in 1991-2011 from 63 to 53 and the aging index went up from 158 to 188, but ISTAT foresees a significant increase to 2030 (from 188 to 226) and 2050 (up to 265), in line with forecast for Italy and Europe. It's clear that any future development depends on trend of migratory balances (+18.652 in 2001 and +37.378 in 2012) and particularly of foreign immigration, now a little under a tenth of regional population (350.761 in 2012) and distributed mostly in MA (49%) and the rest between IA (28%) and RA (23%).

In the period 2001-2012 a weak increase (9%) of employment is observed, with a diversified sector trend: growth in services sector (26%) and decrease in industry sector (-17%) are observed; employment in agriculture grows only in RA (13%) so the share of agricultural employed is still 8% of total in 2012 and decreases very much in the others (-33% in MA, -43% in IA). Within the URAs it is notable that in the last decade population grew more in RA (+5.3%) that in the others (2,7 in MA and 0,7 in IA) and although in RA the aging index is higher than in the

9. In Pisa there are an important University, the most important airport of the region and high-level sanitary pole.

10. University, high-level sanitary pole, an innovative cluster of pharmaceutical products, and financial service.

11. Resident people in Tuscany at 2011 census were 3,672 million.

region, demographic growth is ensured even in inland by immigration from those communities, especially from Eastern Europe, that are dedicated to forestry and agriculture.

Agricultural trends

Data about farm trend in the period 1982-2010 reveals that there was a regional farms decrease of -52% (a little over national decrease of -48%), stronger both in the IA(-66%) and in the MA (-49%) than in RA(-39%). This general shift has been more pronounced in the last decade, so in 2010 farms concentration resulted higher in RA (from 37% to 47%), lower in IA (from 40% to 28%) and steady in MA (from 24% to 25%). Besides a corresponding shift of the total agricultural area (TAA) and utilised agricultural area (UAA) have occurred in the same period and with a similar dynamic, marking in Tuscany a notable diminution both of TAA (-492.425 ha, -28%) and of UAA (- 235.096 ha, -24%). In RA this phenomenon has been less marked, so TAA in 2010 has increased up to 58% of the region, and UAA up to 60%. So, the average farm size too has increased in the same period, and it was strongest in the provinces of Siena (from 14ha to 20 ha) and Grosseto (from 11ha to 15ha). These data sketch a process of agricultural structures reorganization and specialization, given the more competitive orientation of the CAP, as it is better shown by trends of main crops (olive, vine, cereals and horticultural) and livestock. In RA there has been a concentration of all main crops, much marked for vine (from 45% to 55% of regional data) and horticultural (from 38% to 52%) than for olive cultivation (from 43% to 45%) and cereals (from 62% to 66%). In IA there has been a higher reduction of surface for the vine cultivation, so in 2010 census only 12% of total resulted in this area (from 22% of 1982) although some of the best wines of the world are produced there even today. In MA only surface for vine cultivation has been steady (33%) whereas olive and cereal have had a limited reduction (from 39% to 36% olive and from 14% to 10% cereals) but horticultural cultivation (mostly practiced in the surfaces around the cities of the metropolitan belt) has been reduced from 18% to 11%. Also about the main livestock (cattle and dairy cows, ovine and pigs) it is observed a higher concentration in RA at 2010 census, above all of dairy cows (from 41% to 57%), whereas total cattle changes from 53% to 59%, ovine from 72% to 79% and pigs from 75% to 78%. In MA only total cattle has had a relative positive sign (from 17% to 20%), and a steady share of dairy cows (19%) and pigs (11%). Instead in IA they are observed only relative negative signs, mostly marked in total cattle (from 30% to 21%) and dairy cows (from 39% to 24%) and pigs (from 18% in 2000 to 11% in 2010), and milder marked in ovine (from 19% to 15%).

International trading trends

The balance between imports and exports from 1991 to 2012 shows, at regional level, a increasing trend in the period 1991-2006 (even always negative, from -182 to -75 million euro, equal to a reduction of -59%). Instead, in the last five year period a worsening is been observed up to -128 million euro (equal to a decrease of 70%). Among URAs, only MA has had a positive trend at the date 2001, 2006 and 2011 (+6, +43, +20 million euro), confirming a stable phenomenon. Some explication can come from a more detailed data. This aggregate includes a very important non-food group (A013) of live plants which has had in this period a positive and strongly increasing trend, furthermore there is a specialised cluster¹² just in MA. In order to understand something more about food groups, we had recourse to the more detailed¹³ classification Standard International trade (SITC/Rev.4) at Group level. These data, reorganised for the URAs in the same period 1991-2011, reveal that all areas have a positive increasing trend only in the balance for beverages with a marked increase in the last decade for RA and IA (that confirms the specialization in high-quality wines that occurred in those areas in the last decade):

12. The rural district of Pistoia

13. For reconstructing urban-rural areas performance, we have looked for territorial data at NUTS 3 level, so the classes lower than third number, are not available in ATECO classification.

total balance in 2011 was 650 million euro with a growth of 585% from 1991. Another positive balance is been observed only for cereals, with an increasing trend in the period, underpinned by RA performance, in fact in 2012 regional value was 101 million euro 67 of which in RA. Also in vegetable international trade RA has had a positive and weakly increasing trend in the period, but less than 20 million euro, so not enough to compensate regional balance equal to -120 million euro.

Rural economy and land consumption

The goal of rural economy diversification is been strongly pursued by rural development plan¹⁴ for 2000-2006 and underpinned by the following (Toccaceli 2010). So, several initiatives were carried out both for enhancing the territory and supporting farms income and agricultural employment, and to ensure quality and safety of food. Short chain, farmers markets, direct sales on the farm, ethical purchasing groups, educational farms, the network of fourteen “roads of wine and flavours” and numerous recognition of products by designation of origin, are prime examples of how the Tuscan agriculture has been transformed over the past fifteen years. So farms pluri-activity was established and particularly agritourism has developed, so that in 2008 there were 4061 farms offering 50.636 beds and in 2012 there were 4170 farms with 56.159 beds: 60% of them are in RA, 18% in MA (but with 20% of beds) and 22 in IA. However, a limit to expansion of agritourism is been imposed to avoid indiscriminate building up in rural areas. This measure is part of a more general policy of regional urban planning that is currently under legislative review. Even if the current urban law of 2005 is rather restrictive, in past decades percentage of artificial fabric has increased following a more increasing path than population growth up to 1980, then decreasing up to 2000 but again weakly increasing to 2006 (Fanfani, Dodaro 2011). In the proposition of the new law, maintaining the quality of rural areas is recognized as a fundamental goal and many measures are proposed to fight soil consumption, among them excluding the possibility of new residential expansions outside the already urbanized areas and promoting the reuse and regeneration of urban areas whereas in rural areas by allowing uses consistent with its maintenance (Tuscany Region, 2014).

Finally, at regional level the examined urban-rural relations roughly draw a dynamic interaction among the URAs, as to expect that the functional RA will be also in the future the most important food production area in the region.

4. Possible scenario, disruption factors and conclusion remarks

Possible impacts of demographic trends

Istat¹⁵ forecasting considers likely a low growth of Italian population in Central Regions; especially it is foreseen a growth from 12 to 13,3 million people in the “central scenario”. Applying this average rate of growth of 12,5%, Tuscan population could increase by 0,5 million inhabitants in 2050 and population density from 160 to 180 inhabitants/square km. It is foreseen the same dynamic already observed as recent trend: decrease of natural balance and increase of internal¹⁶ and foreign migratory balance. It is especially expected a notable increase in foreign residents from 7,5% current level to 22-24% at national level. Increasing aging process is forecasted, from 43,5 to 49,7 years.

How that scenario can affect land consumption and food production?

If, as first hypothesis, we can assume homogeneous distribution of the increased population across the URAs, then it seems likely an urban scenario where it will be strengthened a multi-

14. In Italy it is a regional policy tool.

15. A specific forecast about population is provided by Istat (2011) report “Il futuro demografico del Paese. Previsioni regionali della popolazione residente al 2065”, www.istat.it (accessed 2014/6/30).

16. A relevant phenomenon because it is foreseen a significant decrease of population in South and Islands Regions too.

polar and interconnected urban system, with a limited peri-urban expansion and a persistent polycentrism, as to preserving land availability for agricultural use.

Instead, if an uneven distribution will be, you may consider both conurbations of the more attractive cities and possible concentration in the coastal areas as a consequence of depopulation of some most marginal rural zones, such as mountain zones poorer of economic opportunity and lacking of good access to private and public services. The consequence might be both the worsening of quality life in those cities and the negative pressures on those peri-urban areas with consequent consumption of land for urban or building purposes.

Anyway the study on inland areas have highlighted that depopulation process is interesting a number of areas in Tuscany too, mostly in mountains and in RA. So it matters consider this as a likely disruption factor that might negatively affect food production for a combined effect on small farmers, agricultural labour force, local markets.

Furthermore, it has to be considered that the expected population aging might further reduce the activity rate in agriculture and, in the hypothesis of uneven people distribution, it seems more likely a decrease in the labour force for agriculture in rural zones and especial in RA.

As synthetic remarks we can highlight that: a set of effective measures of cohesion policy, which should be carried out in the next years¹⁷, might positively affect attractiveness of a certain number of rural areas and contrast the progression of depopulation process; legal tools -such as that described above – to contrast soil consumption and urban sprawl are worth as nowadays as in the following time.

Possible impacts of agriculture perspectives

About agriculture perspectives, according to a recent outlook study on the future of Italian agriculture to 2030¹⁸, the latest trends are confirmed, mostly relating to both the expected increase in farms' average size and the beginning process of generational turnover at the guide of farms. In order to evaluate possible increase or decrease in food production¹⁹, at least two disruption factors are considerable among those depending on the urban-rural relations examined: on one hand the availability or not of water for people and agriculture also in IA and RA; on the other hand the preservation or the loss of land for agricultural productive use.

As a synthetic remarks for avoiding the worst perspectives it can be highlighted that: measures to avoid possible speculative actions on rural lands, such as those encompassed in the proposed new urban law, might favour this productive destination; policy measures to sustain competitive production and innovation process in Tuscan farms might allow the preserving of productive capacity.

Finally, bearing in mind the starting condition and considering the scenario without the worst prevision, possible impacts on increasing in food production could be limited as well as could be hard to hypothesize a so deep change to invert current food dependency from import.

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17. Above all if we consider the time to exploit structural investments and observe their effects.

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Network governance evaluation in rural areas: an Adaptive Co-Management approach

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Abstract

The paper aims to contribute to the evaluation processes related to local governance in rural areas. In the absence of specific indicators on the quality of governance in rural development agencies in the LEADER programme, we assume that Adaptive Co-Management (ACM) capacity might be a proxy measure of the quality of network governance in Local Action Groups (LAGs). The study proposes a methodological approach based on ACM principles measured through Social Network Analysis (SNA), to investigate and measure key characteristics of the governance network. This methodology is tested empirically using two case studies in the South of Italy. The study highlights how social networks among stakeholders of development agencies such as LAGs, and their structural characteristics, affect governance in rural areas. The network measures allowed us to assess the three ACM criteria that reflect both how and how well the LAGs adaptively co-manage their rural areas.

Keywords: network governance, LEADER Programme, Adaptive Co-Management approach, Social Network Analysis, Gruppi di Azione Locale (GAL)

1. Introduction

One of the evaluation questions developed by the Common Monitoring and Evaluation Framework guidelines (CMEF) about the LEADER programme relates to enhanced governance in rural areas (European Commission, 2011). However, there are no specific results or impact indicators requirements for evaluation of LEADER, or monitoring and evaluating LEADER governance because LEADER is considered a tool to achieve the objectives of other axes of rural development programmes.

In an attempt to overcome some of the limits affecting previous research, this work aims to contribute to the evaluation process by suggesting a framework for assessing the quality of local governance in rural areas under the LEADER approach. In particular, in the paper a first step towards the local governance's investigation is moved by means the network governance evaluation.

Assuming that the LEADER method has played a relevant role in delivering most development policy in some rural areas, the present study investigates how network governance under the LEADER method is assessed using an Adaptive Co-Management (ACM) approach.

The methodological approach is based on ACM principles measured through Social Network Analysis (SNA) and is tested empirically using two case studies in the South of Italy.

In the present paper, ACM capacity is used as a proxy measure of the network governance quality. The research unit is the Local Action Group, and has been chosen for two reasons. The first relies on what Derkzen and Bock (2009, 75) state: "the investigation of rural partnerships can reveal important lessons for the way that new forms of governance develop in practice". The second is because, despite the huge literature on rural partnerships and rural governance, relatively few studies investigate governance processes within these partnerships.

2. Network governance under the LEADER method and the Adaptive Co-Management approach

Network governance has been extensively studied in the organizational economics literature. It is mainly referred to inter-firm coordination in contrast to bureaucratic structures within firms and formal contractual relationships between them (Powell, 1990; Uzzi, 1996, 1997, Piore and Sabel, 1984). A number of scholars have offered definitions clustering around two key concepts: (1) patterns of interaction in exchange and relationships and (2) flows of resources between independent units (Jones et al., 1997). As highlighted by Dedeurwaerdere (2005), the aim of network governance is to create a synergy between different competences and sources of knowledge in order to deal with complex and interlinked problems.

Focussing on rural development issues, the literature generally acknowledges several elements as broadly typical of governance, including a shift from a traditional government approach to new participatory governance modes for making collective choices, i.e. related to policy formulation and decision-making procedures for their implementation through actions and projects. In keeping with this approach, governments and public administrations (PA) are no longer the only decision-makers. Decisional power is distributed among the different components or agencies, with new arrangements based on the combined roles of state agents and communities.

LEADER action groups are based on regional partnerships between government and private actors intended to create local development strategies based on local capabilities. They are established through the sharing of power and responsibilities between government and local actors or co-management. From the theoretical view, co-management is increasingly being combined with learning-based approaches. Adaptive management or learning-by-doing represents good practice in managing diversity, and was originally formulated as a way to deal with uncertainty and complexity. Thus, co-management and adaptive management have been evolving towards a common ground: Adaptive Co-Management.

In this respect, ACM seems to suit the investigation of the quality of LEADER network governance since it is people-based and refers to the intentional sharing of power among stakeholders at different scales and levels, over resources (Armitage et al., 2007) and relationship management (Natcher et al., 2005), within a dynamic learning process.

3. Network governance principles and criteria in the ACM approach

ACM is a governance based approach widely applied to the governance of environmental sensitive and natural areas (Olsson et al., 2004; Janssen et al., 2006; Armitage et al., 2007; Berkes, 2009; Bodin and Crona, 2009; Cundill, 2010; Sandstrom and Rova, 2010). However, there are no specific empirical studies on adoption of ACM to investigate governance under the LEADER method. In this study, the ACM capacity approach is applied for the first time to the LEADER context to resolve the problem of lack of indicators and tautology linked to the 'quality of governance'. ACM capacity can be defined broadly as the ability of a system (or the components of that system) to withstand disturbance and be capable of responding to change.

On this basis, this approach seems to be suitable for the evaluation of Local Action Group (LAG) governance since it matches the strengths of adaptive and collaborative (co)management, through a focus on learning and the linkages between actors and organisations.

The choice of studying ACM through the 'social network' approach has several theoretical and methodological justifications.

Firstly, ACM systems are perceived as social networks of actors, co-management networks or networks governance because of their role in making the rules that regulate resource usage (Bodin and Crona, 2009). Secondly, the network perspective implies that either the characteristics of the involved actors or the patterns of their interactions, i.e. the network structure (Fried-



kin, 1981), affect the quality of the processes and their respective outcomes. Thus, it is assumed that some kinds of co-management networks are more adaptive than others because certain structural network properties may enhance, for instance, the processes involved in resource exchange and in the legitimacy of the rules. Also, the governance of rural areas involves a multiplicity of actors, different levels of government and participation in the policies and various modalities of relations between levels of government and actors.

As a consequence, “the network coordination system permeates the governance of rural areas” Mantino (2008: 7). In this view, as Marquardt et al. (2012) argue, SNA allows systematic assessment of governance, collective action and other qualities of a particular network.

Finally, since concepts such as interactions, relationships and networks between different sectors (government, public sector, private sector and civil society), and different power relations among stakeholders are very central to the concept of local governance, and networks governance (Thuesen, 2009), the SNA approach enables empirical investigation of the structural properties of ACM networks within LAGs (Goodwin, 1998; Ray, 2000; Böcher, 2008).

According to this approach, the three ACM’s principles (collective action, social learning, resilience) were broken down into criteria and then indicators as shown in Table 1.

Table 1 - Governance principles and criteria in the ACM approach

Governance's principles	Criteria	Indicators
Collective action	Centralisation	Network centralisation
	Density	Network density
	Strength of ties	Contact frequency
	Diversity of stakeholders	Network diversity index
Social learning	Strength of ties	Contact frequency
	Betweenness	Network betweenness centralisation
	Flows of information on the LEADER	Leader information network density
	Flows of information not related to LEADER	Other information network density
Resilience	Leadership redundancy	Automorphic equivalence
	Modularity	Contact frequency
	Diversity of stakeholders	Network diversity index
	Network density	Network density

3.1 Collective action

As highlighted by literature (Marwell et al., 1988; Folke et al., 2005; Sandström and Carlsson, 2008; Bodin and Crona, 2009; Nardone et al., 2010), this principle is captured by: *i) network centralisation* (Freeman, 1979), which refers to the cohesion of the whole network and indicates the degree of variance in the distribution of centrality; *ii) network density* that is the ratio between the number of existing relations and the potentially highest number of possible ties; *iii) strength of the ties* measured by *contact frequency* and, as it benefits from diversity of stakeholders, by *iv) the network diversity index*.

3.2 Social Learning

It involves seeking out socially distant people¹ (measured by means of the *contact frequency*) and is facilitated by brokers with high 'betweenness' centrality. *Network betweenness centralisation* allows comparison between different networks in terms of their members' betweenness centrality. Finally, it is positively affected by dense relationships among actors exchanging information either on LEADER programme or other business topics (*LEADER information network density*, *Other information network density*).

3.3 Resilience

This principle is positively associated with i) *automorphic equivalence* that captures leadership redundancy (Berkes, 2009), ii) *frequency of contact*; iii) *network diversity index* and negatively linked with high values of *network density* (Oh et al., 2004; Bodin and Crona, 2009). Other social sources of resilience are social learning (Swartling et al., 2011) and social capital² (Schouten et al., 2009).

4. An empirical application

The LAGs studied are Kalat in the province of Catania and Rocca di Cerere in the province of Enna, southern Italy, which are currently implementing the LEADER Initiative under funding for 2007-2013.

The direct survey, conducted from October 2012 to January 2013, through face to face interviews with all LAG partners (n = 48, response rate = 100%) generated relational, information network data, and qualitative, contextual data.

5. Results and discussion

5.1 Findings of relational data

The comparison between the investigated LAGs' networks, has revealed some specific features of the ACM capacity (Table 2). Rocca di Cerere LAG network is significantly more centralised and less dense than Kalat LAG as showed by network centralisation and network density values. The high centralization value for Rocca di Cerere LAG is balanced by a better performance of Kalat LAG in terms of network density and weak ties. These features positively affect *collective action* because promote linkages across sectors and facilitate bridging organisations and problem-solving capabilities for issues that a single actor couldn't tackle alone. Conversely, both of the LAGs networks show medium levels of stakeholder heterogeneity, involving members from a variety of organisations representing different social and economic sectors operating in their respective contexts.

1. with whom an actor has infrequent and episodic contact, so-called 'weak ties' (Granovetter, 1973).

2. Measurement of social capital is beyond the scope of this study. However, in this context, social capital is mostly captured by other indicators of social features, such as: network density, network diversity index, and contact frequency.



Table 2 – Values of governance principles and criteria in the ACM approach in the examined LAGs

Indicator	Collective action		Social learning		Resilience	
	Kalat LAG	Rocca di Cerere LAG	Kalat LAG	Rocca di Cerere LAG	Kalat LAG	Rocca di Cerere LAG
Network centralisation	22.22%	52.42%				
Network density	0.56	0.38			0.56	0.38
Network betweenness centralisation			10.39%	16.62%		
Network diversity index	0.42	0.48			0.42	0.48
Contact frequency *						
- <i>No contact</i>	43.70 %	62.00 %	43.70 %	62.00 %	43,70 %	62,00 %
- <i>Occasionally</i>	43.40 %	25.40 %	43.40 %	25.40 %	43,40 %	25,40 %
- <i>Once a year</i>	1.80 %	3.60 %	1.80 %	3.60 %	1,80 %	3,60 %
- <i>Monthly</i>	7.90 %	7.40 %	7.90 %	7.40 %	7,90 %	7,40 %
- <i>Weekly</i>	3.20 %	1.60 %	3.20 %	1.60 %	3,20 %	1,60 %
LEADER information network density			43.70 %	62.00 %		
Other information network density			43.40 %	25.40 %		

* expressed as percentage of contact frequency typologies and maximum number of ties in the LAG's network

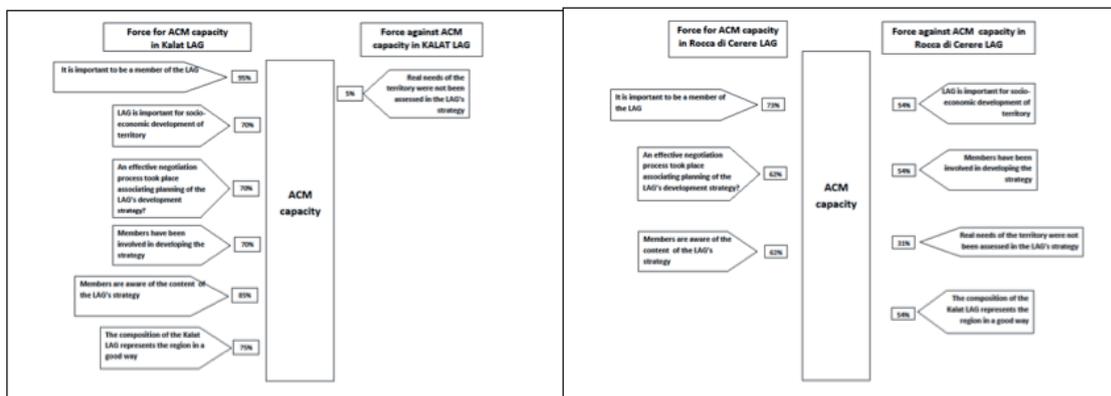
As regard *social learning* capacity, if the results for betweenness in both of the LAGs could negatively affect this principle, the low levels of contact frequency positively affect LAG efficiency to deal with the complexities in the systems, that is, all the economic interests therein. Network density for flows of information about the LEADER programme is low in both LAGs. This result raises the question of whether there is real interest in the LEADER programme among LAGs members. Finally, as regard the indicator “network density of other kinds of information not related to LEADER”, the presence of ties in non-LEADER activities is positive because they facilitate processes of cooperation, thus, enhancing the LEADER rationale. The investigation of *resilience* provides controversial results about capacity of the two LAGs to absorb or buffer external disturbances, while keeping their core structure unaltered and their self-organising capabilities in terms of learning and adaptability. Leadership redundancy - measured as automorphic equivalence - shows the dimension of resilience in an ACM approach. Results for both LAGs, show a low presence of automorphically equivalent members. Low level of leadership redundancy in both the examined LAGs may inhibit the resilience capacity of the LAG to absorb disturbances and reorganise while undergoing changes, in order to retain the same essential function, structure and identity. An high rate of sporadic contacts within the two LAGs can be considered a proxy for weak ties among members of different sub-network within the LAG partnership. The presence of weak ties in a polycentric network positively impacts on the capacity to buffer, adapt and change shape, and encourages experimentation and innovation within the network.

Very heterogeneous LAG partnerships, revealed by the network diversity index, potentially enhance resilience within the LAGs. High values for the network diversity index can be a key source of innovation and renewal in the system, including response diversity. Finally, resilience capacity depends on network density. High values of network density (e.g. in Kalat LAG) reveal good ACM capacity in terms of fostering linkages among members, and potential for innovation and, ultimately, capacity for resilience.

5.2 Findings of qualitative analysis

The investigation of the real ACM capacity of both of the examined LAGs requires more than the network measures described above. Figure 2 show the response rates of interviewed LAG members for specific topics and the potential impact on ACM capacity.

Figure 2 –Qualitative information and impact on ACM capacity in Kalat LAG and in Rocca di Cerere LAG



Somewhat surprisingly, for both of the LAGs, not all LAGs partner considers that belonging to this partnership could be particularly relevant for them. In fact 5% of Kalat LAG members and 27% of Rocca di Cerere LAG think that is not important to be involved in the LAG. Moreover, not all of the partners think that the LAG could play a critical role for the development of the rural area they live and work. In addition, a significant percentage of the members (30% in the Kalat LAG and 46% in the Rocca di Cerere LAG) do not feel themselves sufficiently involved in the negotiation process that led to the design of the local development strategy. Probably, this is why they are not aware of its content and do not think that the strategy reflects the real needs of their rural areas. In addition, an high percentage of them, especially for the Rocca di Cerere LAG, consider the current LAG partnerships not adequately representative of the area.

We are aware that only two LAGs were investigated and, therefore, it is difficult to frame these results in a broader context. However, it would seem plausible that the nature and degree of the relations among LAG members, which depend on the overall LAG's ACM capacity too, is a function of several variables such as perceptions about the role of the LAG for the development of rural areas. The study of the correlations between network properties and the variables affecting relative values, would require the application of specific methods beyond the scope of this study. As the relationships among LAG members depend on several variables, we can state that ACM capacity for both of the LAGs was low, especially for the Rocca di Cerere LAG. In fact, despite the high heterogeneity of LAG partnership and the presence of links between its members, data show only occasional and not related specifically to the LEADER programme contacts, and that most of the relationships are among actors in the same socio-economic sector (bonding ties).

6. Conclusion from the mixed methods analysis

In this paper we assumed that Adaptive Co-Management capacity might be a proxy measure of the quality of network governance such as LAGs. By proposing the ACM approach we emphasised the relevance of the investigation of the structure of the management development agencies rather than focusing only on LEADER goals. In order to test the applicability of the proposed empirical methodology, we investigated the governance of two LAGs in two rather rural areas in the South of Italy.

The study highlights how social networks among stakeholders of development agencies such as LAGs, and their structural characteristics, affect governance in rural areas. The network measures allowed us to apply the three ACM criteria that reflect both how and how well the LAGs adaptively co-manage their rural areas.

We assessed the LAGs' capacity to bridge actors from a variety of organisations representing different social-economic sectors, in their respective contexts. In addition we investigated further qualities and capabilities of these partnerships, such as LAGs' capacity to promote social learning as a process that involves knowledge sharing among multiple stakeholders with regard to norms, policies and management objectives. Finally, we assessed the capacity of LAGs to adapt to change without loss of quality through disruptions whether political, social or economic.

These aspects are new outcomes not included in the European Commission Common Monitoring and Evaluation Framework (CMEF), which may lead to a new organisational model of LAGs based explicitly on the ACM approach.

Such an organisational model would seem suitable in view of the new EU LEADER programming for the 2014-2020 which calls for a flexible implementation process, with simple common rules that would improve integration between different socio-economic sectors.

The proposed approach is a starting point for both a broader research agenda in order to design more robust methodologies for the evaluation of ACM capacity in LEADER initiatives, and a basis for fruitful discussions on the direction/s this line of research might take in the future.

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Can Social Network Analysis help the implementation of joint actions in agriculture? Case study: social connectedness of farmers in the Italian province of Pisa (Tuscany)

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Abstract:

This paper introduces a social network perspective to the study of joint actions in agriculture. Specific measures of the Common Agricultural Policy 2014-2020 support collective approaches to sustainable farming. Joint actions are not spontaneous. Social network analysis can help to interpret the social behaviour of the persons involved. We characterized the ego network of a case study in Tuscany using UCINET. Our results suggest that being a leader in organic farming does not ensure a collective transition to sustainable agricultural practices through a “neighbourhood effect”, as most ties within the network are not shared locally. Social network analysis can benefit policymakers providing them with a socio-relational frame, which can help to highlight the factors within the network that prevent farmers from collaborating towards a joint transition to sustainable farming.

JEL Q18 – Agricultural Policy; Food Policy; Q10 General

Keywords: social network analysis, joint actions, CAP 2014-2020, agri-environment measures, sustainable farming

Introduction

In agriculture, collective actions towards agri-environmental objectives can yield greater environmental benefits than separate actions of individual farmers (European Court of Auditors, 2011) and can help to tackle externalities (OECD, 2013). Collective actions are more effective when targeted towards spatially adjacent parcels (Davies et al., 2009; Hanley et al., 2012) and can help to mitigate the disbenefits for society of inappropriate land management practices (Dale and Polasky, 2007; Power, 2010) as well as delivering ecosystem services (Vanni, 2014). Specific measures of the new Common Agricultural Policy¹ support collective contracts and co-operation between organic farmers over adjacent areas. Joint actions in sustainable (e.g. organic, low-input) farming can boost biodiversity, while avoiding a large scale return by farmers to conventional farming.

Specific measures within the agricultural policy of the Region Tuscany (central Italy) foster the transition of farmers to sustainable farming. Farmers do not spontaneously turn collectively to sustainable farming. The “neighbourhood effect” can drive farmer’s engagement in sustainable agricultural practices (Sutherland et al., 2012). Studying farmers’ social networks can help to interpret the social behaviour of the persons involved (Mitchell, 1969).

In this paper, we focused on the “ego network” of an organic farmer, working in the Italian Region of Tuscany (central Italy).

Our work aims at testing ego network analysis as a methodology to assess the attitude to cooperate of farmers, as a necessary step to identify the public interventions which can positively in-

1. REGULATION (EU) No 1305/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 december 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005. Available from: <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0487:0548:en:PDF>

fluence relationships between farmers and among farmers and stakeholders from other sectors. The most common general method for collecting primary data on social networks is the interview (Appel et al., 2013). We interviewed “ego”, an organic farmer from Tuscany. Following Wellman (1997), we interviewed “ego”: we asked the respondent to describe each member of his network, as for socio-demographic and relational characteristics. Additional information on ego was collected as secondary data from a published interview (Regione Toscana, 2014). In pursuing our objective, we need to answer to the following research questions: (i) what kind of relationships are those between farmers? (ii) to what extent the social connectedness farmers affect the collective transition to sustainable agriculture? (iii) which patterns of the network prevent joint actions? (iv) how policies can help to remove the features of the network which prevent the collective transition to sustainable farming? Additional information on ego was collected as secondary data from a published interview (Regione Toscana, 2014).

Methodology

The case study an organic farm set in the Italian Region of Tuscany (central Italy): “Bio Colombini”. Since 2001, the selected farm has supported social farming activities. The farmland covers 18 ha, which are cultivated with olives and horticultural crops. “Bio Colombini” has four neighbouring farms. Information about the farm was collected as secondary data from a published interview (Regione Toscana, 2014).

The methodology is based on “ego network analysis” (ENA), a constrained and simplified application of social network analysis (SNA), which main advantage is simplicity in data collection (Everett and Borgatti, 2005). SNA studies the structure of the relationships within social groups and provides explanations for social actions and social phenomena (Henning et al., 2012). SNA focuses on the way how social structures facilitate and constrain opportunities (Tindall and Wellman, 2001). Actors within the network are called “nodes”. Relationships between dyads (pairs of nodes) are called “ties”, when mutual, or “edges”, when directed. Dyads are the basic units of analysis for social networks, irrespective of whether nodes are or are not linked by a tie/edge (Henning et al., 2012). An ego network is a set of ties and/or edges defined from the standpoint of the person at its centre (Wellman, 1997). The central actor is “ego”. The persons which ego is connected to are known as “alters”. The set of nodes that ego has ties with is called “alters.” Information on alters, including their mutual connections, is obtained entirely from ego (Everett and Borgatti, 2005). ENA techniques have usually involved structural variables, such as density, and/or compositional variables, such as the attributes of the alters (homophily) (Everett and Borgatti, 2005). The personal attributes of ego, the features of ego’s personal network and an ego-alter level, covering alter-alter and alter-ego ties, are needed (Carrasco et al., 2008).

The most common general method for collecting primary data on social networks is the interview (Appel et al., 2013). Following Wellman (1997), we interviewed “ego”: we asked the respondent to describe each member of his network, in terms of for socio-demographic and relational characteristics. Surveys intended for ENA include two kinds of questions, i.e. name generators and name interpreters. A name generator is a set of questions (“with whom...?”) aimed at identifying the respondent’s alters (Burt, 1984). Following Marin and Hampton (2007), we set up multiple name generators to provide research with multidimensionality. The name interpreter includes questions gathering information on alters and ego-alter relationships (Burt, 1984).

We limited the analysis to acquaintance for working purposes between ego and alters. Name generators included questions on joint activities such as communication, relations of exchange and collective participation to educational, scientific or social projects, economic information, updates on sustainable agriculture and updates on innovations in agriculture. Regarding communication, ego was asked for frequency and topic. With regard to exchange relationships



(mutual or not), questions covered factors of production, economic information, updates on sustainable agriculture, updates on innovations in agriculture. Ego was also asked for acquaintance between alters.

Data analysis and network visualization were carried out using Analytic Technologies UCINET². Regarding network metrics, we calculated the compositional variables, which summarize the characteristics (attributes) of ego and alters, as well as the structural (relational) variables, i.e. those relying on the pattern of relationships (McCarty et al., 2007).

The compositional variables we measured are gender, age, work area, profession and use of email, social media and the internet for working purposes.

As for structural variables, we measured density, reciprocity and the degree of multiplexity.

Density is a measure of social cohesion, i.e. provides information about how well a group is connected. Density is calculated as the ratio of the actual number of ties to the maximum possible number of ties; formally:

$$Density = \frac{\text{number of edges}}{\text{number of possible edges in a dyad} * \text{number of dyads}} \quad (1)$$

When all nodes are connected with each other, density has the maximum possible value, equal to 1 (complete network); conversely, when there are no ties/edges among nodes, density is equal to 0 (disconnected network).

The higher the number of ties per node within a network, the higher the density of the group and the higher the social cohesion of the group (Wey et al., 2008). Table 1 shows network with different densities.

Table 1. Density of four 4-node networks with different number of ties.

Maximum number of ties	6	6	6	6
Actual number of ties	6	4	2	0
Density	1	0.67	0.33	0

Reciprocity is the ratio of the number of mutual dyads to the number of adjacent dyads, it reflects how many of the relationships are mutual. Reciprocity is expressed as a fraction of the adjacent dyads; formally:

$$Reciprocity = \frac{\text{number of mutual dyads}}{\text{number of adjacent dyads}} \quad (2)$$

2. <http://www.analytictech.com/>

Figure 1 provides an example of a calculation of reciprocity.

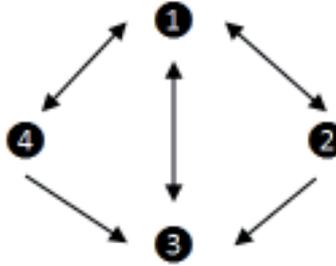


Figure 1. A 4-node network with five directed ties: 3 out of 5 dyads are mutual (1-2, 1- 3, 1-4), so reciprocity accounts for 3/5 .

Greater cohesion and reciprocity might suggest a greater potential for transmission within a network (Wey et al., 2008).

The degree of multiplexity is the number of ties in any relations for the same dyad (Table 2). It is a measure of the strength and durability of the relationships between two nodes (Provan et al., 2008).

Table 2. Multiplexity of three nodes having different relationships with ego.

NODE	Relationship with ego				Multiplexity
	A	B	C	D	
N1	•	•	•	•	4
N2		•			1
N3		•	•		2

Homophily was defined for ego. Homophily driven by similarity, i.e. the share of common socio et al., 2001). Individuals are more likely to form ties with “similar” individuals (La Fond and Neville, 2010).

Results

We performed primary data analysis using UCINET. Figure 2 displays the sociogram (ego network diagram) of relational data.

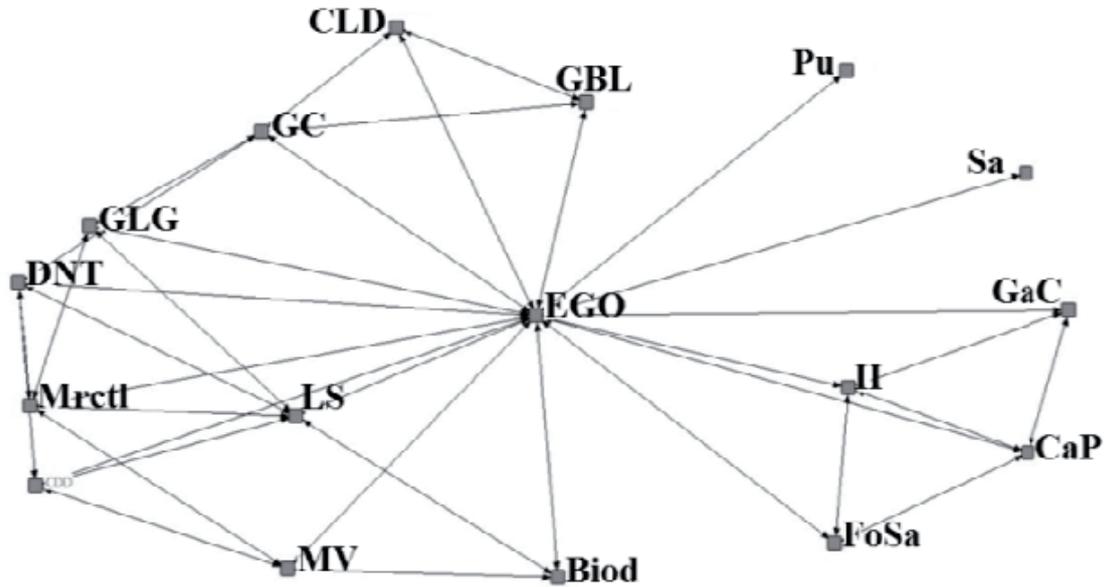


Figure 2. Sociogram based on relational data

Ego’s and alters’ attributes were collected using 3 shows the attributes of ego; for alters’ attributes and an example of coding refer to Table 5.

Gender	Age	Profession	Place of work	Personal use of email, social media and the internet for working purposes
M	31-50	Farmer	district of Pisa (Tuscany)	no

Table 3. Attributes of ego.

The multiple name generators delivered 16 names of alters (nodes). For privacy purposes, we provided each name within name with a code. Tables name generators.

Table 4. Name generator on the exchange of factors of production. Numbers state for the direction of the exchange: in = 0, out = 1, mutual = 2.

With whom of your acquaintances you had exchanged any of the factors of production during the last twelve months, irrespective for the exchange to be mutual or not? (max 20 names)															
GC	GaC	CaP	II	FoSa	CLD	GBL	DNT	GLG	LS	MV	Mrctl	Biod	CDD	Pu	Sa
-	-	-	-	-	1	1	2	2	2	1	1	1	-	-	-

The name interpreter (Table 5) is a rectangular matrix showing alters attributes and features of ego-alter relationship.

Table 5. Name interpreter. Numbers state for multiple choice answers. Gender: male = 0, female = 1. Age (years): 20-30 = 0, 31-50 = 1, over 50 = 2. Work sector: agriculture (as entrepreneur) = 0, expert advice = 1, public administration = 2, retailing = 3. Work area: district of Pisa = 0, other districts of Tuscany = 1, outside the boundaries of Tuscany = 2. To what extent are you kin on this person?: little = 0, sufficiently = 1, much = 2. How long have you been knowing each other?: up to 1 year = 0, 1 to 5 years = 1; over 5 years = 2.

	Gender	Age	Profession	Place of work	To what extent are you kin on this person?	How long have you been knowing each other?
GC	0	1	1	1	2	2
GaC	1	1	3	1	2	1
CaP	0	1	2	0	2	2
II	1	2	2	0	2	2
FoSa	0	2	2	0	2	2
CLD	0	2	3	2	2	0
GBL	0	1	3	2	2	1
DNT	0	1	0	0	2	2
GLG	0	1	3	1	2	2
LS	0	1	3	0	2	2
MV	0	1	3	1	2	2
Mrctl	1	1	3	1	2	2
Biod	1	0	3	1	2	1
CDD	0	0	3	0	2	1
Pu	0	0	1	2	2	1
Sa	1	0	1	2	2	2

Homophily was evaluated on the basis of personal attributes. Ego shares the same gender (11 out of 16 alters are male) and the same range of age (9 out of 16 are 31 to 50) with most nodes. All alters work within the boundaries of Tuscany and acquaintance is over one year. Ego is keen on homophile relationships with networkers. However, 9 out of 16 alters work in the retail sector, 5 out of 16 in public administration and only one is a farmer.

The ego network is undirected, as acquaintance is mutual. Potentially, undirected networks can show the maximum possible number of ties, i.e. 240. The actual number of ties is 74.

We calculated a density (formula (1)) of 0,272, meaning that most alters miss mutual connections. Ego may take advantage of the lack of ties among the alters, which allows access to new ideas and opportunities (Burt, 2004).

Multiplexity is used to create subsets of data to smaller networks of intensive closeness. The cut-off for inclusion in a network of intensive closeness is 3, i.e. it includes the nodes which participate with ego in three or more activities. A half of the nodes were eligible for the network of intensive closeness. Those alters are similar for gender (men), age (31-50 years), working sector (mainly retailing) and place of work (outside the district of Pisa).

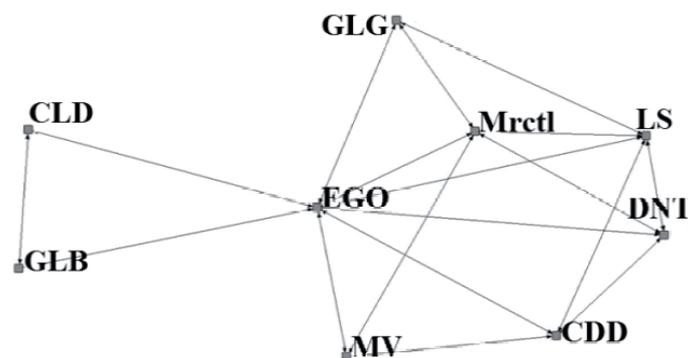
Table 6 displays ego-alter relationships, as well as the degree of multiplexity of the dyads of the ego network.

Table 6. Matrix of exchanges and multiplexity. Dots show the relationships (exchanges) between each alter and ego.

	Factors of production	Economic information	Updates on sustainable agriculture	on	Updates on innovations in agriculture	Collective educational, scientific or social projects	participation to	Multiplexity
GC			•		•			2
GaC			•			•		2
CaP			•			•		2
II			•			•		2
FoSa			•			•		2
CLD	•	•	•					3
GBL	•	•	•					3
DNT	•	•	•		•	•		5
GLG	•	•	•					3
LS	•	•	•					3
MV	•	•	•		•			4
Mrctl	•	•			•	•		4
Biod	•	•						2
CDD			•		•	•		3
Pu			•		•			2
Sa			•		•			2

Figure 3 shows the network of intensive closeness of “ego”.

Figure 3 sociogram of intensive closeness.



Ego-alter acquaintance with the network of Reciprocity (formula (2)) collective use of factors of production agriculture (reciprocity = 4/6 providing alters with factors of production (reciprocity 3/8), updates on innovations in agriculture (reciprocity 4/6). Other activities show no mutuality. Ego is more keen on providing alters with factors of production and information than on requesting.

Conclusions

The research question that motivated the paper was whether network features (density, homophily, multiplexity and reciprocity) were related to the actual lack of joint actions in agriculture, intended to collectively pursue sustainability objectives.

The case study is a farmer (ego) from Tuscany, practicing both organic and social farming. The farm is a leader among both Tuscan and Italian organic farms.

Ego is involved in organic and social farming mainly for ethical reasons, but he also actively look for his business to improve.

For advise on sustainable practices and innovations, ego relies on a set of net which are not employed in the agricultural sector. Beyond professional relationships, the ties between ego and the alters are characterized by close and informal linkages and are based on trust and affection. Ego knows personally and long since a collaborated with any of them and do not feel kin on them. The lack of kinship relies on contrasting ideas on ethical farming.

The lack of mutual confidence between ego and his neighbouring farmers, as well lack of any kind of cooperation among ego and those farmers, may harden the process of establishing collective actions.

The ego network analysis suggests that even though ego's organic farm is a leader in Tuscany, most professional ties are not shared locally. The drivers of such a behaviour could be: i) a great difference between ego's and ego's neighbours characteristics; ii) ego is a leader in organic agriculture because he does not share strategic features of his job with his neighbours. Providing stakeholders with a socio-relational frame of the agricultural sector can help to boost collective actions in agriculture aimed at delivering agri-environmental and social benefits. More deeply, social network analysis can help policymakers to understand which factors within the network prevent the collective transition to best management practices in agriculture.

Policymakers should support all actions intended to facilitate the spread of best agricultural practices, such as brokerage, training, promotion of collective projects. These actions could help to raise the number of trust ties among farmers as well as to increase farmer confidence in public support. The actions are critical. Strengthening relationships among farmers, with the support of the public sector can help to reduce farmers' isolation, thus facilitating the mutual exchange of experiences and the spread of good environmental practices.

Future work is needed to investigate ego complete social network, starting with the description of the ego networks of his neighbouring farmers. Besides, common problems such as poor information about available public support, lack of confidence in public support, prevalence of self-interest, no motivation in change, no experience in collective work affect the diffusion of innovations in agriculture. All actions which can boost the variety and the number of contacts as well raise the number of strong ties among the farmers can help to addressed the above mentioned problems. Future work is also needed to supplement our results with econometric analysis.

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The role of Local Action Groups in stimulating territorial and farm evolution: an empirical test in Lazio Region

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Abstract:

In the context of the evaluation of Rural Development Policies (RDP), particular importance is given to the analysis of the effectiveness and efficiency of the projects implemented by Local Action Groups (LAG), as part of the LEADER program. The Axis 4 of the RDP 2007-2013 provides for a stronger support to upgrade capacity planning, management, as well as the exploitation of local resources in rural areas. Recent literature on the role of LAG sustains the idea that the LEADER's experience has obtained good results, but some bias emerges if an in-depth analysis is carried out. The impact of LAG was not homogeneous but it diverges within different territorial contexts, characterised by different degrees of "institutional quality". The proposed paper sets in this framework and aims to provide a comparative assessment of the LAG's actions through an analysis of public expenditure articulated by LDP measures. In terms of efficiency, I will evaluate the processes of boundary shift about farms operating in LAG, analysing the dynamics of deepening and broadening localised and not localised in LAG areas.

keywords: governance, effectiveness, efficiency

Introduction

The analysis of Leader program is a topic of great economic and social importance. Leader axis is fully integrated into the Rural Development Programme (RDP) 2007-2013 as a way of applying the measures; this is an important tool for the competitiveness of rural areas through the planning and the management capacity at the local level. In this context, the governance of rural areas and policies routed to them plays a key role. In this regard, Stoker (1998) draws five propositions to frame our understanding of the critical questions about governance theory and asserts that each proposition implies a dilemma or critical issue:

Propositions	Dilemma
Governance refers to institutions and actors from within and beyond government.	legitimacy
Governance identifies the blurring of boundaries and responsibilities for tackling social and economic issues.	accountability
Governance identifies the power dependence involved in the relationships between institutions involved in collective action.	principal-agent problems
Governance is about autonomous self-governing networks of actors.	accountability
Governance recognizes the capacity to get things done which does not rest on the power of government to command or use its authority.	accountability

Source: Stoker (1998).

Consequently, governance becomes a complex action that involves collective actors operating in different territories. There are two prospects around rural governance:

- 1) the first conceives the rural governance in the broad spectrum of territorial governance;
- 2) the second one refers to an institutional conception and analyses the institutional mechanisms which operate in the formulation of rural governance, starting from the highest level until the local territorial areas.

Mantino (2008) defines governance as a multidimensional process, and he proposes different models of governance, questioning the different levels involved, according to the degree of centralization of decision-making. The governance model adopted by the Italian Regions seems to be centred on vertical coordination in hierarchical form, rather than on cooperation and consultation with the sub-regional levels. This model of governance that perceives the sub-regional institutions in a purely executive role is highly influenced by region: that is to reconcile the delegation process with an appropriate level of financial efficiency. Marotta *et al.* (2008) describe a model of consumption of rural development policies that seems efficient on the expenditure and partially effective for policies. A not perfect translation of the principles of cooperation and partnership is the basis of the diffusion of governance models distorted. In the third of the five propositions, Stoker (1998) argues that governance is an interactive process that involves various forms of leadership. The preference by the institutions liable for a choice of governance models towards hierarchical and vertical coordination rather than cooperative solutions, sacrifices effectiveness for the benefit of efficiency.

The proposed paper is set in this framework and aims to provide an assessment of local development initiatives promoted by Leader. The references used recall recent contributions in the literature on the impact of policies, and in particular the Leader initiative (Hodge, Midmore, 2008, Nardone *et al.*, 2011, EC 2006, Casieri *et al.*, 2010). However, with respect to previous research, I intend to provide a double perspective of analysis:

1. a macro territorial level, through a comparative analysis between ex-ante foreseen and ex-post realized actions of Leader in the Lazio Region;
2. a sort of *indirect* evaluation of the Leader at micro farms level. The underlining hypothesis is that belonging to a Leader area could “inspire” farms’ evolutionary trajectories, which can be described through processes of boundary shift (Banks, Long, van der Ploeg, 2002). Therefore, we compare farms localised in and outside LAG (Local Action Groups) areas to verify if be part of lag have encouraged the boundary shift’s process, by virtue of territorial changes lags’ and regardless of Leader’s founds.

By assimilating farmers localised and not localised in lag areas, I promote an analysis of typological change of Italian farms in the period 2000-2010, to verify the activation of new development trajectories, along the *boundary shift* phenomena.

1. Methodology

The Leader initiative has as scope the promotion of local development, where the implementations of strategies are defined in their respective Local Development Programme (LDP) approved by every region. The analysis is based on eight lag localized in the Lazio Region, each of which presented a LDP that includes specific steps to promote integrated rural development models. The lag in this region have adopted the following development strategies:

- *Best use of natural and cultural resources* (Axis III);
- *Adding value to local products* (Axis I and Axis III).

The effectiveness analysis is carried out by comparing the planned expenditure and the effective applications. The database is provided by the Lazio Region; the data is correct at the time of April 2014. As far as microanalysis is concerned, I put forward an indirect evaluation of the belonging to the leader areas, by testing the dynamics of the farms by referring two variables of “coherence”: the adoption of practices of deepening and broadening, coded through a com-



parison of farms between 2000 and 2010 that adopt connected activities and quality agricultural products. The evaluation between lag and extra-lag areas checks eventual differences. The source of the data is represented by the last two censuses of agriculture, which were derived from data on connected activities and quality production.

2. Results

2.1 Macro territorial analysis: lag’s efficacy

The figure 1 evidences the efficacy of analysis, where a comparison between planned and realized actions has been carried out. Two variables have been considered for each lag: the planned expenditure and the applications received on behalf of local operators, divided up into single measures.

As evident from the table, the lags have provided for each possible measure (the dash in the table indicates the lack of funding and, therefore, any application received); the x on the table evidence both applications received and funds supplied. The lags have carried out the principal functions foreseen by Lazio RDP and by Handbook of Procedures, with particular reference to measure 4.1 (implementation of local development strategies):

- calls for public and private beneficiaries;
- administrative checks for applications received;
- administrative checks for applications of payments.

With regard the “Cooperation” (measure 4.2), seven lags have included a cooperation project, in their LDP approved.

At least, the measure 4.3 (management of local action groups, animation and acquisition of skills), provides six types of intervention (establishment and functioning of lags, planning of LDP, development of animation activities and awareness of rural population, management and dissemination of information on the implementation of LDP, training activities for the lags ‘staff). In this context, all lags have submitted an application for payment in advance behind the reporting of actual costs incurred.

Figure 1: LDP measures

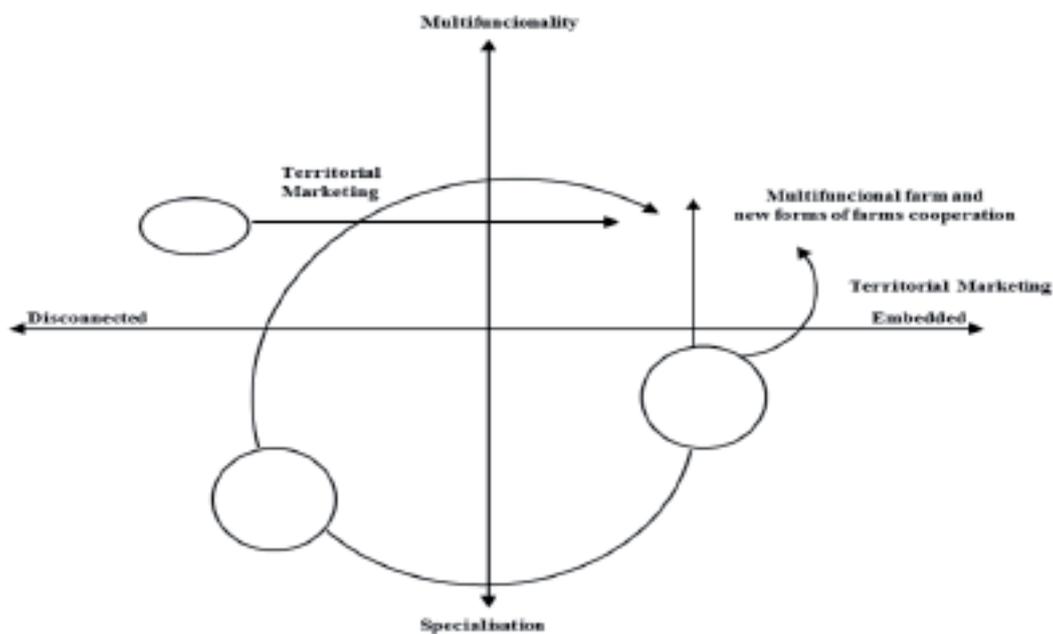
LDP measures	LAG1		LAG2		LAG3		LAG4		LAG5		LAG6		LAG7		LAG8	
	Total funding	Applications received														
411 111	x	x	x	x	-	-	-	-	x	x	-	-	x	x	x	x
411 121	x	x	x	x	-	-	-	-	x	x	-	-	x	x	x	x
411 123	-	-	-	-	-	-	-	-	x	x	-	-	x	x	x	x
411 124	x	x	x	x	-	-	-	-	x	x	-	-	x	x	-	-
411 125	x	x	x	x	-	-	-	-	x	x	-	-	x	x	x	x
411 132	x	x	x	x	-	-	-	-	x	x	-	-	x	x	-	-
411 133	x	x	x	x	-	-	-	-	-	-	-	-	x	x	-	-
413 311	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	x
413 312	-	-	-	-	x	x	-	x	x	x	-	-	-	-	x	x
413 313	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
413 321	-	-	-	-	x	x	x	x	-	-	x	x	-	-	-	-
413 322	-	-	-	-	x	x	x	x	-	-	x	x	-	-	-	-
413 323	-	-	-	-	-	-	-	-	-	-	x	x	-	-	-	-
413 331	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.2.1. "Cooperation" (total)	x	x	-	-	x	x	x	x	x	x	x	x	-	x	-	-
4.3.1. "Gestion" (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Source: Elaborations on Lazio Region database (2014).

2.2 Microanalysis: the trajectories of LAGs' farms

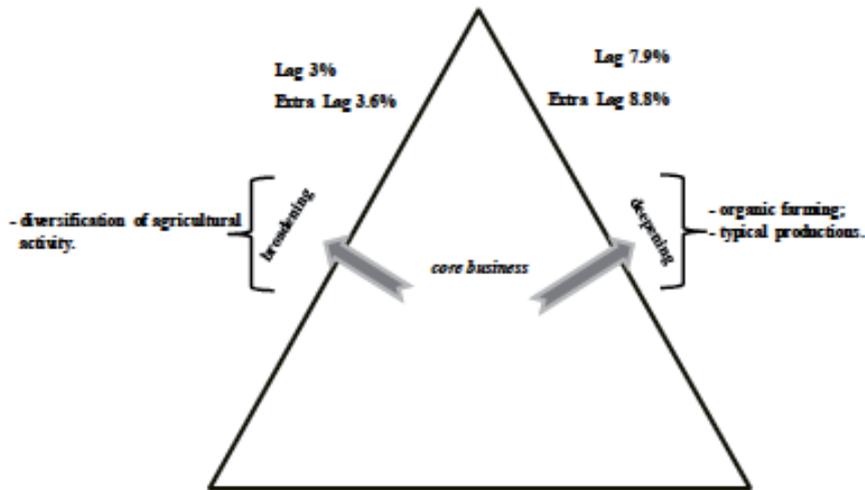
As far as microanalysis is concerned, the evolution of farms' path of development has been analysing, along the different boundary shift's processes. These are examples of farm innovation towards more multifunctional and territorially rooted farms, as well explained in figure 2. Ventura and Milone (2004) support the idea that sociotechnical transition of agriculture in the last years, involves the transition towards multifunctional agricultural and more territorially embedded activities. These processes involve, on the one hand, embedding pathways, where territorially rooted farm emerge; on the other side, they foster transition from productivity paradigm towards multifunctional agriculture.

Figure 2: Different paths of innovative farms



Source: Ventura and Milone (2004).

To measure this transition it is possible to refer to the well-known processes of boundary shift (Banks *et al.*, 2002). By comparing farms inside and extra LAG areas, I investigated the deepening and broadening processes. To catch deepening activities, farms with valorisation of agricultural products (organic farming and typical products) have been considered; as regards broadening, farms with diversification of agricultural activity have been analysed from the last two census of the Italian agriculture. The figure 3 shows the results.

Figure 3: *The boundary shift*

Source: our elaboration from Banks et al., 2002)

The percentages of farms with deepening and broadening strategies are similar inside and outside Lags' areas, with higher values in the last ones. Strategies of farm diversification, through connected to agricultural activities (broadening), have been adopted by 3.6% outside lags, against 3% inside the Lag area. Less than 8% of farms have adopted strategies of qualification of agricultural products, through organic farming and typical productions (deepening).

The data evidence very similar trajectories towards multifunctional paradigm of agriculture inside and outside the lags: this witness a low indirect lags' impact on farms' adjustment strategies. On the other side, the low found percentages of farm adopting qualification and diversification strategies, confirming the difficulties of transition towards the multifunctional paradigm, as well underlined in recent literature (Brunori, 2010).

Conclusions

The study is a first step into investigating the efficiency and the effectiveness about lag from an empirical point of view. As such, the paper does not offer a complete analysis on the subject; moreover, it requires further research and further revision.

The paper has tried to analyse the impact of Leader initiative in Lazio Region. To this end, I have put forward two level analysis: on the basis of a macro territorial level, I say the Lag has a good effectiveness in carrying out the planned activity, even if some exception evidence the bad performance of rural governance in stimulating rural development processes. On the other hand, the microanalysis related to the evolution of farms in Lags areas, as compared with farms outside them, evidence strong similarities, with no differences in the percentages of farms having adopted deepening and broadening strategies. This seems us, as incoherence in farm's trajectories, because a lag should stimulate patterns of qualification and diversification of farming activity in rural contexts.

The analysis brings to some preliminary conclusions: firstly, from a spatial perspective, as underlined in literature, Leader confirms its utility in stimulating territorial innovation; on the other side, on a farm level, our research evidence the persistency of a distance between farms and institutions. As a matter of fact, that means Stoker's dilemmas concerning the rural governance are prevalent and do not foster adequate territorial innovation on a microeconomic perspective.



The normative implication in the light of the future programming period 2014-2020 are evident, taking on the rising relevance of the community-led local development in the future strategies for rural development.

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Understanding Collective Action in Sustainable Consumption: a Relational Approach

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Abstract

Bottom-up measures have emerged in several countries with a view to promoting awareness campaigns and practical actions with respect to environmental sustainability. In such context new forms of production processes and local consumption are emerged, called Food Community Networks (FCNs). Within FCNs, Italian Solidarity Purchase Groups (SPGs) are among the most representative forms of self-organized collective action aiming to promote sustainable consumption. The aim of this study is to understand how clusters of economic actors organized in different ways (aggregations of consumers and of producers, environmental associations, etc.) tend to influence the promotion of sustainable consumption and production. This has important implications for rural development policy, whose aims is to promote competitiveness, sustainable management of natural resources, and the balanced development of rural areas.

JEL classification: Q57, P32, O21.

Keywords: Solidarity Purchase Groups, Alternative Food Networks, Public Goods, Social Network Analysis

Introduction

Depletion of natural resources has become a key issues on the European policy agenda. Bottom-up measures have emerged in several countries with a view to promoting awareness campaigns and practical actions with respect to environmental sustainability. All this has led to the creation of new strategies in the policies for consumption, redefining a new alternative geography of food and new opportunities for small enterprises excluded from globalization (Whatmore and Thorne, 1997; Miele, 1999; Murdoch e Miele, 1999; Murdoch et al., 2000). In the new emerging geography of food, the reincorporation of production processes and local consumption is spreading quickly assuming different forms such as the so-called Alternative Food Networks (AFNs) (Abatekassa and Peterson, 2011) or the much less analyzed Food Community Networks (FCNs) (Pascucci et al., 2013). FCNs differentiate from AFNs as in these experience participants share both the benefits and cover expenses of the organization (Caracciolo and Lombardi, 2012). A common feature of the different forms of FCNs is an interesting relational structure that governs market transactions. Within FCNs, Italian Solidarity Purchase Groups (SPGs) are among the most representative relational forms with the objective to promote sustainable consumption (Brunori et al., 2011; Graziano and Forno, 2012; Migliore et al., 2013).

The phenomenon of SPGs is continuously growing in Italy and this seems to be mainly due to new and confirmed policies for consumption testing new social paradigms aimed at promoting sustainable development in rural areas through active reorganizing of the agriculture and food industry (Cembalo et al., 2013; Migliore et al., 2012; Schifani and Migliore, 2011; Brunori and Rossi, 2000). By their very nature, SPGs are activated by committed individuals who, in an entirely voluntary manner, offer their time and resources to organize various type of initiatives at the local level. As a result, there is a set of rules deriving from complex relational structures competing to define a self-organized collective action for sustainable consumption.

The rules within SPGs differ from the mainstream as they experiment with new social paradigms

and innovation system models (Cembalo et al, 2013; Brunori, 2000, 2011). At the local level, in fact, SPGs are often at the center of a much more complex network structure which involves actors that share an explicit ambition of territorial governance, similar to what happens in the Anglo-Saxon movement of Transition Towns (Grasseni, 2013). In other words, these networks represent the typical 'grassroots innovations' (Seyfang & Smith, 2006), in which individual actors and organizations experiment with new solutions to common problems.

These forms of FCNs represent particularly important cases because they allow for the construction and consolidation of relations of reciprocity which favor the management of natural resources at local levels with satisfactory long-term outcomes (Migliore et al., 2014). However, while research conducted on SPGs has shown that these groups represent important sources of social innovation capable of suggesting effective solutions to the problems of the unsustainability of the agro-industrial system, to date it is still not clear which actors and roles within the network influence the promotion of long-term sustainable consumption and production.

To develop a more inclusive view of how such influences are established within the network, this work draws on the evolutionary theory of collective action (Ostrom, 2000, 2010). In these studies, the conditions which affect the likelihood of individuals bringing about collective actions to overcome social dilemmas in the management of resources used in common are analyzed. Among these conditions, the way in which the individuals are linked via a network has proven very important in triggering collective action. In fact, it is a commonly held opinion that individuals who are linked in a network are more likely to contribute to each other's welfare (Granovetter, 1973; Ostrom, 2010).

The aim of this study is to understand how clusters of economic actors organized in different ways tend to influence the promotion of sustainable consumption and production.

The hypothesis behind the present study is in fact that the capacity of SPGs to diffuse and produce long-term collective actions is the result of the strategies of specific actors in possession of relational capital (quality and amount of relations). More precisely, it is presumed that the bigger the number of relationships that each actor or group of actors establishes within the network, the higher the capability of the actor to affect collective action. Following this line of reasoning, it is possible to identify the key actors and their role within the collective action.

With this in mind, the article takes a relational approach and analyzes in detail the relational system of one specific SPG called *Gasualmente* (placed in the city of Palermo), which constitutes one of the most active SPGs in Sicily (Southern Italy). Contrary to traditional consumer groups and similar to other SPGs, which have developed in Italy over the last twenty years (Graziano and Forno, 2012), *Gasualmente* represents a political "laboratory" where innovative solutions, aimed at stimulating sustainable consumption and production of agricultural products and local food, are tested. Established in 2009, *Gasualmente's* main mission is to create a Solidary Economy Network in Palermo which ideally links to other networks of similar type that have emerged recently in other parts of the region as well .

As the analysis below will show, SPGs promote solidary consumption of local food. In so doing, such social interaction create a system of relations, which goes beyond consumer and producer organizations involving a multiplicity of different actors whose actions are conditioned by the number of mutual ties formed among them. In what follows, we will therefore identify and discuss each actor's strategic role, trying to specify those that can influence the collective decision making process and the transmission of information within the social network.

Method

In order to study social relations, we have used in this paper the Social Network Analysis (SNA). It is an analysis technique identifying and analyzing relations among the members of a network

(individuals and/or associations) in order to discover schemes depicting relational structures (Hannemann e Riddle, 2005). In other words, Social Network Analysis (SNA) permits us to analyze and visualize social relations among actors, groups, associations and other actors involved in the exchange of goods, information and knowledge (Wasserman & Faust, 1994).

To identify the relational system around Gasualmente SPG the technique of snowball sampling was used (Browne, 2005; Noy, 2008). Starting with Gasualmente consumers we contacted and interviewed 33 other actors (Alters) involved in the system. As the analysis of the network will show, a particularly interesting finding was that Gasualmente structured relations not just with producers (as in the case of the French Amap or the American CSA) but also with cultural, environmental, educational and consumerist associations (Table 1). Data was collected through face-to-face interviews.

By applying Social Network Analysis, we have identified what role different participants of the network play, that is who can influence the long term collective action (Figure 1). For the analysis a specific set of ego-network analysis indexes was used. More precisely Structural Holes have been examined (Borgatti, 1997; Burt, 2002, 2009; Goyal & Vega-Redondo, 2007). They occur when inside the network there is no tie between two actors, which gives one of the actors from that network the chance to exert a greater influence. Every hole in the social structure of a SPG is an opportunity for every actor to link non-connected nodes, to mediate messages among the nodes at the edges of the holes and in doing so to act like a broker.

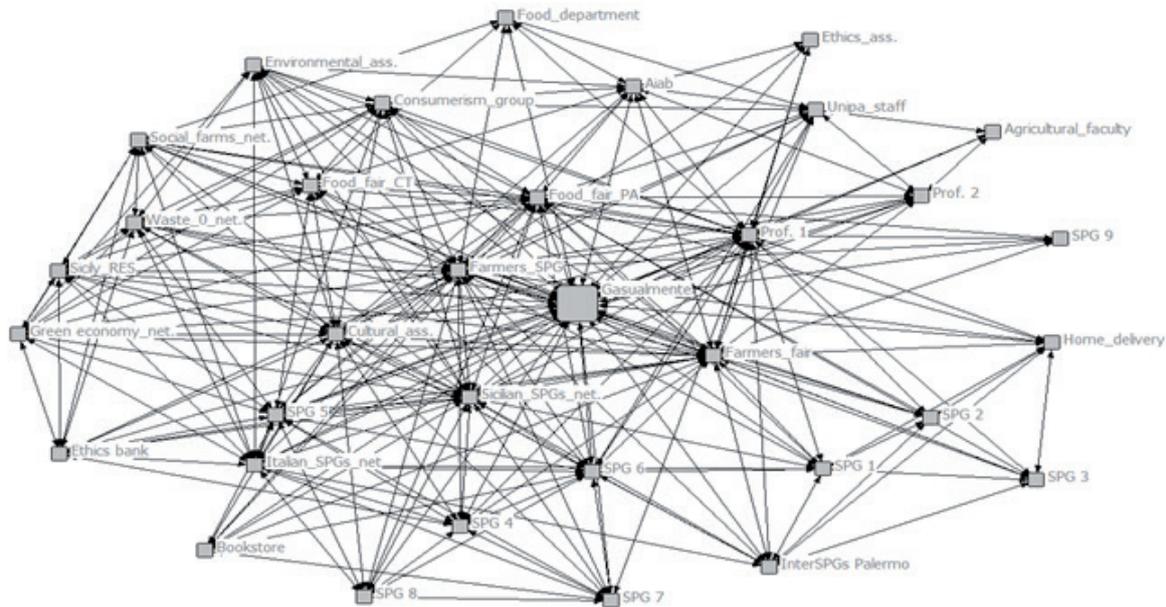
Table 1 – Alter names and labels

<i>Alters</i>	<i>Label</i>	<i>Alters</i>	<i>Label</i>
Local and organic food fair staff in city of Palermo	Food_fair_PA	“BibiGas” Solidarity Purchasing Group	SPG 7
Local and organic food fair staff in city of Catania	Food_fair_CT	“A tutto GAs” Solidarity Purchasing Group	SPG 8
Gasualmente home delivery service	Home_delivery	“Gastone” Solidarity Purchasing Group	SPG 9
Farmers association in local and organic food fair in Palermo	Farmers_fair	Solidarity Purchasing Groups Association in Palermo Province	InterSPGs Palermo
Farmers association of Gasualmente	Farmers_SPG	Professor 1 of Agriculture Department	Initiator.1
Association on agriculture ethics	Ethics_ass.	Professor 2 of Agriculture Department	Initiator.2
Environmental group “Legambiente”	Environmental_ass.	Agriculture Department Head of University of Palermo	Agricultural_faculty
Cultural association	Cultural_ass.	Events Office of University of Palermo	Unipa_staff
Italian Association Organic Agriculture	AIAB	Ethics Bank	Ethics bank
Politic Consumerism Association “Sicillyah”	Consumerism_group	Regional Agriculture Department of Food resources	Food_department
“Feltrinelli” bookstore	Bookstore	Network of Solidarity Economy in Sicily	Sicily_RES
“Mondello” Solidarity Purchasing Group	SPG 1	Social Farms network	Social_farms_net.

"Sperlinga" Solidarity Purchasing Group	SPG 2	Italian Solidarity Purchasing Groups network	Italian_SPGs_net.
"Espace" Solidarity Purchasing Group	SPG 3	Sicilian Solidarity Purchasing Groups network	Sicilian_SPGs_net.
"le Nuvole" Solidarity Purchasing Group	SPG 4	Green Economy network	Green Economy_net.
"Bio...logico!" Solidarity Purchasing Group	SPG 5	Network to promote waste reduction	Waste_0_net.
"Riportiamo alla luce" Solidarity Purchasing Group	SPG 6		

The four measures that allow identifying the brokering capacity for every single actor of a network (Trobia and Milia, 2011) are: a) *effective size*, obtained from the difference between the number of nodes every single actor is connected to and a redundancy factor. The effective size lets us know the capacity of every actor to bridge the structural holes, so the higher the value of this measure, the more significant the benefits for the actor in terms of information and control. b) *Efficiency* indicates the ability of every actor to use the smallest number possible of arches to connect the vertices. In brief, it indicates that the size of connectivity redundancy as a node can be effective not being efficient, it measures the impact of every single actor on the network. This measure varies from 0, in presence of redundant ties, to 1, so we look for the minimum number of connections inside the network that are enough to connect the nodes they belong to, and at the same time they determine a better information transmission. c) *Constraint*, based on the idea that the actors connected to other nodes that are connected to each other could be less free to move. This measure reveals how much an actor depends on other actors; it has a negative relation with information inside the network: the higher the value of the link, the less likely the chance to act. d) The last measure is *Hierarchy*, which makes us think of a situation when an actor is in a better position than other actors belonging to the same network. In other words, the Hierarchy measures how the actors are connected by asymmetric ties, so it analyses the presence of command positions, where an actor transmit his will on the others. This measure varies from 1, when there are no mutual connections and the graph is highly hierarchized, to 0 when all the links are equal and the graph is not hierarchized.

Figure 1 – Relational structure of Casalmente



Results

The analysis of structural and relational traits of Gasalmente network, done by applying Structural Holes indexes, has shown that Gasalmente consumers structure many relationships with various actors, highly dependent on each other which is due to the fact that they share the same values, direct relations and trust each other (Table 2). It favors a strong sense of community, which is a typical trait of actors promoting ethical and solidary economy.

Table 2 – Structural holes and brokerage roles in Gasalmente

	<i>Effective Size</i>	<i>Efficiency</i>	<i>Constraint</i>	<i>Hierarchy</i>
Gasalmente*	20.000	0.625	0.113	0.051
Farmers_SPG	18.096	0.566	0.130	0.068
Professor. 1(Prof. 1)	15.556	0.576	0.146	0.057
Farmers_fair	14.913	0.552	0.150	0.066
'A Fra bio PA (Food_fair_ PA)	13.120	0.525	0.158	0.052
Sicilian_SPGs_network	10.375	0.432	0.161	0.027
Cultural_associations	10.149	0.423	0.162	0.027
Italian_SPGs_network.	7.737	0.407	0.199	0.025
SPG 5	6.947	0.366	0.199	0.019
SPG 6	5.955	0.350	0.224	0.027
'A Fera bio CT (Food_fair_CT)	5.097	0.319	0.232	0.012
Aiab	4.380	0.337	0.284	0.027
Consumerism_group	4.250	0.266	0.233	0.008
Unipa_staff	4.143	0.345	0.311	0.042

Social_farms_net.	4.000	0.267	0.248	0.012
InterSPG Palermo	3.583	0.299	0.303	0.014
SPG 1	3.250	0.271	0.303	0.010
Prof. 2	3.100	0.310	0.355	0.019
Waste_0_net.	3.000	0.200	0.247	0.003
Green economy_network.	2.966	0.198	0.248	0.005
Environmental_associations.	2.692	0.207	0.282	0.004
Sicily_RES	2.571	0.184	0.264	0.003
SPG 4	2.500	0.208	0.304	0.006
Food_department	2.286	0.327	0.480	0.015
Ethics bank	2.250	0.187	0.304	0.003
SPG 7	2.024	0.184	0.332	0.009
SPG 8	1.711	0.171	0.362	0.008
Bookstore	1.529	0.170	0.399	0.010
Home delivery	1.471	0.163	0.397	0.005
SPG 2	1.375	0.172	0.437	0.001
SPG 3	1.375	0.172	0.437	0.001
Agricultural faculty	1.000	0.250	0.766	0.000
Ethics_ass.	1.000	0.200	0.648	0.000
SPG 9	1.000	0.200	0.662	0.012

**Intended as Casualmente consumers*

The analysis of structural holes has confirmed, in the case of Gasualmente, that the most effective transmission of information (effective size) comes not only from the consumers and producers of Gasualmente, but also from Prof. 1, the informal association of agricultural producers and the event 'A fera Bio. If we consider the Efficiency values higher than 0.5, the ties formed by these actors determine a good message transmission inside the network as they are not redundant. An efficient message transmission (mediation) is provided also by Sicilian_SPGs_network, cultural association, National_SPG_net., other SPGs and associations that actively promote sustainable consumption. Constraint and Hierarchy indexes are particularly interesting in the data shown in Table 2. In reference to outcomes obtained from the Hierarchy index, the results indicate that there are not any command positions and that information is transmitted with the same "intensity", all the obtained outcomes are nearly 0 and so none of the actors fulfills his desires on the others. This last value suggests that within Gasualmente, the transmission of values related to critical and sustainable consumption occurs according to democratic and active principles, which determine actions aimed at identifying a new institution for sustainability.

Conclusion

Our case study demonstrates a typical example of self-governing common resources, where social norms are framed together by actors involved in the system of relations; a fact that as noted by Ostrom (1991, 2000, 2010) in similar organizations, guarantees a sustainable development and permits to obtain significant and lasting outcomes. It also suggests that a better and more sustainable management can be achieved when common resources are used by a multiplicity

of actors that are interdependent and when the relational capital of every network can contribute to the development of the local territory with innovative pilot proposals. The case we have examined shows that the relations within a FCN are not limited to mutual relations among consumers and producers, but tend to involve other actors from the society: cultural associations, educational institutions and university professors, consumerist associations, informal networks of small-scale producers. The evolution of such relational structures formed within FCNs enables the formation of self-organized collective action for sustainable development in the area. This relational system plays an important role as in such experiences a better redistribution of economic resources among actors is allowed together with a mutual cultural exchange that increases awareness for the preservation of common resources and the local territory. In so doing, these experiences represent interesting solution to the contemporary problems of rural development, which are jointly produced by consumers and producers in the pursuit of a model of society based on participation, sustainability and human relations.

The policy implications of such bottom-up responses are clear especially in the context of rural development, whose goal is to promote competitiveness, sustainable management of natural resources, and the balanced development of rural areas. In accordance with EU regulation 1305/13 and in particular with article 5, comma 3, in fact, rural policies should promote local markets and short supply circuits. Although these forms of FCNs arise often as reactions to the inefficacy of political institutions, they may indeed represent important experiences on which to base an integration of intents between European institution and local communities. As the analysis has shown a useful strategy to pursue a long-lasting sustainable development of rural areas needs to acknowledge the role-play by different actors, not just producers and consumers. As the case of Gasualmente has clearly highlighted cultural associations, educational institutions as well as other social actors are fundamental to spread a different culture to cement new practice of production and consumption. After all, the call for sustainable development needs to be based on new civic values as well as new forms of participation.

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Implementing the Future Rural Policy. A Multi-stakeholder Governance Test in Reality

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Abstract

In a changing and turbulent economic global scenario, the public sustain to agriculture will face counteracting local forces originating from some local actors, unwilling to accept all the facets of the CAP and the RDP. Power and leadership of actors and main social leader can help or contrasts implementation of public policies. So that policymakers will not avoid the confrontation with people and the hard work to continuously survey their willings and interests. The comparison between two case-studies located in different Italian regions (the Marches and Friuli Venezia-Giulia) showed the essential role of local interests in the success/failure of implementing the public interventions. The paper reports results of case-studies located in different socio-geographical areas, the case of the 'Verdicchio of Matelica Wine Road' in the Marches, and the case of the 'Rural District Bassa Pianura Friulana'. The failure of a proposed rural policy depends on local counteracting interests. Implementing the Future Rural Policy in a view of positive success does necessitate the continual and fatiguing consultations with local communities.

JEL: R58; O15;

Keywords: Rural Development Policy; Stakeholder Analysis; Social Network Analysis; Multi-stakeholder Governance;

1. Introduction

The overall future scenario for the Italian agriculture will be quite different from the actual due to the global economic turbulences and non agricultural interests increasing requests. Public policy intervention should appear clearer and more intelligible for the entire society—even besides its rural component—in order to achieve goals of feasibility, efficiency and effectiveness. Mainly, the RDP will further encourage farmers to adapt their choices to market conditions, even more linked to social and environmental objectives. Following some preceding findings (Idda & Benedetto, 2003) the empowerment of self governance in local communities is to be considered fundamental for ensuring a self-regulating and self-sustainable development. This is an evolutionary mechanism originating within the singular local economies in view of the valorization of identity and the territorial assets as strategic values for the sustainable development. Such a bottom-up approach is able to guarantee a certain stability to the started economic development, because it directly involves local actors by providing a path-oriented design to meet the needs of the involved actors or, at least, consider their opinions, when gathered during any preliminary investigation. Moreover a major involvement and commitment of social actors allow to avoid money waste, and a better spending capacity, but also a better internal coherence looking at the relationship between the quality of objectives, action taken to pursue them, and the correspondence between the objectives. The problem of capacity and the efficiency of public spending, already highlighted at the end of the Nineties (Reho & Zolin, 1998; Mantino et al., 2000) is still very important and closely connected to the quality of human capital, especially to the social capital that qualifies the diverse areas in which the RDPs are to be implemented

(Idda & Benedetto, 2003). Supporting the creation and strengthening social relations in a given place, in pursuing socio-economic common goals, would promote the effectiveness of RDPs. Therefore, tools capable of supporting and promoting consultation and planning activities and practices, in view of rewarding the collective skills in pursuing objectives of local development, are strictly needed. The structure of relationships that embody a 'district organization' are successful and stable cases of new links between economic development and governance, that are based on the enhancement of the existing—or even in fieri—social capital (Idda et al., 2007). In this sense, districts are privileged places of origin both of business networks and trust and cooperation among actors, and would be necessary to direct the path of development of a given territory towards this form of territorial organization.

Literature on SNA (Social Network Analysis) and the SA (Stakeholders Analysis) shows the possibility to implement those tools for the assessment of policies and their effective implementation. The research question examined in this paper is how patterns of social interactions among policy-makers and other stakeholders influence whether the proposed policy will achieve its social and economic goals. Analyses performed in diverse territories, and their consequent comparison, can help to enlighten possible different causes of success/failure of RPD implementation. Definitively, the paper aims at demonstrating the necessity of using tools of social involvement for the more effective future implementation of rural policies.

The paper is structured as follows. Paragraph 2 reports the background theory literature on Network Theory (NT), Stakeholders Analysis (SA) and Case Study Research (CSR). Paragraph 3 illustrates the methodology, paragraph 4 reports the results and paragraph 5 give the discussion and conclusive considerations.

2. Theory Literature

2.1. Network Theory

In policy making, features of society matter, and in social analysis network matters too. Borgatti and Lopez-Kidvell (2011), in making theory on network distinguished two kinds, a theory of the networks, which considers the antecedents of network phenomena, and a network theory, which, on its turn, considers the consequences of network phenomena. The first refers to a theory of tie formation, considering arguments that determine the network phenomena, and the second to a theory of the advantages of social capital, considering the consequences of the network phenomena. This latter stresses the strong ideas in the social sciences individuals are embedded in dense webs of social relations and interactions. Thus societies are actually 'systems of relationships' between actors seen in their capacity of playing roles relative to one another (Nadel, 1957), with a major relational perspective in economic sociology named 'embeddedness', the idea that economic transactions among actors are influenced by the social relations among the same set of actors (Granovetter, 1985). The behavior of people, can depart from market, political expectations and other type of ties (i.e. friendship, kinship) (Borgatti et al., 2009).

2.2. Stakeholder Analysis

After Freeman's theoretical statement (1994), Stakeholder analysis (SA) became popular, due the increasing appreciation for how the characteristics of stakeholders—individuals, groups and even organizations—influence the decision-making process. Roots of the SA are both in the political and policy sciences, and management theory, and have yet evolved into a systematic tool with clearly defined steps and applications for scanning the current and future organizational environment (Schmeer, 2000). Stakeholder analysis can identify key-actors and understand their behavior, intentions, interrelations, agendas, interests, and the influence or resources they have brought—or could bring—to bear on decision-making processes (Brouwer et al., 2012). As a

cross-sectional view of an evolving social picture, the utility of stakeholder analysis for predicting and managing the future is time-limited and it should be complemented by other policy analysis approaches (Brugha & Varvasovszky, 2000). Moreover, 'a participatory, multi-stakeholder approach tries to approximate the diversity of interests and positions, not only to further democratic principles but also to increase the practical likelihood that the proposed actions and plans will be accepted, implemented and effective' (Connelly, 2012, pp. 8).

2.3. Case Study Research

Cross-site comparisons of case studies have been identified as an important priority by the scientific community in different applied fields, offering an excellent starting point for overcoming most difficult methodological barriers, such as managing qualitative and quantitative data (Datta, 2006). A Case Study Research (CSR) is a method whose defining features are: i) empirical study of contemporary situations in a natural setting; ii) a focus on asking "how" and "why" questions; and iii) the treatment of each case as an experiment in which the behaviors cannot be manipulated (Myers, 2009; Yin, 2009). In CSR, data collection can be accomplished using quantitative or qualitative methods (Dooley, 2002; Yin, 2009). Case studies an iterative process employing a variety of data collection methods to compare within and across cases to research validity (Duxbury, 2012).

3. Methodology

Considering the theory literature, we chose to perform a comparison between two case-studies located in different Italian regions, the Marches and Friuli Venezia-Giulia, adopting a qualitative survey technique, in order to assess the role of social network in implementing a RDP measure in a natural setting. This doesn't mean the refusal of qualitative methods of assessing the RDP implementation, but a proposal of integration between different methodological approaches.

The use of qualitative case-studies, can help in discussing the eventual different successful/unsuccessful results of the RPD implementation as due to different patterns of local communities, and infer a relationship between the local society and the feasibility of RDP. Knowledge of the actual shape of local communities' vision of RDP can help policymakers in avoiding errors and political compulsions.

4. Results

4.1. The case of the Verdicchio di Matelica wine road

The case study has been carried out applying SA guidelines stated by Schmeer (2000), selecting and interviewing the selected key-informants in order to figure the map of Leadership and Power of the 12 selected key-actors-informants (see fig. 1), involved in the supposed proposition and promotion of the wine-road. The detected overall mood seems to be favorable to the adoption and management of the road, but in a framework of fragile personal and institutional relations. In fact, many declared to fear local constraints, struggles, social divisions, and unwillingness to invest private money and prefer to have public financial support. We can infer that any of the key-stakeholders is waiting the first movement from others, especially from public bodies.

implement a development process, it seemed to be necessary to consider not only the primary sector, but also other facets. According to the statement that rural development process has to be strictly linked to the rural area as it is necessarily an integrated endogenous development process, based on local resources, the Chamber of Commerce of Udine promoted co-operation between key actors and local stakeholders. A bottom-up approach with the participation of all key institutional actors was considered essential. Consequently, several local stakeholders were asked to take part in the process. The majority decided to participate proving to have good management skills to promote the official recognition of this area as a rural district. They stated that the rural development concept is wide-ranging: they agreed upon the improvements deriving from a districts, like the opportunity to diversify local economic activities (i.e. handicrafts, small industries, rural tourism, etc.), improve infrastructure connecting extensive rural areas, increase the supply of services for local residents, further equal opportunities between genders, maintain environmental resources, etc. Moreover local stakeholders considered that the rural development concept has an integrated logic that considers the economic, social and environmental dimensions of a rural area to achieve several targets. They helped to collect and analyze several technical-economic data in order to point out the main local economic chains and resources (enterprises, farms, etc.) with the aim to valorize them and more in general to improve competitiveness of the territory.

The widespread occurrence of geographical concentrations of agro-food actors has led stakeholders to form and build up clusters/districts. The district tool seemed to fit the rural development governance of this area, where the link with the territory appeared a fundamental characteristic of the whole development process and the change from a firm-based to a territory-based competition perspective seemed to be strategic.

However, the support of the region and the large involvement of local stakeholders were not worthy to obtain the official recognition.

5. Discussion and Conclusive Considerations

The research has been performed comparing only two case-studies, being this an actual limitation. That can be resolved only by enlarging the number of considered cases in the future. Nevertheless, findings are useful for the upcoming debate on implementing effective rural policies, mainly because they demonstrate that local communities' behaviors do effectively affect the actual effectiveness of RDP, and definitively success/failure of public interventions. Finding of the two case-studies show struggles and lack of effective communications between local enterprises (farmers as well as managers of hospitality and other economic local activities and their respective professional boards) and regional policy makers are to be considered amongst the main causes of weak social network, unable to achieve more common positive goals. In the first case-study, the declared local willingness to join collective efforts to produce a stronger marketing efficacy is defeated by the absolute lack of capacity to effectively collaborate and contract with policy makers the actual content of public intervention and money investment. The second case study shows a social network with more willingness to cooperate and a more diffused sense of membership and community. The territory of the rural district is very complex and necessitates a very integrated and coordinated vision on the future socio-economic development. The extraordinary number of public and private stakeholders that have freely participated in the project showed the eventual feasibility of the rural district.

Nevertheless the rural district didn't pass the law statement owing to the lack of political-institutional stability. In the both cases, the lack of feasible communications and micro-linkages between private and public actors are the base of a weak governance. The 'territorial logic' and the 'administrative logic' of procedures didn't match at all, facing big dis-tuning and dis-timing and,

therefore, impeding to goal the proposed collective objective. Today local policymakers have to make choices in a very complex environment, within a system of multidimensional values that include not only economic goals, but also political ambitions, social, ethical, religious, communication and other objectives: This complexity requires instruments able to manage—and ensure the effectiveness of policies—over long periods complex processes that include a varied number of stakeholders (multi-stakeholder) often counter parting the public choice.

In the both cases, the lack of feasible communications and micro-linkages between private and public actors are the base of a weak governance. Results of the case studies are useful for policy-makers as well as for farmers, and their political representatives in boards of policy-making, for future better arrangement of social relationships oriented at enhancing the level of social benefits. The more diffused and continual use of the SA, within the framework of a well defined network of local interests, embodied by the actual SN, will help the policy-makers so that the implementation of CAP and RDP should switch from the high declarations of common intents to the factual.

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Implementation and Prospects of the rural Development Policy in Sicily to support young Farmers

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Abstract:

The paper analyse the implementation up to 31/12/2013 of the 2007-2013 RDP for Sicily, with particular reference to the Measure 112 and to those measures related to it (Young People Package). By collecting different information categories (financial, physical, procedural and expert opinion) the RDP in its entirety has given excellent results in terms of commitments but modest in terms of payments for most of the measures. The Measure 112 had a remarkable success in terms of approved applications, of which only 1/3 funded, due to the limited programmed budget. Referring to the integrated approach, the low expenditure speed of the Package-related measures emerges, due to critical economic situation, bureaucratic management issues and to the timing to realize the investments, disregarding in this case the achievement of the set objectives. Positive aspects as well as criticalities arouse from this study may constitute valid indicators for the drafting of the new regional programming.

JEL:

- 1) Q18 Agricultural Policy; Food Policy
- 2) R58 Regional Development Planning and Policy
- 3) D78 Positive Analysis of Policy Formulation and Implementation

Keywords: Rural Development Policy, Young farmers, Sicily, Financial execution, Effectiveness

Introduction

The low generational renewal and the correspondent low youth employment rates in agriculture represent troublesome issues in the entire European Union (EU) territory, especially in the Mediterranean countries (Tarangioli and Trisorio, 2010). The scant presence of young entrepreneurs is due to several reasons: economic (in terms of low incomes and difficulties encountered in providing full-time employment), social (related to the quality of life of the farmers in the rural areas and the lack of services) but also mainly sector-based reasons encompassing an endless list of factors ranging from the high cost of land to the acquisition of expertise, as well as the setting-up costs (Regidor, 2012; Frascarelli, 2013; Gabrielli and Tarangioli, 2009; Bortolozzo and Tarangioli, 2005; Tarangioli and Trisorio, 2009).

Currently interventions in favour of youth entrepreneurship in agriculture are substantially related to the instruments put in place under the 2007-2013 EU Rural Development Policy aiming to support the generational turnover in agriculture, and in particular to the “Measure 112 Setting up young farmers”, aimed at facilitating the settlement in agriculture of young people up to 40 years of age, and at meeting the specific challenges they have to face in order to establish themselves in the agricultural sector.

More specifically, the Italian National Strategic Plan (NSP) (MiPAAF, 2007) introduced the possibility to act on the youth farm in a systematic perspective both through the granting of a pre-

mium for the first settlement behind the presentation of a business plan (BP), and fostering the integration of the Measure 112 with other measures, directly or indirectly aimed at increasing the competitiveness of the farm, identifying in the relative “Young People Package” (YPP) an integrated planning approach at farm level. Ensuring a significant presence of young people in rural areas is one of the priority aims of the Common Agricultural Policy (CAP), given that the youngest farmers, benefitting from timelines which are longer than those of older farmers, are preferable in farm management as to long-term investment decisions (Corsi, 2009), for their risk propensity, their ability to look for synergies and complementarity with other agents in the territory and to implement planning decisions with high innovative content (Ballari, 2008; Cersosimo, 2012). Keeping alive their role, by generating new employment opportunities and promoting the development of services, is crucial for the socio-economic development of rural areas and for the growth of primary sector (Regidor, 2012).

In this perspective, the CAP places a greater emphasis on the issue around young farmers for the 2014-2020 period than in relatively recent times, through the introduction under the first pillar (+25% of the amount of direct payments for 5 years) (MIPAAF, 2014) and to the definition under the second pillar of specific thematic sub-programmes including a mix of integrated measures aimed at advancing their entry in agriculture and at sustaining their income in the early hardest years of the setting up (Bartolini, 2013; Canali, 2013; Canali and Gjika, 2012; Carbone and Corsi, 2013).

This paper, drawn up in correspondence with the launching of the new EU Rural Development policy, aims to present a detailed analysis of the implementation as at 31/12/2013 of the 2007-2013 Rural Development Programme (RDP) for Sicily, with particular reference to the Measure 112 -and those measures related to it- which had a noteworthy response (as well as in other Italian regions), and in the light of the indications emerged from the 2014-2020 planning, it will receive more and more attention. Results were discussed with the Regional officials in charge of drafting and of budget allocation concerning the new planning.

Methodology

The 2007-2013 RDP for Sicily is organized into 4 Axes and the Measure 511 - Technical Assistance; compared to the 41 measures provided for in the Community legislation, the Programme provides for the activation of 33 measures (Regione Siciliana, 2012). By collecting different information categories (financial, physical and procedural) relating to the implementation of the RDP for Sicily up to the 31/12/2013, a financial analysis was conducted on the amount of loan disbursements on public expenditure and expressed in terms of both admitted and certified expenditure. It has been possible to examine the financial progress of the RDP by year, by axis and by measure, through the quantification of the financial indicators relating to the commitment capacity (ratio between approved and programmed expenditure for the measure), the payment capacity (ratio between certified and programmed expenditure of the measure) and the expenditure speed (ratio between certified and approved expenditure). More specifically, the data collected from the official documents available on the dedicated website (www.psr Sicilia.it) were supplemented by those directly collected from the Regional Department of Agriculture, Rural Development and Mediterranean Fisheries (ARASP).

At a later stage, after reviewing the state of execution of the Measure 112 in the Italian regions up to the 31/12/2013 on the basis of the data made available by the Italian National Rural Network (NRN) (Ottaviani and Lafiandra, 2014), the paper focuses on the YPP in Sicily. The 2007-2013 RDP for Sicily has confirmed a single premium for the setting up, associating compulsorily it to at least one of the following measures: modernisation of agricultural holdings (121); improvement of the economic value of forests (122); first afforestation of agricultural land (221); diver-

sification into non-agricultural activities (311). Other measures were optional, such as those ones related to the use of advisory services (114) and the participation of farmers in food quality schemes (132), aimed at promoting the vocational training of the new farmer. The constraint for young people setting up a holding consisted in investing a total amount not lesser than twice the single premium received under Measure 112 and not exceeding €500,000. The data provided by the ARASP concerning number and financial amount of applications -received, eligible and approved- allowed us to analyse the Measure 112, through the exam of both the financial execution up to 31/12/2013 (extended to all the YPP-related measures) consisting in the examination of the main variables of expenditure, and the effectiveness of its implementation, expressed in terms of realization rate of the output targets for the 2007-2013 period; a detailed framework for the YPP implementation has also been outlined for the same reference date.

Contextually “face to face” interviews to the regional officials in charge of the YPP measures were carried out also for a better understanding and interpretation of the examined data. Interviews were conducted in the first trimester of 2014 in the offices concerned via a questionnaire -previously used in other studies (Laboratorio di Studi rurali “Sismondi”, 2013) and then adapted to the Sicilian context – including 12 questions (mostly in an open format) aimed to collect quantitative and qualitative data on the funded intervention (procedural aspects, adequacy of the programmed expenditure in comparison to the grant applications, interest in the measure, time frame for the grant payment, the achievement of the established objectives, etc.), as well as the personal perceptions of the interviewees on the Measure application trend and their opinions related to the criticalities and possible solutions.

Findings

The financial execution of 2007-2013 RDP for Sicily up to 31/12/2013 shows that as much as 93.1% of the total (almost € 2.2 billion) is committed to the financing of approved applications (Table 1). In contrast, the payment capacity is still modest, amounting to 64.0% (slightly below the national average reported by NRN, equal to 65.9%) as a result both of a significant value for the Axis II and of modest values for Axis I and low levels for the Axes III and IV and Technical Assistance. In addition to the ongoing financial and liquidity crisis, the limited payment capacity is due to both the delayed activation of some measures occurred in the last years of the ongoing programming period, and to the start of spending in some cases paradoxically in 2013; these elements are also linked to bureaucratic-problems. Going into the details of measures, there is a remarkable variability of payment capacity, which for 20 measures is less than 50% (Figure 1).

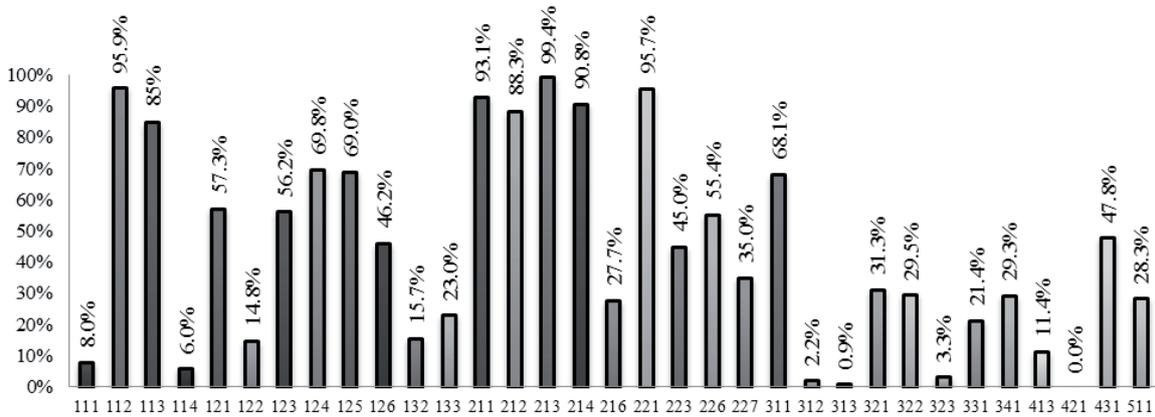
Table 1: Financial execution of 2007-2013 RDP for Sicily by axis up to 31/12/2013

Axis	Programmed expenditure* (€) (A)	Approved expenditure (€) (B)	Commitment capacity (%) (B/A)	Certified expenditure (€) (C)	Payment capacity (%) (C/A)	Expenditure speed (%) (C/B)
Axis I	861,852,149.00	831,751,907.36	96.5	510,932,095.07	59.3	61.4
Axis II	929,551,127.00	882,933,507.00	95.0	752,339,382.46	80.9	85.2
Axis III	228,664,218.00	182,495,865.27	79.8	98,598,062.09	43.1	54.0

Axis IV	120,121,206.00	106,610,543.80	88.8	18,575,280.80	15.5	17.4
Tech. Ass.	32,770,155.00	18,915,939.00	57.7	9,284,369.15	28.3	49.1
Total	2,172,958,855.00	2,022,707,762.43	93.1	1,389,729,189.57	64.0	68.7

* 2007-2013 RDP for Sicily approved by the European Commission, Decision No. C(2012) 9760 of 19/12/2012.
 Source: Our elaborations on ARASP data.

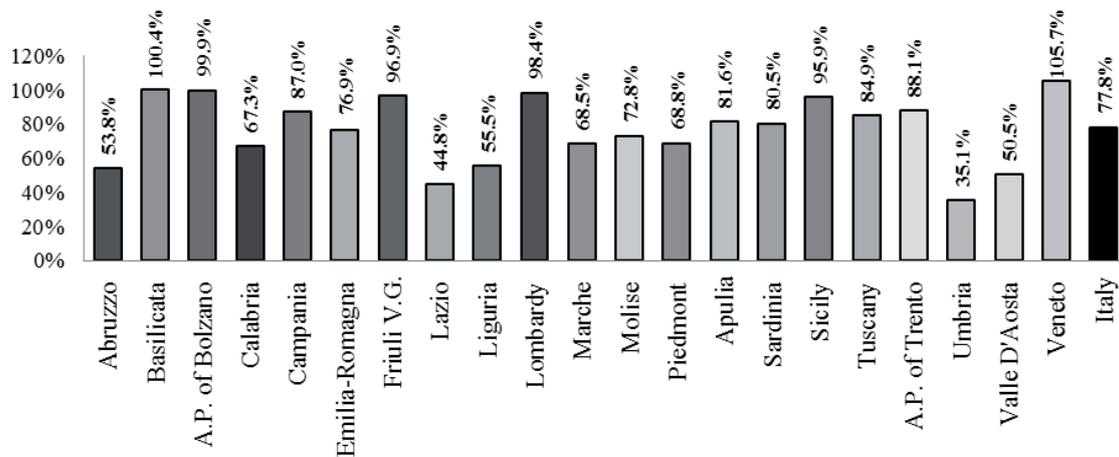
Figure 1: Payment capacity by measures of RDP for Sicily up to 31/12/2013



Source: Our elaborations on ARASP data.

With reference to the Measure 112, as already mentioned it had a great success both in Sicily and in many other Italian regions. Despite at national level, the allocated budget had been reduced by 17% compared to the previous programming period, the measure had 10.2% of budgeted funds for Axis I. At the end of 2013, approximately €557 million were spent out of the programmed expenditure, equivalent to 77.8% of the allocated budget. The regions with the highest expenditure were Sicily (€70.1 million), Apulia (€61.2 million) and Tuscany (€56.4 million). In 12 regions the capacity payment stood at values higher than 70% (Figure 2). Referring to RDP for Sicily, the Measure 112, with a single tender procedure of 30/04/2010, made available a €73.1 million budget, resized with respect to 2000-2006 programming. Nevertheless, the measure retains some relevance, concentrating 10.2% of the programmed expenditure for the Measure 112 at national level and 8.5% of the financial envelope for Axis I at regional level. Turning to aspects more specifically related to the implementation, at the end of 2013 €70.1 million were spent out of the allocated budget, with a payment capacity of 95.9%; at the same date, 96.4% of the programmed expenditure was committed. In addition, 1,752 young farmers admitted to the measure received the single premium (in the case of farm set as a corporate status, a multiple premium was granted, up to 3 individuals). Young farmers were mainly represented by male (55.9%), although there was a significant number of female (44.1%); men prevail in the 18-30 year-old age group, women between 31 and 40 years. Finally, for both output indicators of the measure -number of assisted young farmers (1,827) and the total volume of investments (€73.1 million)- the index of effectiveness reached 95.9%.

Figure 2: Payment capacity of Measure 112 by Italian region up to 31/12/2013



Source: Our elaborations on RNR data.

The performance of the measure is to be considered very positive, as demonstrated by the large participation of young people expressing their willingness to settle for the first time on an agricultural holding (5,307 applications), reflecting the desire for redemption and employment that new generations are relying on. This large participation is not however matched by an adequate financial budget: in comparison to 4,294 eligible applications, only 1,432 were admitted to the support of measure (1/3), corresponding to 2,116 projects of the YPP-related measures, for an overall approved expenditure of €297.2 million (Table 2). In this sense, the integrated approach of YPP and the weighting of selection criteria for aid applications, by assigning high scores in relation also to the size of investments, determined mainly funding of farms potentially able to offer stronger guarantees of durability and competitiveness, coherently with the provisions of 2007/2013 Rural Development Policy.

In relation to these elements and assuming an expenditure speed of 99.4% for Measure 112, the same indicator for the whole YPP amounted to only 42.0% (contracted to 24.2% if referring only to the related measures) due to the critical economic situation (economic, liquidity and credit crisis), to bureaucratic management and to the timing to realize the planned investments. Among the interventions related to the modernization of agricultural holdings (121), the material investments for farm improvement (land acquisition, restructuring of production plants, irrigation systems, etc.) were the most successful, followed by the projects related to the purchase of agricultural installations, machinery and equipment and the construction and/or modernization of rural manufactured. Among the projects aimed at the diversification into non-agricultural activities (311), young people greatly favoured those investments relating the agritourism sector, by allocating 3/4 of approved expenditure. Finally, it is interesting to note the little attention of young farmers towards certified organic production compared to conventional one.

Table 2: Participation to the YPP by measure up to 31/12/2013

Items	Measure 112	YPP-related measures							Projects (No.)	Package total
		121	122	221	311	114	132			
Applications (No.)	Received	5,307	4,382	10	30	394	1,044	123	5,983	
	Eligible	4,294	4,149	6	25	363	979	125	5,647	
	Approved	1,432	1,410	5	10	242	381	68	2,116	
Expenditure (,000 €)	Eligible	191,520.0	517,114.1	508,588.9	1,776.0	55,912.5	1,273.4	15,798	576,964.5	708,634.1
	Approved (A)	70,480.0	190,694.3	266.9	740.8	34,504.5	450.8	104.6	226,761.9	297,241.9
	Certificated (B)	70,080.0	41,967	0.0	0.0	12,931	0.0	0.0	54,898.0	124,978.0
Expenditure speed (B/A)	99.4%	22.0%	-	-	37.5%	-	-	24.2%		42.0%

Source: Our elaborations on ARASP data.

With regard to the direct survey, the officials in charge of the YPP measures stated that the financial allocation for Measure 112 in the 2007-2013 period turned out to be inadequate, given the high number of eligible applications but not funded, and the fact that during the financial breakdown by measures, officials were not fully aware of the real interest for the measure itself. Besides, financial size of farm investments for the YPP measures were initially underestimated (on average equal to 160,000€). Moreover, after the closure (November 2010) of the application call procedure (just one out of the 4 programmed time windows was implemented, absorbing the entirety of the available financial resources and keeping out de facto other potential beneficiaries from the participation to the following calls), significant delays emerged, due to the large amount of applications to be evaluated under the aspects of admissibility and eligibility; as a consequence, the final ranking was published in the first semester of 2011 and only then it was possible to proceed with the enactment of the first funding decrees. According to the interviewees, at the end of the programming period nearly all the young farmers received the setting up aid, while there were still limited decrees for progress payments (for most applications, investments are just about to begin or currently underway) and even less final payments (the implementation of the BP and its final testing came to an end for some applications or officials are waiting for the issue of the final report including expenses calculations). In this sense, though highlighting the validity of the integrated planning within the YPP, the respondents stated the need to implement strategies improving young farmers' access to credit, to foster the cooperation between stakeholders with appropriate instruments and lastly to expand the YPP with agri-environmental measures. As to the result and impact indicators set by the 2007-2013 RDP for Sicily for Measure 112, interviewees claimed that the former (Gross Value Added in the funded enterprises/companies: +€14,075,208.00; 1,421 companies run by young farmers) will be achieved in the near future, while the latter (economic growth: +€13,665,250.49; labour productivity: €99.86/AWU; creation of 1,360 jobs with the effect of mitigating the exodus from the primary sector) will be thwarted by the ongoing economic and financial crisis. Lastly, respondents highlighted the soundness of the integrated planning approach of the YPP as a tool to foster youth employment and the start-up of numerous farm development

processes, coherently with the objectives of rural development policies; they feel quite confident in a future re-proposal of such an approach.

Conclusions

In the past programming periods, the measure intended for young agricultural entrepreneurs enjoyed an undeniable success at a national level, although an array of doubts was expressed as regards the efficacy of the instrument (merely a formal transition of farm ownership, use of granted aid for the management of existing farms and - in the case of real start-up - inadequate financial resources to cover initial or investment costs) (Tarangioli and Trisorio, 2009; Carbone and Corsi, 2013). This is why the 2007-2013 rural development policy has “rethought” the measure, which while preserving its single premium feature, in the new business-oriented design formulation gives the young farmer the opportunity to plan a global firm strategy, relying more heavily on project quality (BP). The participation of young farmers to the Measure 112 was largely positive in most of the Italian regions.

In Sicily, young farmers proved to be willing to actively contribute to a diversified, competitive, innovative, multifunctional and sustainable development of the regional agricultural sector. This attitude despite the economic and structural difficulties of the sector during the last years and the complicated and articulated process to gain access to the Measure 112 aids – due to both the mandatory requirement of the integration in the same application of at least another measure and the drafting of a BP. In the current planning period, the above-mentioned measure had a remarkable success in terms of eligible applications (3 times the number of the approved ones), showing at the date of 31st December 2013 a more than satisfactory achievement of programmed targets and an advanced stage in the financial execution. Referring to the integrated approach adopted in Sicily (YPP), it seems not to have determined considerable criticalities or obstacles as much to the initial participation of potential beneficiaries, but rather to the following implementation of the BP. From the financial analysis carried out, in fact, a low payment capacity and a low expenditure speed for the measures linked to the Measure 112 came to light; in this regard, it is sufficient to point out that of the six measures -compulsory and optional- up to the end of 2013, just for two of them the funding decrees were enacted, besides with rather small amounts, mainly for reasons of economic nature (liquidity and credit crisis), bureaucratic order (due to delays in the examination of several projects and in the following payments) and management issues (difficulties in the management of a tool which is so innovative compared to the ordinary supporting instruments implemented by the regional administration).

In the new Rural Development Planning it is to be hoped that, taking into account, on the one hand, the validity of the integrated approach and, on the other hand, the above-mentioned critical issues, the credit access, one of the main constraints to the setting-up of young farmers and their following farm investments (Ballari, 2008; INEA, 2013; Corsi et al., 2005; Brun et al., 2014), is to be simplified or to find alternative suitable tools in order to minimize their exposure (and/or the family support). In this sense, the goal of the young farmers payment provided under the first pillar of the 2014-2020 CAP should just be the reduction of the duty in financial terms for the young settled-up, but the modest amount of the aid makes it to be retained inadequate to the achievement of this aim (Canali, 2013; Frascarelli and Pupo D’Andrea, 2014).

Another important issue is the need to simplify the bureaucratic process in order to make possible to fulfil the programmed phases, as well as an accurate choice and weighting of selection criteria of aid applications, by taking into account their actual profitability in the evaluation of the investment plans.

Lastly, decrease of allowed times for the implementation of the farm investment plan admitted to funding (starting up) would allow a more rapid start of entrepreneurial activity.

The 2014-2020 RDP for Sicily – submitted to the European Commission last May – contemplates a further slight reduction of the financial endowment (with the aim to address financial resources towards those firms able to offer better guarantees of competitiveness and durability on the market) concerning Measure 6.1 (previous 112) by an amount of 65 million euro (around 11% decrease compared to 2007-2013 period), confirming the individual contribute (40,000€) in capital account but to be granted in at least 2 rounds. A change, this latter, which might baffle young entrepreneurs thus called to bind more of own financial resources in the start-up. As in the recent past, in order to access to the setting-up premium, it will be mandatory to activate a number of other tools, within the sub-program “Young Farmers Package”, supporting the investments of the BP. The need for an easier access to credit for young farmers setting-up is still unsatisfied, despite the input come to light from this research but also from a survey conducted by the local independent evaluator.

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Rural Tourism and Agritourism: a virtuous green circuit promoting multi-functionality and sustainability of rural areas

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Abstract:

Europe territory is characterized by a strong presence of rural areas. While the primary sector still plays a major role in some regions, the importance of agriculture in the economic system of the EU-28 is declining. The inability to generate sufficient revenue has in many cases, led farmers to diversify from the agricultural base and undertake pluriactivity. In this context, Rural Tourism is one of the key opportunities in terms of potential growth for rural areas. This paper proposes the study of Rural Tourism, with the aim to overcome the difficulties to define analytically the Rural Tourism and Agritourism and to build a comprehensive body of knowledge and a theoretical framework for future analysis and studies. The distinction between the multifunctionality of agriculture and pluriactivity of farm, has allowed a qualitative distinction between the two forms of tourism that are meeting a great success.

JEL:

R51 (Finance in Urban and Rural Economies), Q01 (Sustainable Development), L83 (Sports • Gambling • Restaurants • Recreation • Tourism†)

Keywords: Rural Tourism, Agritourism, Multifunctionality, Pluriactivity, Rural Development

Introduction

Europe territory is characterized by a strong presence of rural areas. After the European Commission adopted in 2010 a new method of classification of rural areas based on a variation of the previous OECD's method¹, approximately 52% of European territory is classified as predominantly rural, 38% intermediate and only 10% predominantly urban (European Commission, 2013). Nevertheless, for over a century, the traditional assumption that urban areas provide a different way of life and usually a higher standard of living than rural areas, supported the powerful trends of industrialisation and urbanisation that have steadily altered the economic, social and political condition of rural areas. While the primary sector still plays a major role in some regions, the importance of agriculture in the economic system of the EU-28 is declining (European Commission, 2011).

Eurostat data on the Entrepreneurial Income of Agriculture, for the period 2005-2013, confirm that revenues for the agricultural system, fluctuated considerably. In 2013 there were levels of EU-15 income, slightly below the level as 2005². From the base year of 2005, the EU-28 index

1. The method underlying this new typology is based on a population grid of one square kilometre resolution to create clusters of urban grid cells with a minimum population density of 300 inhabitants per km² and a minimum population of 5 000 inhabitants. All the cells outside these urban clusters are considered as rural. This was possible by classifying NUTS 3 regions on the share of population in rural grid cells. If more than 50% of the total population lives in rural grid cells, the region is classified as predominantly rural. Regions where between 20% and 50% of the population lives in rural grid cells are considered intermediate, while those with less than 20% in rural grid cells are predominantly urban (Eurostat, 2010).

2. Net entrepreneurial income of agriculture (Indicator C): This income aggregate is presented as an absolute value or in the form of an index in real terms. It consider activities like Growing of crops (perennial and non-perennial); Plant

rose for two consecutive years, before falling back in 2008-2010 (at the height of the financial and economic crisis) strongly below the level as 2005. Thereafter, the index of Entrepreneurial Income of Agriculture rebounded, with relatively rapid growth in 2011 and 2012 (Eurostat, 2013). The inability to generate sufficient revenue has in many cases, led farmers to diversify from the agricultural base and undertake pluriactivity (Fleischer & Pizam, 1997). In this context, diversification from and within primary activities has become a necessity and agricultural secondary activities and services, related to the rural environment, have been the major driver of growth within the EU during recent decade.

Whilst the share of agriculture in rural economies has declined, the importance of diversification in rural economies has grown. This need has met the trend of “counter urbanisation” that has gradually asserted in the “well developed” parts of the world. Together with a parallel process of “de-agriculturalisation” of rural households and an increasing development of non-agricultural activities in rural areas, these processes contributed largely to the formation of a “new rurality” characterising more and more the rural regions of Europe (Kasimis, 2010). In the EU-28 as a whole around 5.2 % of farms had at least one other source of income, referred to as other gainful activities (Eurostat, 2013). When considered in terms of their economic weight, agricultural holdings that undertake secondary activities were more important as they generated 18.9 % of agricultural standard output³ in the EU-28 in 2010.

This process of adaptation to the new scenarios, has requested a re-positioning of the farm, thanks to which, it has the opportunity to go outside the boundaries of the farm traditional function following three defined paths: deepening, broadening and regrouping (Van der Ploeg, Long, & Banks, 2002). These new strategies permit, therefore, the diversification of the business areas of agricultural, pointing to new ways of creating value, which leverage an integrated use of local specificity, with positive impacts in terms of development rural (Nazzaro, 2008).

The evolution of the economic dynamics, related the assertion of new values and cultural trends and behaviour, have led to new needs, new expectations and lifestyles resulting in the creation of new consumer behaviours (Marotta & Nazzaro, 2011). The latter showed, more and more, a strong sensitivity to environmental issues and quality of life. These intangible needs, have characterized a new “demand of rurality” (Iacoponi, 1996) at the base of the recovery of the activities and the socio-productive functions of rural environment.

In this context, Rural Tourism is one of the key opportunities in terms of potential growth for rural areas. In fact, the overall importance in terms of standard output, of the Agricultural holdings that undertake a Tourism services, in EU-28 Countries amounts to 12,5%, after contractual work (39,1%) and both processing farm product and production of renewable energy that amount at 18,7% (Eurostat, 2013). With nearly three quarters of bed places in the EU-27 located in rural areas, this sector already plays a major role in the rural economy (European Commission, 2011) and it plays a fundamental role in the wider context of the EU Rural Development Policy (RDP) 2014-2020, which has the aim to solve the new challenges faced by rural areas improving the competitiveness of agriculture and forestry, the environment and the countryside and the quality of life in rural areas and to encourage the diversification of economic activities.

The present work aims to contribute to the theoretical debate, to overcome the difficulties to define analytically the Rural Tourism and Agritourism, to build a comprehensive body of knowledge and a theoretical framework for future analysis and studies.

The authors have completed two phases. In the first phase, it has been required a theoretical and bibliographical documentation concerning different forms of tourism considered. An analysis propagation; Animal production; Mixed farming; Support activities to agriculture and post-harvest crop activities; Hunting, trapping and related service activities (Eurostat).

3. This statistic is based on the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock.

of the difference of the two types of tourism examined, in terms of quantitative and qualitative characteristics of the phenomena has been conducted, to understand how these forms can contribute to the rural environment promoting multifunctionality and sustainability of the rural areas. Research focus of this phase was on the study of the different activities (primary, social, economic and rural function) of Rural Tourism and Agritourism. It has been defined the issues related to a correct definition of multifunctionality and pluriactivity to constitute an explanatory theoretical background for future analysis. The second phase has been drawn up and completed with the analysis of the relationship between Rural Tourism and Agritourism and the objective that EU policy stands to achieve the development of rural areas of EU countries. The focus was on the analysis of how different forms of Farm Tourism can address the rural development challenges.

Methodological notes – Multifunctionality and Pluriactivity

The scientific idea of Environmental Economics and the need/opportunity to think of a development model more respectful of environmental resources is established by the World Economic Conference for Development (WECD) in 1987 with the publication of the report "Our Common Future" which has become the foundational document that is still valid as on model for the sustainable development strategy. In it are clear and since then some essential pillars for the development model that marks the passage of time (Ciani, 2012):

1. Moving towards the multicriteria measurement of the level of development;
2. Intra-and inter-generational approach in the development process;
3. Breakage of the traditional paradigm of development based on the indirect relationship between development and resources, with the passage proposed, in the strategy of sustainable development, to a direct relationship.

The multicriteria approach to sustainable development, has imposed more and more at the micro level, the option of multi-functionality, especially related to the production of ecosystem services (Millennium Ecosystem Assessment, 2005). In this context, pluriactivity and multifunctionality are terms often assimilated.

Agricultural activity in rural areas, is the centre around which carry endogenous development based on local resources, able of enhancing the local entrepreneurial capacities. The value no longer resides, as before, in the agricultural product, but in the many qualities allowed by technical progress, accompanied by marketing actions in response to changing preferences and the availability of consumer income. For every traditional agricultural product matches today a wide range of products, variants typological qualitative and related services required for agriculture (Sotte, 2006). The interplay between multiple activities into a space where traditional goods are produced in a dynamic way supporting the development of a multiplicity of relationships and the ability to allocate efficiently human and material resources, represent the new rurality. In this sense, Agritourism activities should be considered one of the best way through which expand and diversify farm activities. This diversification, as well as implement new business areas, bringing new clients / tourists to the company, allows to enhance intangible assets, environmental assets and landscape values.

While Agritourism is the expression of the pluriactivity of the agricultural firm, multifunctionality refer the fact that an economic activity may have multiple outputs and, by virtue of this, may contribute to several societal objectives at once OECD (2001). Key characteristics of multifunctionality relate to the existence of multiple commodity and non-commodity output that are jointly produced by agriculture and the fact that some of the non-commodity output exhibit the characteristics of externalities or public goods, with the result that markets for these goods do not exist or function poorly (Vejre & et. al., 2007). The multifunctionality should therefore not be confused with the term, related to it but substantially different, such as "pluriactivity". We

can understand the multifunctionality as the possibility that the same activity has two or more outputs (products), while pluriactivity means that different economic activities, such as food production and tourism, are combined within the same management unit (farm).

There is a general agreement to consider the production function of agriculture the key function, referring to other function as coupled, secondary, externalities or services (Paalberg, Bredhal, & Lee, 2002), (Peterson, Boisvert, & De Gorter, 2002). In this sense, Rural Tourism should be considered as expression of Multifunctionality of agriculture. The importance of multifunctionality of the agriculture in terms of sustainability is emphasized by the EU that states as agriculture apart from its production function, encompasses other functions such as the preservation, management and enhancement of the rural landscape, protection of the environment (including against natural hazards), and a contribution to the viability of rural areas. Agriculture must also be able to respond to consumer concerns for example those regarding food quality and safety (European Commission, 1999). The EU defines three main functions of Agriculture:

1. Food Production Function
2. Environmental Safety Function
3. Rural Development Function

According to Van der Ploeg et. al. (2000), Rural development is a multi-level, multi-actor and multi-faceted process. Rural development can be operationalized at the level of the individual farm household. At this level, rural development emerges as a redefinition of identities, strategies, practices, interrelations and networks. Agritourism should be considered as a main activities which can guide the development of rural areas. Sometimes this redefinition rests on an historically rooted but marginalized cultural repertoire. In other situations it is based on highly 'market-oriented' responses that embody a general or partial reconceptualization of what farming should be in the context of the new ties emerging between town and countryside (Broekhuizen, 1997). The co-ordination and allocation of family labour between different (agricultural and non-agricultural) activities in the pluri-active farm household is an important source of synergy which need for a rural development (Van der Ploeg et. al., 2000).

While farm and rural tourism are expressions of multi-activity and multi-functionality, they both represent an important source of development for rural areas.

Results – Differences between Rural Tourism and Agritourism

It is generally acknowledged that tourism plays an important role in many countries' economies. This is certainly true in the European Union, which is the world's number one tourist destination (Eurostat, 2013b). The analysis of data on nights spent in accommodation establishments on a regional basis (2012), demonstrates the strong interest, of both EU residents and non-residents, on the rural areas of the European Union. From the base of densely populated areas (100), the nights spent in Thinly-populated areas amount at 98,2%, followed by the intermediate urbanized areas to 89%⁴. In this context tourism has the potential to pull the growth of rural areas. Furthermore, the new EU policy moves towards an encourage of projects that bring together agriculture and rural tourism through the promotion of sustainable and responsible tourism in rural areas.

Rural tourism is a growing sector and offers attractive growth opportunities that arise from the ability to respond to some of the emerging trends in tourism demand, which tend to use less massified forms, and pay more attention to the values of nature, of culture, of food, and to the countryside (Belletti, 2010). In addition to the primary function of food production, the new "tourism" dimension, required farms to operate in new and different contexts as social, leisure,

4. These statistics refers to the nights spent in accommodation establishments in the year 2012 on the basis of a classification of the land areas in densely populated, thinly populated and intermediate urbanized.

education, environmental protection, landscape management and control of water resources. The EU definition of rural tourism is a holiday that is primarily motivated by the desire to closely experience the countryside, its people, heritage and way of life. The holiday should be primarily based in a rural setting, as opposed to being general touring/sightseeing holiday (Gorman, 2005).

The OECD's Rural Development Programme (OECD, 1994) tackled the definitional issue in the early 1990s. They concluded that rural tourism, in its "purest form", should be:

1. Located in rural areas
2. Functionally rural - built upon the rural world's special features of small-scale enterprise, open space, contact with nature and the natural world, heritage, 'traditional' societies and 'traditional' practices.
3. Rural in scale - both in terms of buildings and settlements - and, therefore, usually – but not always - small-scale.
4. Traditional in character, growing slowly and organically, and connected with local families. It will often be controlled locally and developed for the long-term good of the area.
5. Of many different kinds, representing the complex pattern of rural environment, economy, history and location.

This definition, underlying the how Rural Tourism is strictly related to multifunctionality of rural areas and how it should be connected to the multicriteria approach to the measurement of the development of rural areas. In this context, businesses need to consider very carefully how they pitch their enterprises, to take maximum advantage of the marketing opportunities afforded by rural images. They also need to understand how is the "perceived rurality" so that their activities do not damage the reality or image of the countryside. Rurality represent an essential requirement for many visitors: tourism is ultimately a form of escapism from everyday urban and suburban life: for this reason understanding how the market defines rural is, therefore, vital. There is also a broad environmental and ethical goal in seeking a definition. The search for a definition of Rural Tourism brings with it a search for the value judgements which should underlie the rural tourism development and management process (Lane, Kastenholz, Lima, & Majewski, 2013). Rural Tourism, in contrast to other types of tourism such as the heritage tourism⁵, is normally considered a "complete", albeit unplanned, package of tourism facilities, comprising a range of accommodation facilities, a range of hospitality facilities, attractions both natural and man-made, retailing, and often co-ordinated information facilities provided by a local partnership, a local council or community. Almost all accommodation facilities will be privately owned, along with many of the attractions. Because of this, rural tourism can be, and often must be, more attentive to market demands. At the same time, it includes additional forms of tourism that exist in a rural setting, including eco-tourism and other nature-based forms of tourism, cultural tourism that does not relate directly to agriculture (McGehee & Kim, 2004).

Within the background presented above, Rural Tourism assumes itself a strong and complex multidimensional character. It may have had its roots in farm based or Agritourism, but is now much more diverse, and continue to diversify (Bernard, 2012).

There are many definitions of Agritourism in existence, and many types and terms of agriculture-related tourism that are similar to Agritourism. For example, Agritourism is seen as virtually identical to its European equivalent "farm tourism" (Busby & Rendle, 2000) (Getz & Carlsen, 2000). Other authors report an evolution of more than 13 definition of Agritourism (Busby & Rendle, 2000). Previous Research on Farm Tourism have tended to focus on particular declinations of

5. The concept of Heritage Tourism has emerged as the further development of "cultural tourism". It focuses its attention on the cultural aspects related to the most complex cultural identity of the territories, trying to go beyond the traditional content as museums, monuments, historical "official" territory of cultural tourism (Bessiere, 1998) (Chhabra, Healy, & Sills, 2003) (Moscardo G. , 1996).



this phenomenon, such as bed and breakfast activities (Warnick & Klar, 1991) (Moscardo G. , 2009), while Maude & Res (1985) and Blaine, Golam, & Var (1993), examined the wider context of farm tourism .

Agritourism and Rural tourism are not the same but Agri-tourism may be seen as a segment within Rural Tourism (Wilson, Fesenmaier, Fesenmaier, & Es, 2001).

Traditionally, agriculture was central to rural life. It was the main employer of labour, the main source of income within most rural economies, and indirectly the farming process and community had a powerful influence on traditions, power structures and life styles. Decisions made by farmers determined land use and landscapes. Early forms of rural tourism were, not surprisingly, strongly linked to accommodation on farms. Farm tourism is not a new phenomenon. It exists as a recognizable activity for over a hundred years (Frater, 1983). The use of the term Agritourism became common during '80, but gradually, the term rural tourism has taken over, with Agritourism becoming just one sub-sector of a more holistic rural tourism. Agritourism can include various types of overnight accommodations but also encompasses day visits to on-farm attractions like festivals and educational events (McGehee & Kim, 2004) and for these reasons, it can be defined as rural enterprises which incorporate both a working farm environment and a commercial tourism component (Weaver & Fennel, 1997). Many studies have focused on motivation or rationale for development of Agritourism enterprises. The inability to generate sufficient revenue has, in many cases, led farmers to diversify from the agricultural base and undertake pluriactivity (Fleischer & Pizam, 1997). Farm tourism has been primarily developed for its economic benefits and represents a symbiotic relationship for areas where neither farming or tourism could be independently justified (Inskeep, 1991). The obvious, and most prevalent, reasons for Agritourism development are economically based. Each business has the fundamental goal (traditional) to reach the highest level of net income. The traditional production processes anchored to the strong specialization and to the monoculture, in the modern context of dynamic market price, increase the risk of business. In the presence of technical risk or low market prices, business could fail, because an inappropriate level of operating income. The traditional position of weakness of farm financial activity is characterized by long periods of anticipation and returns only in short periods. The option of product diversification is a first real opportunity to limit these risks and improve the cash flow business. Integrating the revenue from traditional agricultural activities with non-traditional, but connected to it and complementary capturing business opportunities that offer non-agricultural functions, such as environmental protection and conservation, are other factors that increase the possibility for the entrepreneur, to raise its total net operating income.

The creation and the development of new economic activity in the form of new farms, the diversification into non-agricultural activities including tourist activities are essential. Agritourism acts as a driving force for the development of tourism in rural areas and promotes the rural development, allowing the family of the farmer to supplement farm income with income related to touristic activities.

Conclusion

In contemporary science, dealing with rural development, multifunctionality has gained increasing attention. The distinction between the multifunctionality of agriculture and pluriactivity has allowed a qualitative distinction between the two forms of tourism considered. Both, on different levels, represent a great opportunity for EU policy makers to guide future policies for the development of rural areas. While rural tourism can be a guide for the development satisfying the growing demand of "rurality", on the other hand, the Agrotourism is set up as a major investigation unit, due to the strong link with the primary activity of agricultural production.

According to Perotto (1993), the rural tourism and Agrotourism could lead a new relationship between Environment, work and free time in terms of sustainability of rural areas. The analysis of the specific characteristics of the two forms of tourism analyzed, has allowed to provide a background that will be a reference for future analysis in the field of rural development.

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The Urban Marches versus the Rural Marches. A Statistical Analysis in a Local Development Perspective

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Abstract:

The paper aims at giving a description of the actual territorial diffusion in the Marches of featured integration between the structures of the agricultural activities and the structures of the other industries, interpreting—if possible—the different capabilities of farming to interact and integrate with industries, giving sense to the local industrial agglomeration and development. For this purpose, we have considered the ‘geography’ of the regional territory in 31 LLSs (Local Labor Systems of ISTAT) gathering socio-economic statistical data and elaborating them in order to model the territorial patterns of integration between farming and not agricultural industries. Results show the capability of farming to interact in the local labor markets, integrating industrial culture and labor calendars. Results are discussed in order to give some suggestions to eventually better govern the rural and agricultural policies, in a territorial viewpoint.

JEL:

R12 Size and Spatial Distributions of Regional Economic Activity;

R52 Land Use and Other Regulations

Keywords: The Marches, agriculture, statistical analysis, territorial integration, urban-rural areas

1. Introduction: Research Focus and Question

In the Italian region of the Marches, relations and disparities between urban and rural societies are peculiar, thus the region can be an utter significant case-study on this topic. It shows a well advanced overall economic development due to the presence of several industrial districts spread in most parts of its territory. Meanwhile, a strong persistency of rural settlements is still ongoing. The current local culture clearly stems from the traditional way of life, typical of the countryside, and many elements of a long lasting ‘rural social culture’ still remain.

A high economic development coexists with a largely diffused rural character (Anselmi, 1990), determining a quite original socioeconomic model, capable of merging high levels of material wealth with immaterial wellbeing (Censis, 2002). After the WWII, a progressive concentration of residents and activities along the Adriatic Sea coast took place, provoking a certain division between the crowded coast and the much less densely populated inner areas (Corinto, 2014).

Anyway, in the Marches, agriculture has always and anywhere integrated its features with other productive sectors in a very peculiar and variable manner, originating diverse forms of co-existence within local markets of productive factors, specially the labor market (Calafati & Mazzoni, 2006; Corinto & Musotti, 2012). Moreover, the recent development of rural and farm tourism—the sole type of tourism capable of increasing the bed supply—gave a clear and further drive to the integration between farming and non agricultural industries, both in the pretty rural areas and in urbanized or industrialized zones and their neighborhoods (Corinto, 2014).

The paper aims at giving an interpretation of the actual territorial diffusion of featured integration between agricultural activities and other industries, assuming the *light industrialization* model (Becattini, 1999) as a general framework, and then asking if farming has different capabilities of interacting and integrating with other industries, thus giving a specific sense to the local industrial (and urban) agglomeration and development.

2. Background: the Marches and the *Light Industrialization*

Since the sixties of the past century, the so called *light industrialization* (Becattini, 1999) has been the key-character of the Italian development, being somehow different from other advanced economies. Over time, the region faced a formidable wave of industrialization based on the robust proliferation of small and medium sized enterprises (SMEs), often clustered within ‘industrial districts’ (Fondazione Censis, 2002).

Namely, an industrial district is defined as a local socio-economic system having the following characteristics: a) a sufficiently small geographical entity [...]; b) a population of families living and “mainly” working in this area [...]; c) a population of manufacturing small or medium-small enterprises, one independent from each another [...] composed by clusters, each specialized in a particular phase of the industrial process characterizing the district; d) a network of international trade relations, acting both in purchasing raw and auxiliary materials, and—more importantly—in selling the district typical produce; e) a specific “culture” (value of labor and family, dating capacity, risk attitude, etc.) and its own “institutional network” (commercial behavior, socio-economic and political associationism, specialized schools, etc.) inherited from a historical process of reciprocal adaptation between the conditions of social reproduction and the external competitiveness of the district; f) [...] a unified image and typical characters perceived by members of the district and external interlocutors; g) [...] a strong sense of belonging and identification diffused in local actors (Becattini 2001, pp. 95).

Long lasting specialized research on the topic, has strongly emphasized that origins of Italian industrial districts descend from a mix of factors, pertaining both to urban and rural world (Fuà 1988; Bellandi & Sforzi 2001; Musotti 2001). In various Italian regions, until up the World War II, urban and rural areas were actually intertwined, a real distinction being very hard. A dense network of cities pervaded the countryside with a very intertwined fabric, so that rural areas maintained close commercial, social and cultural ties with an urban center.

The territory is rich in small and medium-sized towns—urban centers with long tradition of efficient and democratic local government and vigorously engaged in commerce, the professions and handicrafts. The countryside is governed by a good road network, is fairly endowed with infrastructures, and has reasonable access to services. The family run and small-scale enterprise (by the owner, share-cropper or tenant) is common in agriculture. The rural population has close links with the population of the towns.

In the whole population (rural and urban), there is a high proportion of self-employed workers. The economic role of the family is often not confined to consumption, but covers production too [...] Relationships within the family and with the neighbors are supportive and there is a marked community participation and social integration [...] in this world of family businesses and self-employed workers, there is some management experience, some spirit of initiative, some sense of responsibility, and all these gifts, even in small doses, are widespread among population.’ (Fuà 1988, pp. 262-263).

The Marches are the region where the spread of industrial districts has been most penetrating and where—historically—there was the closest integration between the urban and rural world (Musotti, 2011). This issue is also valid in comparison to other Italian regions (Dunford & Greco, 2005). Then we argue this greater integration between the urban and rural areas has resulted in a large spatial spread of industrial districts and a corresponding geographical diffusion of inhabitants. The occurring small average size of urban centers (only the municipality of Ancona has slightly more than 100,000 inhabitants) is the historical legacy of a society in which—for centuries—residents in urban areas based their way of life on contacts with the surrounding countryside (Conti, 1996). These socio-economic and demographic special characteristics have been strengthened by the other big driver of the regional development, i. e. the tourism activities concentrated along the coast of the Adriatic Sea (Corinto, 2014). The region has a coastline of 180 kilometers, along

which the dissemination of tourism activities was seemingly pair to the light industrialization in the inner areas.

ISTAT (2001) has identified 31 Local Labour Systems (LLSs) in the Marche, with an average population of 47.844, while in Italy the LLSs are 686, with an average population of 83.084 (Orasi & Sforzi 2005). Then, we can concisely state the Marche as a network of small and medium towns scattered in rural areas within which the communities do fertilize local economies and support the demographic strength quite diversely than in many other Italian regions. Moreover, socio-economic temper of rural areas fostered the regional development in reconciling the mere material well-being to a high quality of life, with a very high civic culture, in a way that has quite non correspondence in the rest of Italy.

3. Background: Agriculture and the Development Model

The above sketched origins of the development in the Marche underlines an ideal-type for the sociological research as well as the economic one, including agricultural economics. If the rural world has deeply contributed in shaping the regional development, using the undeveloped socioinstitutional features, we argue that should be very interesting to ask how agriculture fits today within the overall economy of the region.

In a development model based on large cities and large companies, agriculture is territorially confined in a periphery, more or less remote from the main motors of growth and the socioeconomic transformation. The labor markets of the 'major centers' and those of 'the green belts' are clearly separated.

On the contrary, in a model based on small and medium cities and systems of SMEs, with numerous and scattered urban centers, agriculture is not practiced in a 'more or less' remote periphery, but in places 'not so far' from urban centers which run specialized manufactures or tertiary industries. In this case, the labor market lays in local systems which are structured according to the actual geography of urban centers, and within which agricultural activities tend to interfere with other sectors, both in terms of singular household and individual levels, workers being capable of alternating farming and non-agricultural jobs.

In the first model, the spatial division and physical and cultural distances between agricultural and non-agricultural works are clear. And the farming activity is stronger (in terms of employment and wealth) whereas other activities are less developed (i. e. there is an agricultural persistence as a *residual* issue).

In the second model, territorial integration between different jobs is possible, because jobs are physically and culturally contiguous. Then, the 'size' of agriculture (always in terms of employment and wealth) depends more on its internal resources (especially the quality of entrepreneurial capacity and the institutional endowments) than on the concurrence of other industries for the same pool of resources (the so-called *pull-effect*).

In the Italian framework, the Marche are the region where, in particular, farming and nonagricultural works found the best conditions for their territorial integration. Therefore, the Marche should be a 'perfect' case-study of no-correlation between the size of agriculture and the global level of economic development (assuming the hypothesis of a *weak-compatibility*), or even a positive correlation (*strong-compatibility*).

4. Methodology and Empirical Analysis

Within the assumed theoretical framework, in order to test the validity of our reflections we used data of the official Censuses of agriculture (ISTAT, 2010) and population (ISTAT, 2011), and enterprises and workers of all sectors, as available at the ASIA-ISTAT database [cit?]. Otherwise, we were trying to interpret the available statistical data referring to the model of interaction be-

tween urban and rural areas, as well as between agriculture and other sectors as posed in the background paragraphs. According to scholars (Bellandi & Sforzi, 2001; Orasi & Sforzi 2005), we chose as geostatistical unit the Local Labor System (LLS), an actual functional region drawn by selfcontainment (near roughly the 75 percent) of the daily home-to-work commuting (travel to work areas). We have eliminated redundant correlated indicators and then selected eleven indicators, of which five (table 1) relating to the demographic and economic characteristics of the LLSs, and six to the structure of the agricultural sector, considering also its social weight within the singular LLS.

Table 1. Analytical variables

Variable	Description
POPDEN5	Inhabitants (2011)/Territorial Area (Kmq)
BUSDENS	Enterprises for profit (2010)/Inhabitants (2011)
EMPLDENS	Employees of enterprises for profit (2010)/Inhabitants (2011)
MANIDENS	Manufacturing enterprises (2010)/Inhabitants (2011)
TOURDENS	Accommodations and Food Service Enterprises (2010)/Inhabitants (2011)
FARM	Farms in ASIA (2010)/Farms in Census (2011)
USTS	Utilized Agricultural Area (2010)/Total Agricultural Area (2010)
AVERAGE	Cultivated Area (net of permanent grassland) (2010)/Farms (2010)
COMPUS	Cultivated Area (net of permanent grassland) (2010)/Cultivated Area (2010)
USPC	Cultivated Area (net of permanent grassland) (2010)/Inhabitants (2010)
LAB	Farming Work (2010)/Inhabitants (2011)

Sources: Regione Marche, 2014: *Agriculture Census 2010 (ISTAT), Population Census (2011), ASIA-ISTAT (2010)*

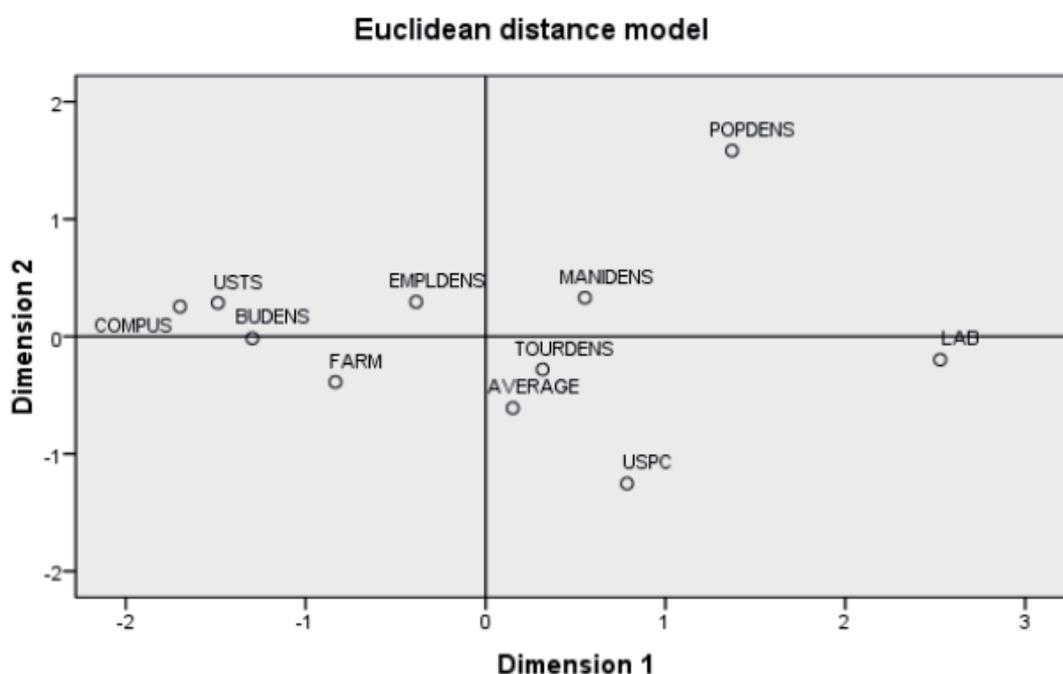
We made a multidimensional scaling analysis (MDS) (Kruskal & Wish, 1978; Tomaselli, 1993) using the data matrix (31 LLSs per 11 variables), with feasible results and thus reducing the 11 dimensions of observed variables to a two-dimensional representation. Thus we can describe the relationships of proximity existing between the 11 observed variables, and then the linkages between the phenomena represented by the selected variables. Table 2 and Graph 1 report the analysis outcome for the eleven descriptive variables

Table 2. Stimulus coordinates

POPDEN5	1,37	1,58
BUSDENS	-1,30	-0,02
EMPLDENS	-0,39	0,29
MANIDENS	0,55	0,33
TOURDENS	0,32	-0,28

FARM	-0,84	-0,39
USTS	-1,49	0,29
COMPUS	-1,70	0,25
LAB	2,53	-0,20
USPC	0,79	-1,25
AVERAGE	0,15	-0,61
S-stress: 0,02768 (good) RSQ: 0,99348		

Graph 1. Derived Stimulus Configuration. Euclidean distance model.



5. Results and Discussion

Our analysis has been capable of describing and interpreting the relation/integration of agriculture with other activities in the territory of the Marche, utilizing the LLSs. It must be noted that the LLSs are the statistical units and not as the observed issues, so that any consideration is to be related to the overall regional territory.

In table 2 and graph 1 we report the results of the MDS using the eleven descriptive variables. In the graph, the interpretations of bi-dimensional coordinates (orthogonal and perfectly uncorrelated) are feasible because the S-stress is near to zero, and the distortion is then tolerable.

The first dimension is characterized by positive values of the intensity of family days of farm work (LAB) and the availability of cultivated area (net of permanent grassland) on inhabitants (USPC). In this dimension, also noteworthy is the definite coordinate of the population density (POPDENS). On the contrary, the major negative coordinates affect the density of firms on inhabitants (BUS-DENS), the density of farms with a formal entrepreneurial profile (FARM), the ratio between 'net' cultivated area on total agricultural area (USTS) and on the total cultivated area (COMPUS). Even considerable is the negative coordinate of the ratio of employees in for-profit enterprises on resi-

dents (EMPLDENS). We could name this dimension as 'social resilience of agriculture'.

The second dimension is characterized by the high positive value of the coordinate of the population density (POPSENS), while, within the negative coordinates, the availability of cultivated area (net of permanent grassland) of inhabitants (USPC) and the average size of farms (AVERAGE), measured by the cultivated area (net of permanent grassland). We argue this issue can reflect—from negative to positive values—a sort of 'urban-rural continuum', enabling us to underline that is the sole feature of the agrarian structure toward which the urban-rural 'dialogue' can exert some influence. We could name this dimension as 'social density and light industrialization'.

6. Conclusive considerations

The geometrical orthogonality of the two dimensions is—in our opinion—the most important result of the research. It shows in fact that, in the Marche, social resilience of agriculture is independent from industrial density and development. The agricultural resilience can/cannot occur due to strictly local causes, both in socio-economically scarce areas (high hills and mountains) and in heavily developed and most densely populated areas. In other words, while it is clear that the past characteristics of agriculture have favored the light industrialization, the rebound of industrialization on agricultural structures can be either positive or negative.

Overall results seemingly describe a persisting 'double polarization' of agriculture, capable of integrating within both the urban and rural socio-economic territorial systems. On the one hand, agriculture is capable of resisting well the forces of erosion resulting from the urban thickening. On the other hand, agriculture is capable of using any resources even in the more demographically dispersed areas, and contributing to maintain employment. That is to say the Marche's agriculture seems to be vital regardless of the type of 'incentive' coming from the local socio-productive fabric and can conveniently self-adapt to different geo-socioeconomic environments. The rural and agricultural background has fostered the light industrialization over time, and conversely today the light industrialization 'can or cannot' combine with the agricultural resilience, considering the orthogonality of the two dimensions resulting from MDS.

In a territorial dimension, with a typical *pull-effect*, increasing urban densification would be capable of restricting the physical base of the primary sector, even inducing an average farm size reduction, but not causing the weakening of farmers' capabilities, which can organize farming in different local conditions. In the Marche agriculture found an original way of active coexistence with other industries both in dense and sparse populated areas, all of them characterized by the presence of industrial districts.

Thus a traditional approach of analysis, which usually associates 'agriculture' and 'rurality' will be not the best choice, because we actually can describe an agriculture which is capable to move along the lines both of a "weak compatibility" and a "strong compatibility" with the rest of industrial activities.

Positive results encourage us for further researches on the same topic and the same method, even considering the opportunity of future attention regarding the region of Emilia-Romagna and Veneto.

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Family farms and policies for farm development: Who decides what?

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Abstract:

The aim of the paper is the analysis of the consumption of rural development policies as the result of entrepreneurial behaviours adopted by family farms of region Lazio (Italy). The underlying hypotheses is that the decision of consuming rural development policy is a collective process which is articulated on the basis of family farms type. The database of region Lazio with funds provided to family farms in the programming period 2007-2013 have been analysed, in order to verify eventual differences based on family types. The results confirm the goodness of our methodology, by emphasizing differences among family farms. Moreover, territorial localization of family farms provides for insights to discriminate access to rural policies and stimulates further researches and normative implications.

JEL codes: Q2, Q18

Keywords: family farms, rural development policies, consumption of policy

Introduction

United Nations have declared 2014 as the International Year of Family Farming. In this context, family farming is considered as the “backbone of sustainable rural development” (Crowley, 2013). With the expression of “farm family business”, Gasson et al. (1988) underline the close interdependence between the family and the farm. Here an overlapping between the productive and the reproductive sphere have been deeply analysed in literature (Errington, Gasson, 1993; Corsi, Salvioni, 2012; De Benedictis, 1995; Sabbatini, 2008; Sabbatini, Turri, 1992). Recent trends in family farming underline farms’ capability to adapt to external circumstances, due to a set of assets well synthesised by the Ben Porath’s F-connection¹ (Ben-Porath, 1980). This does not impede a process of selection and evolution: according to Davidova (2014), recent dynamics in small farms (the majority of which are familiar) at the EU level are strongly characterised by:

- disappearance of the smallest farms, through either their transformation into larger commercial farms or the abandonment of the land;
- higher integration into the market thanks to the support of the EU rural policy;
- persistency of smallest farms through diversification, part-time farming and generational renewal.

Against this background, the role of EU rural development policies seems relevant: in order to support and to address sustainable development of agriculture and to grant farm’s resiliency, recent reforms of the rural development policy (Rdp) define a more articulated toolkit for farmers. To correctly analyze the way family farms gain access to Rdp, a relevant aspect to be examined concerns family size, localization in life cycle and perspective of generational renewal. Therefore, the adoption of Rdp is the result of a collective decision-making process.

The aim of this paper is the analysis of the “consumption” of rural development policies by family farms. Our guesswork is that Rdp represents an opportunity that requires strategic decisions on behalf of farms. In this framework, the hypothesis of the paper is that family farm’s characteristics

1. Family, friends and firm.

influence the consumption of Rdp. Even though an abundant literature has demonstrated the relevance of family context in farm's strategic decisions, this paper provides for a new perspective of the family composition, where the role of assistants is emphasised. Moreover, the paper articulates the analysis on the basis of both demographic and territorial variables, by taking into account farms' territorial localization: as a matter of fact, programs for rural development have been planned by discriminating areas with different degrees of rurality, hence addressing different paths of rural development. Rural marginal areas should comply with territorial integrated strategies, instead of privileging supply chain approaches to the adoption of Rdp. Within this framework a "coherence problem" emerges: measures for farm diversification should be consumed more in rural marginal and intermediate areas: is that true? Are there path-dependence schemes in the access to Rdp? What is the role of the family in the decision-making process? These questions are quite unexplored in literature: therefore, this paper sustains the idea that the access to Rdp is the result of a collective entrepreneurial behavior inside the family farms. After a brief methodological note we will look into the consumption of Rdp on behalf of family farms in the region Lazio, by dividing up the farms according their family characteristics. Some final conclusion will end the paper.

Materials and method

In this paper we define as "consumption of policy" the farmer's ability to obtain funds from rural development policies. To look into family farms' decision-making process, different typologies of family farms have been considered. By making reference to previous works (De Rosa, Bartoli, 2013), family farm typology takes into account the role of farm's assistants either exclusively employed within the farm (p/e: prevalent or exclusive) or not (np: not prevalent):

<i>Family farm typology</i>		
Young farmer and a not young assistant (Y+not Y ass.) - p/e - np	Mature farmer and a young assistant (M + Y ass.) - p/e - np	Older farmer and a young assistant (O + Y ass.) - p/e - np
Young farmers with other (assistant may be young or may be not) (Y + other)	Mature farmers with other (assistant may be old, mature or may be not) (M + other)	Older farmers with other (assistant may be mature, old or may be not) (O + other)

In order to look into the role of family in the access to Rdp, we try to link family types and adoption of rural development policy, by focusing attention on the consumption of Rdp in Italy. The second pillar of the CAP provides for multiannual support to family farms by delivering different types of measures articulated on four axes. Second axis includes surface measures, which offer annual allowances based on farmers' commitments to adopt sustainable agricultural models. In this case, farmers are subsidized for lacking revenues, due to their commitments. Axes I and III comprehend investments measures, aiming at sustaining territorial development. Differently from the previous types of measures, investment measures are strictly linked to an entrepreneurial activity, which foresees risk-taking. As underlined in a recent study by Davidova et al. (2013, 59):

In contrast to the annual direct payments offered in Pillar 1 of CAP, Pillar 2 aid can be offered in a wide variety of forms including both investment aid and regular annual payments within a multi-annual contract, and the basis of aid can vary according to the precise mix of purposes for which it is intended, in ways which reflect the characteristics of the local situa-

tion. [...] In addition, the multi-annual nature of some payments – those for natural handicap, for agri-environment and for early retirement – offers to beneficiaries a valuable element of stable income, which may be particularly attractive to those small and potentially vulnerable SSFs which have few other income sources.

Against this background, our hypothesis is that life cycle of family farms could influence the strategic choice of measures. Moreover, the eventual presence of family assistants may envisage a collective decision-making process which affects the adoption of Rdp. Few analyses have been conducted on the consumption of Rdp, by discriminating life cycle of family farms, role of assistants and farm's territorial localization. This paper tries to fill this gap in literature by providing a first analysis of the access to Rdp on the basis of family composition and the presence of assistants. Information and data are taken from the database of region Lazio: more precisely farms having been funded are considered and linked to farms from the data warehouse of the last census of Italian agriculture, in order to classify them on the basis of family composition. Information concerning number of applications and funds obtained have been gathered. Furthermore, an index of specialization of consumption of Rdp (Rdp_{spi}) has been calculated, according the following formula:

$$Rdp_{spi} = [(X_{ij} / \sum_j X_{i.}) / (Y_j / \sum_j Y_{..})]$$

Where:

X_{ij} = application/expenditure related to measure i applied by family j

Y_j = typology of family farm

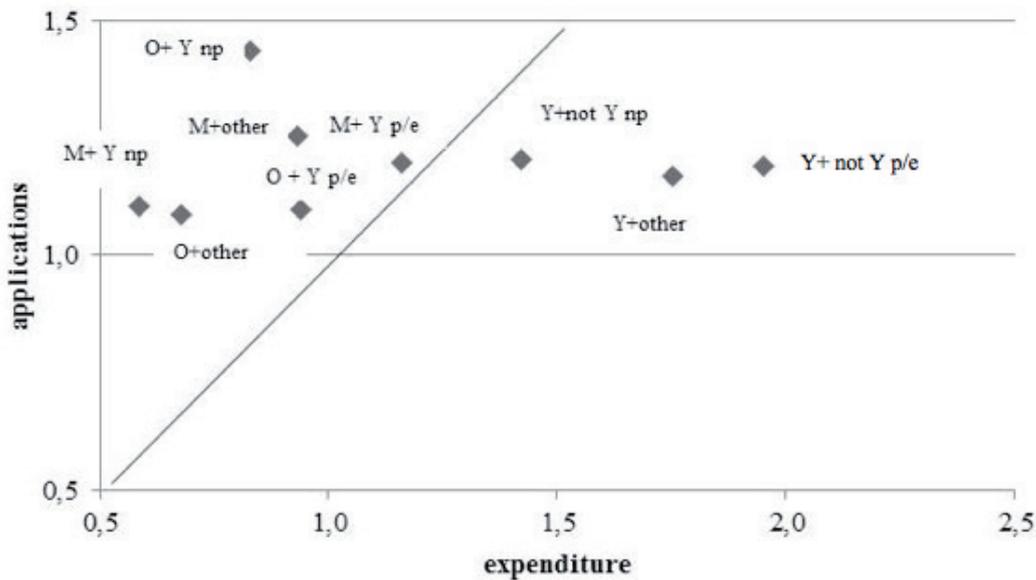
The index compares the incidence of measure i adopted by family farm j with the relevance of the same family farm typology. The indicator has been calculated at both aggregate level and split into the consumed measures. Finally, we have considered farms' localization according different areas of regional plan of rural development (urban poles, areas with intensive agriculture, intermediate rural areas and marginal rural areas). The results take into account family composition and farms' territorial localization.

Results

a) Family perspective

Figure 1 cross specialization indexes related to applications and to expenditure, divided up into each phase of life cycle. The bisecting line separates higher rates of expenditure (on the right) from higher rates of applications (on the left).

Fig.1 – Positioning of family farm on the basis of specialization in expenditure and application

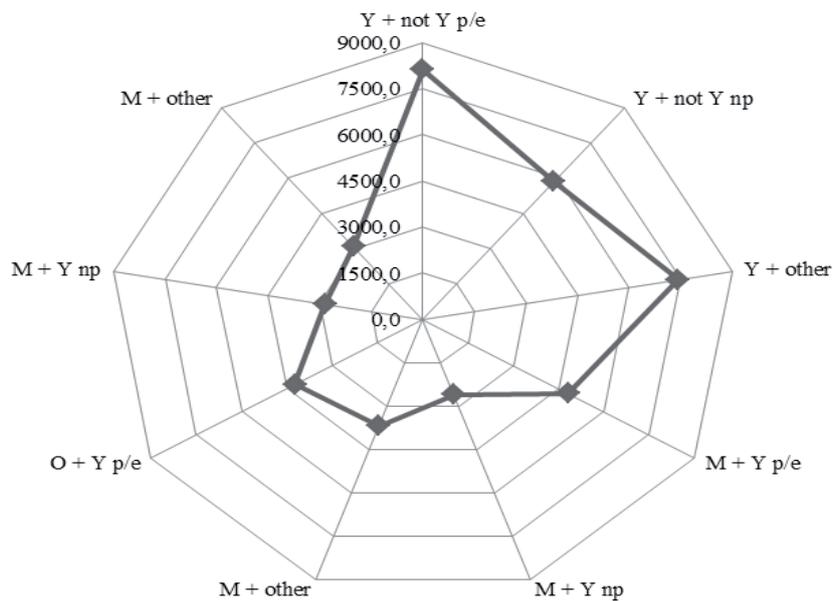


On the whole, applications are balanced among different types of family farms, while the expenditure evidences a negative correlation between life cycle and consumption of Rdp. The young families are located on the left side of the graph, which indicates showing high indexes of specialization of both applications and expenditures. The presence of exclusive or prevalent not young assistants grants good performance on the market of Rdp, by fostering high level of investment aimed at sustaining farm's growth.

The presence of not prevalent assistant reduces the access to Rdp, while in the case of other forms of assistantship, it rises again. This is true in all phases of life cycle, even if in a declining trend, when moving from young to both mature and elderly phases.

Similar considerations can be made when the average contribution obtained by farms is observed (fig.2). The supremacy of young farmers with not young prevalent assistants is evident and fosters the highest levels of contribution per farm. It is relevant to underline how in each phase of life cycle the presence of a prevalent or exclusive assistant stimulates higher performance on the policy market, in term of average contribution.

Fig.2 – Average contribution according to the life cycle of family farms and the presence of assistants



b) Territorial perspective

Table 1 shows the results of an in-depth analysis of the relationships between family composition, type of rural areas and type of consumed measures². Regarding life cycle and types of measures consumed, a clear difference emerges between young and mature phases, with respect to elderly ones. On the whole, young and mature farms gain access to investment measures, while elderly families apply for surface measures (II axis) even if at the presence of younger assistants. As far as rural areas are concerned, patterns of access to Rdp are different moving from urban poles and areas with intensive agriculture to both rural areas (C+D). As a matter of fact, for young farms located in urban poles and area with specialized agriculture, other types of families gain access to a wider set of policies; on the other side, young families with not young assistants (prevalent/exclusive or not) adopt a “traditional” packages of four measures attributable to both generational renewal and farm structural adjustment. That means the other types of families give a relatively higher contribution to the rise of agricultural added value and to the promotion of high quality agriculture: to recall Marotta and Nazzaro’s definition they are more able to sustain farm’s value portfolio (Marotta, Nazzaro, 2010; 2011). Moving towards intermediate and marginal rural areas, a more balanced access to policies between young farms type is evident. A second insight stems from the territorial indifference with respect to measures of the third axis: according to a coherent access to Rdp, interventions for farm diversification should stimulate farms located in rural areas (C+D). On the contrary, higher levels of specialization are found in areas with intensive agriculture. In rural areas the consumption of measures for farm diversification are prevalently adopted by young and mature families.

2. To simplify the description of the result we have joined prevalent and not prevalent assistants, by comparing them with other types of assistantship in the farm

Tab.1 - Specialization in consumption of Rdp: family, territories and measures consumed

	AREA A					
	Y + not Y ass.	Y + other	M + Y ass.	M + other	O + Y ass.	O + other
111	3,3	2,3				
112	2,5	2,4		0,1		
114	1,9	2,4		0,2		0,2
121	1,6	1,4	0,9	0,8	0,8	0,3
132		3,4				
133		3,4				
144	0,2	1,2	1,7	1,1	0,1	0,3
211	1,3	0,6	1,0			5,1
212	0,4	0,5	1,2	1,3	1,3	1,5
214		0,9	1,3	1,7		
216	0,0	0,3	0,8	0,5	2,3	5,1
227				3,1		
	AREA B					
111	2,8	1,3		0,7		
112	3,0	1,8	0,2	0,1	0,2	
113				2,7		
114	2,1	1,8	0,8	0,3		
121	0,9	1,2	0,9	0,9	2,0	0,6
123		2,5	2,6			0,4
132		3,4				
211	0,1	0,4	0,1	2,3	0,7	0,1
212	0,5	1,1	3,1	0,8		0,6
214	0,6	0,5	1,0	1,4	0,3	1,9
215	0,6	0,9	2,8	0,8		1,2
221	0,5	0,6	0,3	0,8		4,9
224				2,7		
311	1,4	0,5	1,6	1,3		0,7
	AREA C					
111	1,9	2,1	1,0	0,2		
112	2,4	2,1	0,2	0,2	0,2	
113			4,3	1,7		
114	2,2	2,1	0,3	0,3	0,2	
121	1,7	1,4	0,7	0,7	0,5	0,2
123	1,5	0,5	3,3	0,1		2,3
125		4,0				
132	1,0	1,0	0,3	1,3		0,7
133						
144	0,7	1,3	1,3	1,3		
211	0,6	0,6	1,6	1,6	0,4	0,2
212	0,7	0,7	0,8	1,5	0,6	0,7
214	0,4	0,6	1,3	1,2	1,5	1,7
221	0,1	0,6	0,4	1,5	2,7	1,8

224			11,1			
311	1,3	0,7	0,8	1,4		0,3
	AREA D					
111		3,0				
112	2,2	1,8		0,1		
113				2,8		
114	2,0	1,8	0,2	0,2		
121	1,5	1,4	1,0	0,5	1,0	0,0
123		0,6		2,3		
132	2,4	1,1		0,7		
144			4,8	1,5		
211	0,7	0,7	0,9	1,5	0,2	0,2
212	1,0	0,4	2,6	1,2		0,5
214	0,5	0,6	1,5	1,3	2,3	2,4
221		0,1		0,4	3,3	16,3
311	0,3	1,2	1,0	1,2		0,7

Conclusions

This paper has put forward an analysis the adoption of Rdp on behalf of family farms in region Lazio (Italy). It represents a preliminary analysis of a deeper research concerning access to Rdp on behalf of family farms. Consequently, limits due to the partiality of the results and to the necessity to integrate our investigation with on field analyses are evident. However, the first results seem interesting and stimulate to carry on our study.

To look into the complex process of decision-making inside family farms, three perspectives have to be considered, in order to get some preliminary conclusions:

- a) life cycle, assistants and access to Rdp; a systematic inverse correlation between life cycle and access to Rdp has been found, where younger families obtain higher rates of consumption, with respect to mature and elderly families. Of course, this has been already underlined in the abundant literature on family farms. The novelty here is that we have taken into account the assistant's role, either prevalent or not. In this case, the presence of an assistant marks a difference. As seen about the average contribution obtained, the presence of assistant has a high impact on upgrading the planning ability of the family farms and, as a consequence, on the aptitude to be funded. As a matter of fact, the role of assistants is fundamental in supporting either the basket of measures or the innovative types of measures to be consumed. Moreover, differently from previous studies on this topic, our research has demonstrated the relevance of the exclusive assistantship in term of higher access to Rdp. This gives emphasis to the collective dimension of decision making within family farms. A prevalent assistant, who may succeed in the farm, has high impact on the decision of applying for Rdp and on types of measures to be consumed, with special attention of interventions aiming at rising added value of agricultural products.
- b) Rural entrepreneurship in the access to Rdp is conditioned by the family life cycles, which explain different perspective of policy consumption: as a matter of fact, elderly phases are more inclined to adopt measure of the second axis, which does not require an effort of investment. However, measures of II axis are clearly aimed at supporting the environmental function of multifunctional agriculture; consequently, elderly farms give a relevant contribution to the persistency of multifunctional models of agricultural activity. On the other side, younger and mature families privilege investment measures to plan farm development; therefore, they consume more measures of I and III axis.

- c) Territorial discrepancies: in terms of different areas of the regional rural plan, very few differences between farms in the types of measured funded emerge. This result is quite different with respect to other Italian regions analyzed in recent studies. For example, in the region Campania, tools to support farm diversification have been deeply exploited in mountain areas (Marotta, 2007). On the other side, in region Lazio a coherence problem emerges, in the sense that measures specifically provided for C and D areas are not enough applied on behalf of farms working inside intermediate and marginal rural zones.

Many explicative variables should be considered to explain these dynamics: recent literature has underlined problems connected to informational asymmetries, scarcity of advising concerning measures for farm diversification (McElwee, 2006) and a sort of path dependency in the access to Rdp. Future strategies for the 2014-2020 provide for innovative tools to sustain small family farms and for a more simple mechanisms of access to Rdp. On this aspect a lot of work has to be done to deeply comprehend the real motivation for farmers to gain a full and coherent access to rural policies in the future programming period.

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Multifunctionality and firm modernisation plans. A case study in Apulia region

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Abstract:

In the context of the EU, rural development aims at safeguarding the economy of the countryside by supporting programmes to modernize and support activities in rural areas for improving income situation. The Local Action Groups process the Measures of Local Development Programmes managing financial funds for modernization of firms. Focusing on Measure 311 Axis III, it aims at diversification into multifunctional non-agricultural activities in order to provide alternative income sources. The aim is to shed some light on the successful positive influence for farms diversifying with tourism, educational and health activities by means of implementation of the Firms Modernization Plans through LAGs. We take in account such case study the Apulia Region. We collected data related to 411 farms which have applied for aid in Apulia Authority until November 2013. An integrated statistical approach was performed; in particular we used a non-parametric test for paired data in order to verify the effective influence of FMPs.

JEL

Q1 Agriculture

Q18 Agricultural Policy

O2 Development Planning and Policy

Keywords: Multifunctionality, Firm modernization Plans, Local Action Groups, Rural Development, Regional Policies

Introduction

In the context of the EU and the Common Agricultural Policy (CAP), rural development aims at safeguarding the economy of the countryside by supporting programmes to invest, modernize and support activities – both agricultural and non-agricultural – in rural areas for improving growth process and income situation (Farm Accountancy Data Network, 2010). EU countries, in special way the less favoured regions, choose measures suited to their specific needs and manage their programmes themselves. The funds comes from the European Agriculture Fund for Rural Development (EAFRD) and part of the direct payments to farmers is now reallocated to rural development through a mechanism called ‘modulation’ (Council Regulation (EC), 2005; Regulation (EU), 2013). The new rural development policies of the European Union for 2014-2020 aim at contributing to the achievement of smart growth in agriculture and multifunctional farming (Sandu, 2014; Scuderi et al., 2014). Currently, EU countries draw attention to their issues for rural development, but must use no less than e.g. 25% on improving the countryside and no less than 10% on diversifying the rural economy. The importance of multifunctional farming activities is remarkably evidenced by the significant changes made to the EU’s CAP, within its rural development policy, that represents the future of the EU rural communities and shapes the agricultural future (Andrei & Darvasi, 2012; Popescu and Andrei, 2011); so multifunctionality has received a lot of attention over the last decade from scholars and policy-makers (OECD, 2003,

2005, 2006, 2008; ENRD, 2010; Ohe, 2007; Ploeg van der et al., 2009; Jongeneel et al., 2008; Grouiez, 2011; Di Iacovo and O'Connor, 2009; Wilson, 2008; Kizos, 2010; Dessein et al., 2013; Contò, 2005). In fact, the EU in recent years has focused its attention on multifunctional farming activities fulfilling the combination of functions required by society: multifunctional land use and creation of multiple values in the rural areas (Contò et Al., 2013). Furthermore, the European Commission's Leader methodology is now well established as an effective model for funding community - based rural development activity. Countries have acknowledged the economic and social benefits that Local Action Groups (LAG) controlled bottom-up approaches can bring. The LAGs are local agencies that receive financial assistance to implement local development strategies, by awarding grants to local projects; they process the Measures of Local Development Programme (LDP) and manage financial funds for Firms Modernization Plans (FMP) by the European Union and by the EAFRD. The FMP is a tool set up by farms in order to help the LAG in requesting for public aid for the different measures. In fact, the addresses of the measures relevant to Axis III, which concern the improvement of the quality of life in the rural areas and the differentiation of rural economy, can participate in the public tenders only through a LAG. Axis III of the National Strategy Plan for Rural Development - Quality of life and diversification – and the activities of the Rural Development Plans confirm the importance of the social dimension within the context of practices and professions in agriculture in order to promote improvement in the quality of life (Contò et al., 2013). Focusing on Measure 311 Axis III, it aims at diversification into non-agricultural activities in order to support farm businesses restructuring through the development of diversified activities that provide alternative income sources. So, the measure provides an integration of income to family members through the promotion of agricultural diversification into non-traditional agricultural activities including social ones. In particular, Action 1 is related to investments for the supply of agri-tourism accommodation in the business context in accordance with applicable regulations; Action 2 provide investments for the supply of educational services and education for the population, with particular reference to the school and students and in synergy with the national education system; Action 3 is related to investments for the supply of health services for the benefit of vulnerable groups. By EU Commission Decision 2009/545/EC of 7 July 2009, Italy were awarded additional € 465,484,000 of supplementary EAFRD share (of which 369.4 million for Health Check expenses and 96,084,000 for Recovery Plan expenses). Table 1 shows the data concerning the progress percentage of expenditure related to measure 311 on the total of the Rural Development Programme of Italian regions. As you can see, Apulia Region, our case study, shows a progress percentage amounting to 67.8% (see Rural Development Programme, Decision C20139700 of 19/12/2012, updated 30/06/2014; Rete Rurale Nazionale, 2014). Among the Convergence Objective Regions (C.O.R.), Apulia region is the second region, after Sicily, and it is the eighth region among the other Italian regions. This is a positive sign of the good performance related to effectiveness of EU policy at regional level: generally speaking, higher is the progress percentage, lower is the risk of automatic disengagement. Within this framework, our objective is to get an insight into the effectiveness of EU and regional policy such as an essential tool in reaching several objectives including those to promote the development of competitiveness in rural areas. Furthermore, we shed some light on the successful positive influence for farms diversifying its activities with the tourism, educational and health activities by means of implementation of the FPMs, measure 311, action 1, 2 and 3 of LDP.

Table 1: Progress percentage of expenditure related to measure 311 on the total of the Rural Development Programme (ordinary, Health Check and Recovery Plan) - Italian regions

Regions	%	Regions	%
Abruzzo	15.18	Molise	23.74
Basilicata (C.O.R.)*	32.62	Piedmont	70.93
Bolzano	90.06	Apulian (C.O.R.)*	67.80
Calabria (C.O.R.)*	56.89	Sardinia	14.32
Campania (C.O.R.)*	44.63	Sicily (C.O.R.)*	72.20
Emilia-Romagna	61.00	Tuscany	68.41
Friuli-Venezia Giulia	57.30	Trento	68.65
Lazio	52.34	Umbria	41.99
Liguria	85.59	Valle d'Aosta	33.34
Lombardy	80.00	Veneto	64.42
Marche	53.97		

* Convergence objective regions

Source: Rete Rurale Nazionale (2014)

We take in account such case study the Apulia Region - in Southern Italy - where 25 LAGs cover the entire region: performing integrated statistical data analysis we aim at evaluating the effective positive influence of FMPs on farms differentiating their activities in not agricultural. Finally, our research questions is how the implementation of the Firms Modernization Plans can improve economic assets and modernization and growth process in rural areas. Also, this paper provides suggestions for bottom-up policy implications deriving by the LAGs developing local strategies supporting stakeholder networking.

Methodology

The aim of this research paper is exploratory (Easterby-Smith et al., 1991). As regard data collection, in order to preserve the explorative feature of the case, we have combined multiple data sources (Gersick, 1988): Apulia Authority and the Apulia LAGs. Within EU Leader + programme, pursuant to art. 62 of EC Regulation No 1698/2005, partnered local development approach shall be implemented by LAGs that are the main parties of a bottom-up planning. Each LAG is, in short, a programming tool representing the various socio-economic sectors that brings together all potential public and private parties of the development process (such as trade unions, business associations, businesses, municipalities, etc..) in the definition of a planned policy (Contò et al., 2012). Our data collection is exhaustive because all 25 LAGs, whose actions involve almost entirely, at least for inland areas, the regional territory, are analyzed and investigated with the exception of 3 LAGs – ‘Murgia Più’, ‘Terre dei Trulli e del Barsento’ and ‘Isola Salento’ - as the ranking list is ongoing. These data represent the official database containing all firms information deriving from FMPs, co-financed by EU funds 2007-2013, related to the implementation of Measure 311, Action 1, 2, 3 and submitted by farms to the LAGs. The FMP is a private initiative tool set up by farms in order to help the LAG in requesting for public aid for the different actions expected in the public notice.

Apulia Authority equips farms and LAGs with a software whose aim is collecting data by FMPs and SIAN (National Agricultural Information System) portal. This software is structured in three sections: 1. Context analysis and actual budget of farms; 2. Investments (goods and services requested by means application for aid); 3. Forecast budget deriving from the first and second section. We collected the database with these data related to 411 farms representing the total number of firms which have applied for aid in Apulia Authority until November 2013. Every

LAG has on average 18 farms submitting the FMPs to LAGs, ranging from 2 farms for the 'Città di Castel del Monte' LAG to 48 farms for the 'Gargano' LAG. The other LAGs with upper number of farms are 'Valle d'Itria' LAG and 'Capo di Santa Maria di Leuca' LAG: these LAGs are overlooking the sea and so the farms falling in ones can be more suitable to not agricultural activities. The average farm size is 41.7 ha. The production regulations was not be considered in this analysis. The individuated variables are as follows:

- *Rev_before* that are the revenues before investment representing the revenues derived from the exercise of non agricultural related activities;
- *Rev_after* that are the revenues after investment indicating the forecast of revenues from non agricultural related activities, obtained from the FMPs implementation;
- *Inv* is the total amount of the expenditure required to implement FMPs;
- *Publ Aid* indicates the net amount of contributions collected by the farms;
- *Farm Size* that is the size of the company in acres;

So, risk capital is obtained by the difference between *Inv* and *Publ Aid*.

The statistical data analysis was performed by an integrated statistical approach consisting in the following four steps: 1) exploratory analysis of the above mentioned five variables: *Rev_before*, *Rev_after*, *Inv*, *Publ Aid*, *Farm Size*; also two new variables were created $\Delta_Funds = [Inv - Publ Aid]$, and $\Delta_Rev = [Rev_after - Rev_before]$; 2) non-parametric test for paired data (Wilcoxon test) in order to verify the significance of the difference between *Rev_before* and *Rev_after* and so to evaluate the effective positive influence of FMPs; 3) estimate of non-parametric correlation coefficient of Spearman's rho between *Inv* and Δ_Rev ($-1 \leq \rho \leq +1$); 4) tests for differences between the LAGs by means of the ANOVA procedure for the above mentioned variables in order to evaluate differences of farms income among LAGs. Data analysis has been performed using the SPSS 16.0.

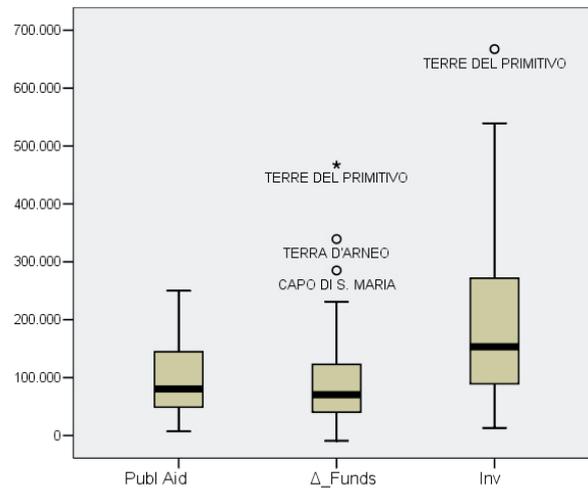
Results

The exploratory data analysis for *Rev_before* shows a mean of € 12,301.9 and a skewness to the right, while the *Rev_after* has a mean value of € 59,871.5 (Table 2). The variable *Inv* has a mean value equal to € 153,393.0 while *Publ Aid* mean is equal to € 97,377.5. The average *Farm Size* is 41.7 ha. The variables *Inv*, *Publ Aid* and *Farm size* show a low asymmetry tending to zero. All variables show a high variability, as demonstrated by the values of standard deviations. The box-plot in Figure 1 shows the greater variability of *Inv* than the *Publ Aid* that appear more concentrated; we have to pay attention to the farm outlier belonging to 'Terre del Primitivo' LAG, that spent € 667,493 such as *Inv* vs *Publ Aid* that is equal to € 200,000. The values of Δ_Funds are more concentrated than the other two variables, except for a few anomalous cases that are outliers: 'Terre del Primitivo' LAG, 'Terra d'Arneo' LAG and 'Capo di Santa Maria di Leuca' LAG.

Table 2: Mean, median, standard deviation (SD) and Skewness of the selected variables

Variables	Mean	Median	SD	Skewness
<i>Rev_before</i>	12,301.9	0.0	37,740.2	5.3
<i>Rev_after</i>	59,871.5	40,000.0	62,560.1	3.4
<i>Inv</i>	153,393.0	153,393.0	113,787.1	0.7
<i>Publ Aid</i>	97,377.5	80,000.0	58,346.4	0.5
Δ_Funds	85,612.9	70,520.0	58,036.6	1.4
Δ_Rev	47,569.6	32,400.0	46,400.7	2.6
<i>Farm size</i>	41.7	18.7	71.0	0.7

Fig. 1: Box-plot of Publ Aid, Δ _Funds and Inv (€)



Since the *Rev_before* *Rev_after* variables were shown to have a non-normal distribution (respectively, the Kolmogorov-Smirnov test for normality $Z = 4.018$, $p < 0.001$ and $Z = 7.919$, $p < 0.001$), we chose a non-parametric test in order to verify the difference between the variables. The Wilcoxon test for paired data (i.e., for each company we analyze values before and after investment) showed a statistically significant difference ($t = 20.78$, $p < 0.001$). Even *Inv* and Δ _Rev variables did not show a normal pattern (respectively, the Kolmogorov-Smirnov test for normality $Z = 3.815$, $p < 0.001$ and $Z = 3.593$, $p < 0.001$) so in order to reach the aim to analyze their correlation, we used the Spearman's rho that showed the value $\rho = 0.53$, significantly different from 0 ($p < 0.001$).

The scatter plot of Δ _Rev vs *Inv* (Fig. 2) shows an increasing but moderate trend, with a significant densification of companies for values of Δ _Rev and *Inv* less than € 100,000 and greater variability for greater values than this threshold. In particular, we note the excellence of a farms belonging to 'Terre di Arneo' LAG for the highest value of Δ _Rev.

We have to pay attention to the difference between 2 LAGs: 'Terre di Arneo' LAG and 'Terre del Primitivo' LAG. As you can see in Fig. 2, the first one is an outlier regarding Δ _Rev variable - with an investment of € 539,240 euro (and a value of risk capital equal to € 339,240) - while, as you can see in Fig. 1, 'Terre del Primitivo' LAG is outlier value regarding risk capital (Δ _Funds) that is equal to € 467,453 (both farms belonging to two LAGs have a *Publ Aid* value equal to € 200,000). So the value of incidence of risk capital on total investment is equal to 63% for the farm outlier belonging to 'Terre d'Arneo' LAG otherwise is equal to 70% for the farm outlier belonging to 'Terre del Primitivo' LAG. In consideration of the nature of FMPs activities aimed at diversifying activities of rural area, we can explain this difference in consideration of the degree of area 'attraction' and tourism; as regard 'Terre di Arneo' LAG, it covers a very important touristic area, the Salento, that in recent years is at the forefront as an Italian and international tourist destination (Porto Cesareo, a municipality belonging to 'Terre di Arneo' LAG, is the second touristic destination after Rimini). So developing non agricultural activities by means of the FMPs in this LAG, such as tourism, educational and health activities, is definitely more successful than in the 'Terre del Primitivo' LAG covering a part of Apulia region that is internal and much less touristic.

The ANOVA procedure was carried out and the results showed to differences significantly different (p -value < 0.001) for LAG, with respect to the seven considered variables (Table 3). Therefore

the 22 LAGs showed a strong heterogeneity. Further steps are related to investigate the causes that have led to a heterogeneity of investment and public aid (policy markers, pre-existing structural conditions, support strategies, services and info point etc..). The explanation can be due to the essence of Leader approach that is a bottom-up approach with a decision-making power for LAGs concerning the elaboration and implementation of local development strategies, and multi-sectoral design and implementation of the strategy based on the interaction between actors and projects of different sectors of the local economy. As actors, strategies and multi-sectoral design are strictly lie to environmental, economic and territorial context, results change depending on the considered area. If we pay attention, for example, on the above mentioned LAGs, we can highlight a different shareholding structure that is crucial in determining the effectiveness of a regional policy; in the case of 'Terre d'Arneo' LAG, it is composed by 115 members between local governments and government agencies, trade associations, banks and, in particular, 9 municipalities and 101 private partners; 'Terre del Primitivo' LAG shareholding structure is composed by 11 municipalities and 62 private partners (organizations, professional and trade associations, economic actors).

Fig.2: Scatter plot of Δ_Rev vs Inv (€)

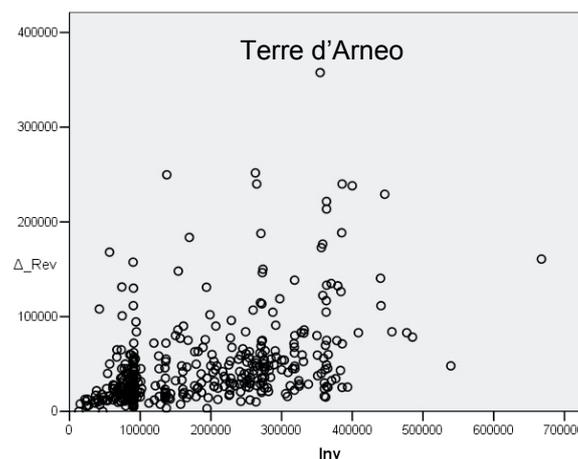


Table 3: ANOVA results for the selected variables

Variable	df	Mean Sq	F-value	p-Value
<i>Rev_before</i>	21	3261726,370.46	2.46	<0.001
<i>Rev_after</i>	21	9036163,412.65	2.48	<0.001
<i>Inv</i>	21	50276148,759.75	4.50	<0.001
<i>Publ Aid</i>	21	13400142,395.37	4.67	<0.001
Δ_Funds	21	12037676,814.43	4.15	<0.001
Δ_Rev	21	5129190,399.72	2.57	<0.001
<i>Farm size</i>	21	12,976.26.	2.81	<0.001

Finally, in line with the aims of this preliminary exploratory research, the results of this study provided an hint on the effectiveness of regional policy such as an essential tool in reaching several objectives including those to promote the development of competitiveness in rural areas. The results highlights the role that FMPs can have in influencing the variation of revenues and

in ensuring a greater share of total income in farms that decide to diversify with investments by means the three Actions of Measure 311 of Local Development Programme.

Conclusions

Research was exploratory, and then, by its nature, needs further empirical validation. The research builds a workable framework for an analysis of economic opportunities and benefits offered by implementation of FMPs. This implementation can lead to develop and promote rural areas and, so increasing the farm income. The theoretical considerations established at the beginning of this paper drew the attention to the importance of investment in the growth process, especially when one is dealing with less favoured regions. Despite the numerous difficulties that can stand out, investment is likely to have a relatively more significant impact, given the expected externalities. The expected results can be consistent with the theoretical and policy review that has been undertaken. The crucial aspect to be remembered is the relevance of diversifying the rural economy in order to modernize and support new activities and so to improve the quality of life in the countryside. Results deriving from analysis of data – before and after FMPs implementation - highlight how favouring an integrated and multi-functional approach is crucial for the revitalizing rural area, so creating innovative organizational models able to develop new jobs and improve competitiveness. In accordance with the literature, a few years are required before the effects of development policy is reflected on the financial statements of individual farms. Therefore, it is necessary a deeper study, taking into account the average revenue related to non agricultural activities after typically 3 years post-investment. Concluding, in consideration of the good performance of Apulia Region about percentage of expenditure of measure 311 on the total of the RDP and analyzing our results, we can say that as regard the effectiveness of EU policy at regional level we have a not high level of risk of automatic disengagement: this can be considered crucial in order to define the importance of the multifunctionality as possible main tool of economic recovery in rural areas. So further steps are aimed at obtaining and analysing the real value of revenues post-investment by means of administrating a web survey to the 411 selected farms. Confronting business forecast level with the real values is crucial in order to define the effectiveness of a regional policy to avoid a waste of economic resources too; then a impact valuation should be carried out in order to investigate in which measure a defined investment follows the desired direction.

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Empirical Survey on Business Models of Kindergarten Farms

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Abstract:

In this paper we present a study regarding a new social farming initiative: the kindergarten farms. The aim of the paper is to emphasize the value of potential synergies between agricultural and educational world focusing the attention on entrepreneurial model, on economic results, on types of farming, on territorial context and the role of the public decision-maker.

Six kindergarten farms were analyzed, that is all those farms that have joined the project “Modello Agrinido di Qualità” of Marche Region (D.G.R. n. 722 on 24th May 2011).

A questionnaire, which is highlighting the economics, societal benefits, constraints and wishes to policy, was developed and tested to collect the case studies data, while the Canvas Business Model (CBM) has been chosen to analyse the entrepreneurial model and the economic results of these particular multifunctional and professional farms. Moreover we tested whether this strategic management tool is suitable to analyse the type of multifunctional farming.

keywords: Social farming, Kindergarten farm, Canvas Business Model

1. Introduction

Multifunctional agriculture is of great interest all over Europe. A huge variety of concepts and strategies exist under the umbrella of multifunctional agriculture.

The image and perception of both agriculture and rurality by the side of the community is changed. Farming and rurality are no longer associated with the decline and exclusion conditions, but these concepts are perceived as extremely positive reality for their environmental, social and cultural value (Casini, 2002).

The many functions recognised to agriculture make more complex the research both for new interpretive categories of activities carried out by farms, for the study of decision-making processes of farmers and the economic results achieved with the opportunity to “take advantage of the attributes of rurality for economic aims” (Basile and Cecchi, 2001).

In this paper we present a study regarding a new social farming initiative: the kindergarten farms. Besides their important care function, kindergarten farms, or rural nurseries provide important educational services, in as much as they can shape future generations’ food habit, food consumption and approach to farming. Children learn to appreciate and respect nature and agriculture; they learn about the healthy diet, the origin of the food and understand the link between agricultural products and food, re-evaluating the social function of the farmers. This is a crucial aspect of care farming which in this way is able to educate future consumers for sustainable production and consumption, indispensable to build sustainable food systems (FAO, 2014). Actually also in educational farms the children visit the farms which offer educational tours to visitors so that they can learn about specific information concerning agriculture, the environment and nutrition (Cannavari *et al.*, 2011). However several authors (eg. Montari, 2001) underline that, although there are many variables that come into play in making each experience unique and unrepeatable in the farm, in educational farms there is always the risk that the gap between the rural and natural environment and the daily life places of children can be too large

and deep therefore the few visits in the educational farms can become just so unusual and exceptional event (in time, in the manner and purpose) compared with the children lifestyle. The kindergarten farms are also a response to these criticisms.

Moreover the kindergarten farms represent a response to the lack of childcare facilities, due to the general weakness of the offer public / private, both for the specific location in marginal areas with low population density such as mountain or highly rural. These activities also represent an new way for economic diversification, for income integration, for promotion of female entrepreneurship and the approach for the rural women to reconcile work with the birth of their sons (Bertolino *et al.*, 2012).

This study focuses on the main characteristics of kindergarten farms, that are childhood facilities intended to growth and education for children from 1 to 3 years old, in a farm context.

The aim of the paper is to emphasize the value of potential synergies between agricultural and educational world focusing the attention on entrepreneurial model, on economic results, on types of farming, on territorial context and the role of the public decision-maker.

Six kindergarten farms were analyzed, that is all those farms that have joined the project “Modello Agrinido di Qualità” of Marche Region (D.G.R. n. 722 on 24th May 2011).

A questionnaire, which is highlighting the economics, societal benefits, constraints and wishes to policy, was developed and tested to collect the case studies data, while the Canvas Business Model (CBM) has been chosen to analyse the entrepreneurial model and the economic results of these particular multifunctional and professional farms. Moreover we tested whether this strategic management tool is suitable to analyse the type of multifunctional farming.

2. Methodology

Among the care farming, the kindergarten farm presents peculiar characteristics: 1) its customer segments are the families with 1-3 years children who live in peri-urban or rural area; 2) it offers a service that has a market value and a social value (value proposition); 3) it establishes with customer innovative relationships that are no-traditional for farm; 4) it uses innovative channels to reach new actors that were not linked before; 5) its revenue streams come from families and public institutions; 6) its social benefits are partly measurable; 7) it arises and develops within a peri-urban or rural farm using both internal and external resources (Key resources); 8) its key activities are educational even with the use of plant-based and animal-based exercise; 9) its key partnerships are with actors of different sectors that were not linked before; 10) its cost structure includes no- traditional costs for farm; 11) its social costs are partly measurable.

To investigate all these characteristics we interviewed the organizers of six Italian kindergarten farms using the standardized questionnaire developed and tested by Working Group 3 “Entrepreneurial Models of Urban Agriculture” within the EU COST-Action “Urban Agriculture Europe” (Alfranca *et al.*, 2013). The questionnaire is addressed to the overall functioning of the farm and asks for both quantitative and qualitative information and data about: i) the purpose of the activities; ii) geographical situation; iii) markets and marketing; iv) institutional environment; v) success factors; vi) problems and; vii) societal benefits. The interviews were carried out in March, 2014.

The data collected during the interviews are the essential source for understand the organization of the six kindergarten farms through the Canvas Business Model (CBM) as proposed by Pölling and Lorleberg within the WG3 “Entrepreneurial Models of Urban Agriculture”, for investigating and analysing business models of urban and peri-urban agricultural enterprises and projects.

In this study the CBM is used to investigate and analyse the entrepreneurial model and the economic results of the kindergarten farm, as a particular form of care farming, with the aim to define the types of farming organization and make suggestions for policy.

According with Osterwalder and Pigneur (2010:14) *“a business model describes the rationale of how an organization creates, delivers, and captures value”*. They (2010:15) described a business model through nine basic building blocks that *“cover the four main areas of a business: customers, offer, infrastructure, and financial viability”*. These nine blocks are: Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships and Cost Structure.

According with Mahadevan the three questions *“who?”, “what?”* and *“how?”*(Markides, 2000),*“form the core elements of a business model”* (Mahadevan, 2004:2). This author describes the *“who”* as the identification of customers and their need, and so as the target group for the business; the *“what”* aspect of business model specifies the value proposition; the *“how”* dimension refers to the operational aspects of the business. Lundy et al. (2012) add a new question, *“how much?”*, to describe revenue and cost. Pölling and Lorleberg (2014) suggest to link the four fundamental questions with the four main areas: *“who? – customers”, “what? – offer”, “how – infrastructure”* and *“how much? – financial viability”*.

To properly analyse the social farming in our opinion should be taken into account other two areas (relationships and supplier) and other two blocks (social costs and social benefits).

The supplier is who organises the key resources and coordinates all partners, while the relationships represent the farm’s networks, intended as all the contacts with customers and partners. The block of social costs is the public support necessary to ensure the social service, while the block of social benefits is how much the Institution saves with a social service activation through the social farming.

Our proposal of a CBM for social farming is shown in figure 1.

Figure 1 - Canvas Business Model for social farming

KEY PARTNERSHIP (8)	KEY ACTIVITIES (7)	VALUE PROPOSITION (2)	CUSTOMER RELATIONSHIP (3)	CUSTOMER SEGMENTS (1)
Who? Suppliers How? Relationship	What? Offer	What? Offer	How? Relationships	Who? Customers
<i>The network of suppliers and partners that make the business model work</i>	<i>The most important activities a company must do to make its business model work</i>	<i>The bundle of products and services that create value for a specific customer segment</i>	<i>The types of relationships a company establishes with specific customer segments</i>	<i>The different groups of people or organizations that the company aims to reach and serve by its products and services</i>
	KEY RESOURCES (6)		CHANNELS (4)	
	How? Infrastructure		How? Infrastructure	
	<i>The most important assets required to make a business</i>		<i>How a company communicates with and reaches its customer segments to deliver a value proposition</i>	
COST STRUCTURE (9)		REVENUE STREAMS (5)		
How much? Financial viability		How much? Financial viability		
<i>All costs incurred operate a business model</i>		<i>The cash a company generates from each customer segment</i>		
SOCIAL COSTS (10)		SOCIAL BENEFITS (11)		
How much? Financial viability		How much? Financial viability		
<i>Public support necessary to ensure that social service</i>		<i>How much the Institution saves activating a social service through a social farming</i>		

Source: Own figure based on: Osterwalder and Pigneur, 2010; Lundy et al., 2012; Henriksen et al., 2012; Pölling and Lorleberg, 2014.

The figure presents the combination among the four essential questions, the six main areas and the eleven blocks. The eleven basic building blocks should be analysed in the following order for a systematic proceeding: 1. Customer Segments, 2. Value Propositions, 3. Customer Relationships, 4. Channels, 5. Revenue Streams, 6. Key Resources, 7. Key Activities, 8. Key Partnerships, 9. Cost Structure, 10. Social Cost, 11. Social Benefits. Then a common understanding offers suitable preconditions for comparative analysis of different farms.

3. Case studies

We examined the six farm that are part of the Project of “Quality Kindergarten Network” (*Progetto Rete Agrinido di Qualità*) generated from a collaboration agreement between the Montessori Foundation-Chiaravalle and Department of Agriculture of Marche Region.

The project was designed to finance the start of quality kindergarten experience located both in mountainous and disadvantaged areas (where education services are deficient) and in peri-urban areas (where there are sufficient existing services) with the objectives of maintaining population’s employment in rural areas and improving the quality of life. The project aims to find new vocations and new sources of agricultural income, but also stimulate a process of cultural re-assessment and recovery of social function that the farming sector owns from ancient times.

This paper is focussing on two farms that host two Kindergartens. The first farm (“La quercia della memoria”) hosts “Nella natura” and it is located in rural area (case study A), the second farm (“Bagalini”) hosts “L’arca di Noè” and is located in peri-urban area (case study B). The method CBM has been applied in both farms.

The peculiar characteristics of the case study A are:

1. Customer segments: the customer segments are not only kids from 1 to 3 years old, but also children from 4 to 6 years old, young students from 6 to 16 years old and disabled people who live in rural area. Moreover, the farm “La Quercia della memoria” offers service to rural tourists, farms, public and private agencies and people asking for local and organically produced.
2. Value proposition: first of all the farm produces organic vegetables, fruits, cereals, poultry and it sells directly food produced. Furthermore the farm offers a lot of services, such as education of kids, assistance of people with disabilities, environmental education, advice and training on environmental sustainability and farm holidays.
3. Customer relationship: personal relationships are the strong point of “La Quercia della memoria” which maintains personal relationships with all customers.
4. Channels: farm uses several channels in order to reach new customer. Particularly the most important channels are environmental, social and agricultural associations, direct marketing and regional projects.
5. Revenue streams: the estimate of revenues shows importance of tradition multifunctional activities (selling organic products: 20,000 euro and selling agri-tourism services: 28,000) and also it highlights substance of new multifunctional activities (selling educational services for kids and for students: 28,000 euro and 4,000 euro, selling social services for disabled people 4,000 euro) and government subsidies (22,000 euro).
6. Social benefits: social benefits are represented by the savings of government subsidies for kid (saving government subsidies for kindergarten per kid: 6,353 euro)
7. Key resources: the farm labor involves family workers; the land, building and machinery belong to the farm. The teacher is the only external resource.
8. Key activities: “ La Quercia della Memoria” bases its activities both on organic farming and selling its products directly. It’s a multifunctional farm offering agri-tourism service, kindergarten, environmental education (WWF Centre) and assistance for people with disabilities.
9. Key partnership: Marche Region is the most important partner followed by WWF, European Network of Eco-museum, National Park of Monte Sibillini, Fairtrade Italy, Mediterranean Association of Organic Agriculture, Mediterranean Institution of Certification, Town of San Ginesio and Town of Cessapalombo.
10. Costs Structure: the estimate of costs shows importance of tradition multifunctional activities (production of organic food: 24,000 euro and management cost of agri-tourism: 18,000) and also it highlights substance of new multifunctional activities (management cost of kindergarten: 16,500 euro, salary for kindergarten teacher: 15,000 euro, management cost of farm events and shop: 2,500 euro).
11. Social costs: they include government subsidies for kindergarten farm for kid (2,570euro) and the incurred costs that each family have each year (2,059 euro).

The peculiar characteristics of case study B are:

1. Customer segments: the customer segments are kids from 1 to 3 years old, children from 4 to 6 years old and young students from 6 to 10 years old. Moreover, the farm satisfies customer meets the demands of customer which asking for tasting and buying local products, courses of cooking and painting and also asking for summer camp.

2. Value proposition: the farm produces vegetables, olive oil, beef and it sells directly in farm the food produced. Furthermore the farm “Bagalini” offers a service of education of kids, entertainment during the holidays and several training.
3. Customer relationship: also for the farm “Bagalini” personal relationships are the strong point. The farm maintains personal relationships with all customers.
4. Channels: the most important channels for the farm are direct marketing and regional projects.
5. Revenue streams: the estimate of revenues shows importance of the direct marketing (selling meat: 130,000 euro, selling olive oil: 4,000 euro, selling tasting local food:30,000) moreover it highlights substance of selling educational services (56,000 euro), selling farm courses (6,000 euro) and government subsidies (22,000 euro).
6. Social benefits: social benefits are represented by the savings of government subsidies for kid (saving government subsidies for kindergarten per kid: 7,851 euro)
7. Key resources: the farm labour involves family workers and external qualified workers; the land, building and machinery belong to the farm. The kindergarten needs 2 teachers (external resources).
8. Key activities: the farm bases its activities both on breeding livestock and producing olive oil, and selling its products directly. The main services offered are kindergarten, tasting local products and cooking and painting courses.
9. Key partnership: Marche Region is the most important partner followed by professional agricultural association.
10. Costs Structure: the estimate of costs shows importance of agricultural productions and direct marketing (management costs of breeding livestock: 60,000 euro, production and processing olive oil: 3,000 euro and management costs of farm shop: 5,000 euro) moreover it highlights substance of external resources (salary for kindergarten teachers: 30,000 euro and salary for qualified workers: 80,000 euro) and both educational activities (management costs of kindergarten: 30,000 euro) and other farm activities (management of farm events and tasting room: 6,000 euro).
11. Social costs: they include government subsidies for kindergarten farm for kid (1,072 euro) and the incurred costs that each family have each year (2,059 euro).

4. Result

The case studies examined show that there are real synergies between agricultural and educational world. In particular the network of quality Kindergarten has developed thanks to three elements: 1) attention to agricultural and social problems by the Marche Region and its foresight to experiment new “practice” combining different expertise; 2) the existence of an educational method, Montessori method, that encourages the development of the child’s will and it recognizes the added value of nature in children’s education; 3) the existence of family farm where culture and experience are applied and is preserved (Van der Ploeg, 2014) and of a new generation of agricultural entrepreneurs who are careful to the quality of life for themselves and others. The study of entrepreneurial model through CBM highlights the growing complexity in the farms management: more and more customer segments and relationship, value proposition, key partnership, key activities and resources come into play.

The complexity of new entrepreneurial model determines another question: the identification of types of farming. The types of farming traditionally are identified according with the structure which the business takes respect to size, productive factors used, relationship between entrepreneur and productive factors (Serpieri, 1929), relationship among farm business, labour and property (Medici, 1951), multiple activities of family farming (Marinelli et al., 1998), dynamic

relationships between farm business and agro-food system (Mantino, 1995). Today probably is necessary to use other classification criteria, such as: subject, farm functions, localisation, customer segments, key partnership (table 1).

Table 1 - Comparison between two case studies

Characteristics	Case study A	Case study B
Subject	Professional agriculture	Professional agriculture
Localisation	Rural area	Peri-urban area
Utilized agricultural area, ha	8	50
Breeding livestock, heads	0	100
Asset value, euro	260,000	1,550,000
Estimated Revenue streams, euro	84,000	226,000
Revenue from production	24%	59%
Revenue from social service	43%	25%
Revenue from recreational service	33%	16%
Wage worker	1	6
Family worker	2	2
Volunteer	1	0
Functions		
Production food	yes	yes
Social- rehabilitation and care	yes	no
Social-educational	yes	yes
Tourist -recreational	yes	no
Environmental and biodiversity	yes	no
Direct selling	yes	yes
Social-leisure well-being	no	yes
Estimated Net farm income, euro	30,000	95,000
	15,000	47,500
Estimated Net farm income per family worker, euro		
Saving government subsidies for kindergarten per kid, euro	6,353	7,851
Increase the share attributable to the family per kid, euro	2,059	2,059

The study shows that the economic results are significantly positive. The net farm income per family worker is 15,000 euro in the case study A and is 47,500 euro in the case study B. This results explains that farms can get positive labour income when they have multiple functions and when they receive adequate financial support from public institution. The best results achieved by the farm in peri-urban area (compared with the one's located in rural area) is due to several factors: it is located in most densely populated area, it produces high-value products (meat, olive oil) and the social services are more specific.

The average annual government subsidies per kid is of 2,570 euro in the case study A (kindergarten in rural area with 7 kids) and it is of 1,072 euro in the case study B (kindergarten in peri-urban area with 14 kids), without considering the regional resource to cover part of investment costs for structural adjustment (20,000 euro per kindergarten).

Whereas the Italian municipalities spend per kid an average annual subsidies of 8,923 euro in directly managed services, the saving of government subsidies per kid is, respectively, of 6,353 euro and 7,851 euro.

Instead, whereas the Italian municipalities spend per kid an average annual subsidies of 4,239 euro in the structures subcontracted to third parties, in this case the saving of government subsidies per kid is respectively of 1,699 euro and 3,167 euro. Therefore kindergarten is more economically sustainable.

The share attributable to the family per kid increases: plus 2,059 euro. Despite this, the overall balance is positive, considering the saving of public administration and the social distribution of the benefits.

Finally we underline that the government subsidies are crucial for rural area farms since the peri-urban area farms are able to attract more children.

5. Conclusion

In this study we underline how new actors (farmers, environmental educators, ...), in atypical contexts (the kindergarten) and with specific work methods, are proposing (or re-creating) knowledge and lost knowledge, offering both the opportunity to make direct experiences and places where the children can grow as citizens aware of being part of a system in which they must survive.

On one side the study emphasizes the importance of the union between agriculture and growth/development in the early years of children life and the merit of the alliance between the agricultural and educational world; on the other side, the survey shows that the economic result of this new farm activity are significantly positive. Thus the kindergarten can be considered properly an new way for economic diversification, for income integration in a multifunctional view of the farm. The study underline also the importance of the role of the public decision maker for both establish the legislation about the kindergarten and support this new activity; this concept is more important if you take into consideration the saving of government subsidies derived from the kindergarten, as the study showed.

In this contest the EU Policies, particularly the 2014-2020 Rural Development Programme (RDP) for the regions, will be crucial for support these new activities of Social Farming.

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Social Capital and the Leader Approach: from Theory to Empirics

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Abstract:

Intangible resources like social capital (SC), if supported by proper governance mechanisms, can positively influence development processes, contributing for example to the reduction of socio-economic marginalization of weak rural areas. Within the EU LEADER Approach, through stakeholders cooperation and networks creation, Local Action Groups (LAGs) should generate SC.

On the basis of empirical evidence collected through questionnaires to 9 LAGs (case studies) in 4 Italian regions, this paper provides a set of 96 innovative indicators for understanding how structural and cognitive SC contribute to increasing LEADER performance. After normalization and aggregation, only 79 were selected for comparative analysis. Social Network Analysis was used for describing relations among stakeholders. Results consist of analytical descriptions of indicators' values for each LAG and comparisons among indicators, which allow causes of excellence to be highlighted in each explored dimension of SC.

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Keywords: Social capital, Governance, LEADER Approach, Evaluation methodology

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Introduction

Social capital is a multi-faceted concept analysed by different theoretical frameworks in the social sciences domains (Bourdieu, 1986; Coleman, 1990; Putnam, 1993; Arrow, 1998, 2000; Lin, 2005; Burt et al., 2013.). With specific reference to economics, social capital is assumed to be a type of capital owned by individuals or groups and based on the endowment of social networks, norms of reciprocity, trust, and common understanding that facilitate collective action and promote social innovation. The measurement of social capital is a central and complex question, contested by influential authors who disagree on definitions and on the claim of its inherent positive connotations (Teilmann, 2012). Durlauf sustains that social capital is a

concept “ill-defined, with different authors attributing different meanings [...] and tautologically present whenever a good outcome is observed” (1999, p. 2). Similarly Solow (1995) sustains that if cultural and social formations are considered analogous to a concept of stock, they must be characterized by the following essential elements (i) comparability with other measured forms of capital (ii) identification of investment and depreciation processes, enhancing or reducing the stock values, and (iii) necessity to define a clear measurement system. Notwithstanding Solow’s criticisms, Sabatini (2009) observes that, in the last decades, empirical analyses quantifying the social capital value have substantially increased and authors measure social capital by using different indicators based on its key dimensions (networks, trust and social norms).

In recent years, the role of social capital in the development of rural areas has obtained increasing attention (Hurlings, 2012; Tamásy and Revilla Diez, 2013; Koutsou et al., 2014), focusing on the positive capacity of social capital to promote rural development by limiting the negative impacts of rural abandonment, biodiversity depletion, unemployment, social exclusion, and contributing to the diffusion of new services, social innovation, protection of natural and cultural heritage, as well as sustaining new forms of governance and landscape management in areas characterized by socio-economic marginality (see e.g. Wiesinger, 2007; Farrel and Thirion, 2005), but also pointing out the negative side of social capital in rural areas (Sørensen, 2014). Different contributions have been proposed in order to measure the accumulation of social capital in rural areas with direct indicators 33! (Franceschetti ed, 2009; Nardone et al., 2010), all of them carefully accede to Fine’s criticisms on the social capital tautology (2001), by differentiating what social capital is and what its outcomes are.

This paper proposes a method/tool for quantifying the value of social capital in specific European rural organizations – the Local Action Groups (LAGs) of the LEADER Approach (LA) (2007-2013) – based on the assessment of its key structural, normative-cognitive types and its effects on the local governance structure, this last aspect has not having been carefully considered in previous analyses. We designed the method to assess a central immaterial feature of the quality of life in rural development policy with the specific purpose of avoiding the critical elements that are present in the evaluation frameworks proposed by the Evaluation Helpdesk of the European Evaluation Network for Rural Development (ENRD, 2010) and in the Metis Report (2010) (for a detailed analysis of the evaluation frameworks see Christoforou and Pisani, 2014); a brief description is given in the first section. The second section explains the method (the three surveys used, indicators, statistical population analysed and normalization technique). The results (third section) present some of the measures of the different types, dimensions and sub-dimensions of social capital and related governance themes in 9 Italian LAGs, highlighting in which ways these measures are useful for the monitoring and evaluation activities of the LAG.¹ The critical elements that need to be analysed in future researches are underlined in the conclusions (fourth section).

1. Evaluation fo social capital in the LEADER approach: state of the art

A specific analysis of social capital within LEADER has been inserted in the Mid-Term Evaluation of LEADER Plus Programme (2006), based on questions regarding: (i) the level of cooperation among rural actors within and outside the framework of the strategy; (ii) the existence of voluntary work and cooperation between municipalities during implementation of the programme. These questions have been analysed in selected case studies at European level. In addition, the final Evaluation of LEADER Plus Programme (Metis Report, 2010) has presented the success stories of the initiatives financed based on different impacts regarding economic performance,

1. This paper is too short for a full presentation and discussion of the proposed research method and its results regarding 9 Italian LAGs; for details see Franceschetti et al. eds. (in press); Pisani ed. (2014)

protection of the environment, creation of social capital and enhanced capacity of people to cooperate in local efforts.

At the time of writing, a systematic and common evaluation of social capital in LEADER applied to all European regions is not yet available. It should be noted that from the programming periods 2007-2013 and 2014-2020, the assessment of the LA has been inserted in the evaluation framework of the Rural Development Programmes (RDPs) based on articles 77-87 of Reg. (EC) no. 1698/05 and articles 67-79 of Reg. (EU) no. 1305/2013. Both normative frameworks provide evidence that RDPs are subject to ex-ante and ex-post evaluations by independent evaluators on behalf of Member States and the Commission, and to the normal monitoring activity by the Monitoring Committees. Article 69 of Reg. (EU) no. 1305/2013 states: "A list of common indicators relating to the initial situation as well as to the financial execution, outputs, results and impact of the programme and applicable to each programme shall be specified in the monitoring and evaluation system provided for in Article 67 to allow for aggregation of data at Union level". These indicators will allow the assessment of the progress, efficiency and effectiveness of the policy implementation against objectives and targets at Union, national and programme level. Moreover the evaluator will have to quantify the impact of the programme using impact indicators.

More specifically in relation to the evaluation of LEADER measures, the European Evaluation Network for Rural Development - ENRD (2010) has provided a methodological approach for assessing the impact of LEADER measures and quality of life measures. For this purpose, the ENRD has identified 7 impact categories and 14 assessment criteria; one of these seven categories is social capital, for which the assessment criteria are "Local identity and coherence" and "Networking and openness". A multi-criteria ranking tool has been foreseen as measurement instrument.

At present the evaluation of LA is much more focused on analysing how the approach is relevant to the amelioration of the quality of life in rural areas, focusing more on impacts than on processes. What it is not sufficiently clear, in our opinion, is *how* LA is going to create, promote or ameliorate the local endowment of social capital and, consequently, the local governance structure, in order to increase the socio-economic impacts of the initiatives. This is still an open question in the scientific debate.

2. Methodology

We used the definition of social capital proposed by the OECD that defines its main components and expected results: "networks together with shared norms, values and understandings that facilitate cooperation within or among groups" (2001, p. 41). The structural type of social capital refers to social networks, supplemented by rules, procedures, and precedents that facilitate mutually beneficial collective action (Hitt et al., 2001), while the normative-cognitive type of social capital focuses on the meaning and understanding that individuals or groups share: these include shared norms, values, attitudes, beliefs and predispose people towards mutually beneficial collective action (Krishna and Uphoff, 2002). Especially when referring to natural resources management, social capital is clearly interconnected with the concept of participatory governance (see e.g. Fristch and Newig, 2012), which involves innovative ways for mutual interactions of public and private actors in taking and implementing policy decisions regarding collective problems (see e.g. Peters, 2000; Kjaer, 2004; Arts and van Tatenhove, 2006). These forms of governance are typically described as multi-actor, multi-sector and multi-level (see e.g. Lemos and Agrawal, 2006). These three characteristics are the result of interactions, relationships and networks that involve power relations, negotiations and decisions – respectively among the multitude of stakeholders, different sectors of the economy and society and different institutional and administrative levels (e.g. Buizer et al., 2011; Broekhoven et al., 2012). Participatory governance often refers to the capacity of the Public Administration to activate, manage

and guide vertical and/or horizontal networks, enhancing dialogue, sharing responsibility and improving participation and coordination (see e.g. EC, 2001; Arts and Goverde, 2006). Key themes for discerning PA capacity are considered to be effectiveness, efficiency, coherence, appropriateness, transparency, accountability, legitimacy, stability, openness and inclusiveness, equity, sustainability (see e.g. Secco et al., 2011). Such an approach to governance (and to understanding governance-social capital relations) can also be adopted in other types of organisations: LAGs are private-public multi-actor and multi-sector partnerships where trust but also effectiveness, efficiency and many of the other above mentioned themes matter.

In this study, the broad concept of social capital was split into 14 dimensions according to a literature review (Franceschetti et al. eds., 2014; Pisani ed., 2014): this division helped to identify the final set of indicators, attempting to avoid overlapping, redundancies and repetitions. The structural dimensions of social capital are: A - context, B - actors in the network, C - horizontal structure of the network, D - transparency and accountability, E - reputational power. The normative-cognitive social capital was divided into: F - trust, G - network quality, H - quality of participation, I - shared values, L - conflicts. Finally, four dimensions related to governance issues were considered: M - decision-making process, N - efficiency and effectiveness, O - organizational capacity and culture, P - vertical structure (figure 1).

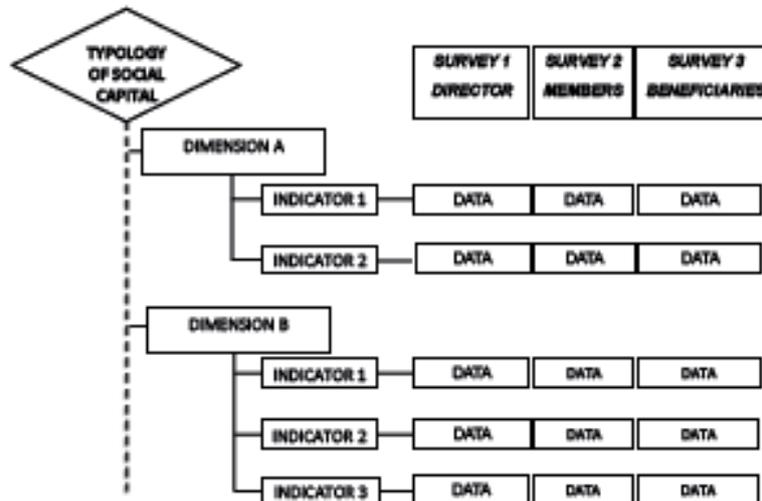
Fig. 1 – Typologies of social capital (structural and cognitive-normative) and governance

Structural SC	Cognitive SC	SC and Governance
<ul style="list-style-type: none"> ▪ A. Context ▪ B. Actors of the network ▪ C. Horizontal structure ▪ D. Transparency ▪ E. Reputational power 	<ul style="list-style-type: none"> ▪ F. Trust and reciprocity ▪ G. Institutional trust ▪ H. Quality of the network ▪ I. Quality of the Participation ▪ L. Common values ▪ M. Conflicts 	<ul style="list-style-type: none"> ▪ N. Decisional processes ▪ O. Effectiveness and efficiency ▪ P. Organizational Culture ▪ Q. Vertical structure

Each social capital dimension, as suggested by Borgatti, Jones and Everett (1998), was studied on three levels of analysis: i) the relationships among individual actors, ii) the internal relationships of the collective subject, and iii) its external relations. Each level corresponds to a group of actors: the Director, the LAG’s members, and the beneficiaries (figure 2 and appendix tables A1, A2, A3). The information and collaborative networks have been studied considering the contribution of the LAG to the improvement of the information exchange among members and the same has been done in relation to the collaborative network, assessing if the LAG has contributed to an increased cooperation among its members in relation to specific projects. The intensity of the relationship has been evaluated only in the case of the information network and this was useful in order to determine the reputational power of each member within the network.²

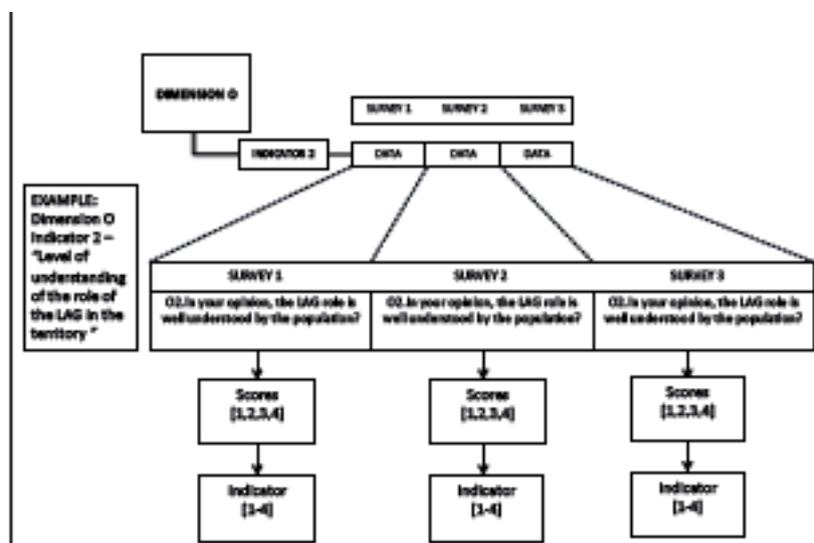
2. The question used for this purpose was “Which members of the LAG are more or less determinant in providing

Fig. 2 – The three level of analysis



Crossing the 3 analysis levels with the 14 dimensions it was possible to obtain information for creating an innovative set of 96 indicators (see appendix tables A1, A2, A3). An example is proposed in figure 3 related to the dimension vertical structure.

Fig. 3 – An example of indicator related to the dimension vertical structure



The data for the indicators were collected by means of 3 questionnaires, proposed to i) the Director, ii) all private and public partners, iii) a sample of 20 beneficiaries for each LAG, representative of the population thanks to the use of a systematic random sampling (World Bank, 2009). Face-to-face interviews were conducted in the case studies. Questionnaires were designed to collect both published (recorded in archives, websites and official documentation) and unpublished data. Questions required different types of responses: cardinal data, closed-ended on

valuable new pieces of information during the meetings? Evaluate each one using a scale from 1 to 4

ordinal scale, dichotomous, open-ended, arrays of closed-ended answers about the presence/absence of relationships with other entities. The latter type of responses was used to calculate indices of Social Network Analysis (SNA), applied for analyzing collaborative relationships, exchange of information, and the level of trust among the members of each LAG. In total, 14 out of 96 indicators were proposed using the SNA indices, where missing values were replaced with symmetric transposed values vector.

The indicators were applied to 9 LAGs, used as pilot case studies for all Italy to test the methodology. For the selection of the pilot LAGs, we first chose 5 Italian regions (see table 1). The criteria adopted in the selection process were geographical location (Italian macro regions North, Centre, South and Islands) and the average public spending estimates. The selection aimed at guaranteeing the maximum variability with respect to the number of LAGs' partners, beneficiaries, geographical location, duration of partnerships, and socio economic context.

Tab. 1: Pilot case studies

Local Action Groups by regions	Members (public and private)	Members interviewed	Beneficiaries interviewed
Prosepio Dolomiti (Veneto)	25 (11 Public 14 Private)	23	27
Bassa Padovana (Veneto)	12 (8 Public 4 Private)	11	29
Valle Umbra e Sibillini (Umbria)	33 (23 Public 10 Private)	31	25
Ternano (Umbria)	22 (10 Public 12 Private)	22	20
Gargano (Puglia)	61 (20 Public 41 Private)	61	20
Meridionale (Puglia)	85 (30 Public 55 Private)	47	4
Covesi (Sardinia)	33 (19 Public 14 Private)	21	20
Sanremo Costiera (Sardinia)	33 (19 Public 14 Private)	24	-
Sulcis (Sardinia)	76 (25 Public 51 Private)	28	27

In order to be able to compare (and subsequently to aggregate) each indicator, the data were normalized. Four hypotheses of normalization were proposed and tested through a sensitivity analysis. Lastly we chose the most robust method: all indicators were re-scaled through the ratio of the difference between the raw indicator value and all LAGs' minimum values, divided by the range of all LAGs' values. A disadvantage of this method is that the minimum and maximum could be unreliable outliers, but on the other hand it allows all indicators to be redistributed within an identical range [0-1], highlighting the differences among case studies when all values lie within a small interval.

Finally we aggregated data into composite indexes giving equal weight to each subdimension, regardless of the number of indicators contained in each one. In this way greater importance was assigned to those dimensions composed of more sub-dimensions and that are considered most important in the literature for the analysis and evaluation of social capital.

3. Results

Our aim is to provide an effective and reliable tool to analyse social capital within the LEADER Approach. The project created several outputs, useful mainly: (i) to describe and analyse each LAG, underlining internal strengths and weaknesses linked to the effective endowment of social capital, (ii) to compare LAGs on different sub-dimensions, highlighting their excellences and vulnerabilities, and (iii) to generate research hypotheses looking at the distribution of the



composite indicators' values. The first category of outputs can be used by the LAG itself for self-monitoring or by other actors (namely Regions or the European Commission) for external evaluation. Normalized indicators can be aggregated in composite indices with the same range [0-1]: in this way we get a concise and clear measurement for each social capital dimension, providing an evaluation tool for institutional decision-makers. For instance, table 2 shows strengths and weaknesses of Sulcis LAG (Sardinia region, in the Islands Italian macro-region) regarding the values obtained in the composite index 'Governance and Social Capital'.

Tab. 2 – Aggregation process of normalized indicators for Sulcis LAG (Sardinia region) for the creation of 'Governance and Social Capital' composite index.

Indicator	Value	Sub-dimension	Dimension	Dimension Value	Composite Index
N1	0.94	N/a – Internal programming capacity	N – Decision-making processes	0.91	GOVERNANCE AND SOCIAL CAPITAL 0.87
N2	1.00				
N3	1.00	N/b – Capacity to influence external programming	O – Efficiency and effectiveness	0.57	
N4	0.99				
O1	0.93	O/a – Integration in the territory	P – Organizational capacity and culture	0.50	
O2	0.96				
O3	0.98	O/b – Coordination with the LAG	Q – Vertical structure	0.75	
O4	0.92				
O5	0.28	O/c – Efficiency			
O6	0.18				
P1	0.56	P/a – Communication capacity			
P2	0.08				
P3	0.75	P/b – Internal operativity and monitoring			
P4	0.79				
P5	1.00				
Q1	1.00	O/b – Dynamics to external relations			

The final composite index value for Sulcis LAG – the highest among the case studies – was split into the four dimensions identified for governance issues (*N - Decision making processes, O - Efficiency and effectiveness, P - Organizational capacity and culture, Q - Vertical structure*) and then into the nine sub-dimensions and connected indicators. Among the different dimensions analysed, the excellence corresponds to the *N - Decision making process* (0.91), while the weakest element is the *P - Organizational capacity and culture* (0.50), based on the weak performances of the *P/a - Communication capacity* (0.32), even if partly compensated for by *P/b - Internal operativity and monitoring* (0.68). Moreover, focusing on the items of the different sub-dimensions, table 1 evidences for instance that the large number of members within the LAG's partnership reduces the efficiency of the LAG on the one hand (*O/c*), but increases the integration within the territory in which it operates on the other (*O/a*).

As mentioned, the indicators' raw values can also be used for internal monitoring in order to understand on which specific dimensions focusing for improving social capital. Table 3 shows, for example, the indicators used for evaluating the dimension *F - Trust and reciprocity*.

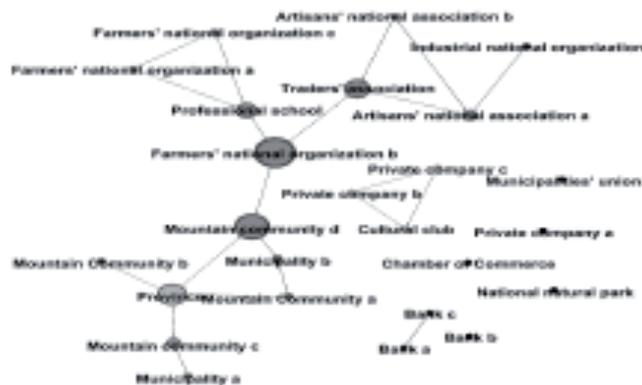
Tab. 3 – Values of indicators belonging to the dimension ‘Trust and reciprocity’ for Prealpi e Dolomiti LAG (Veneto region)

Indicator		Before normalization		After normalization	
		Value	Range	Value	Range
F1	Level of members’ trust in the General Assembly	63.16	[0-100]	0.26	[0-1]
F2*	Level of interpersonal trust of the LAG members	03.00	[0-100]	0.14	[0-1]
F3*	Level of isolation of the members of the General Assembly in terms of trust	32.00	[0-100]	0.56	[0-1]
F4	Level of trust in the LAG Board of Directors	60.00	[0-100]	0.69	[0-1]
F5	Rate of inter-temporal change of members’ trust in the LAG	2.58	[1-3]	0.33	[0-1]
FE-2	Level of trust of the members in the LAG	3.25	[1-4]	0.45	[0-1]
FE-3	Level of trust of the beneficiaries in the LAG	3.23	[1-4]	0.67	[0-1]
FE	Level of trust of the members and beneficiaries in the LAG	3.24	[1-4]	0.69	[0-1]

*level on 99%

In Prealpi e Dolomiti LAG (Veneto region, in the North of Italy) the two indicators related to SNA are quite low: the level of interpersonal trust among the LAG’s members is only 3% (indicator F2) and 32% of members are isolated from the core of the trust network (indicator F3). Figure 4 visually represents this situation: it is easy to identify the isolated members and to highlight the formation of clusters between members belonging to the same category (banks are linked only with banks, and the same happens among public institutions and among private companies). This does mean that some features of bonding social capital are present, and proposals for joint activities are needed to promote a deeper integration of the different LAG members in order to achieve an increased level of trust interconnections.

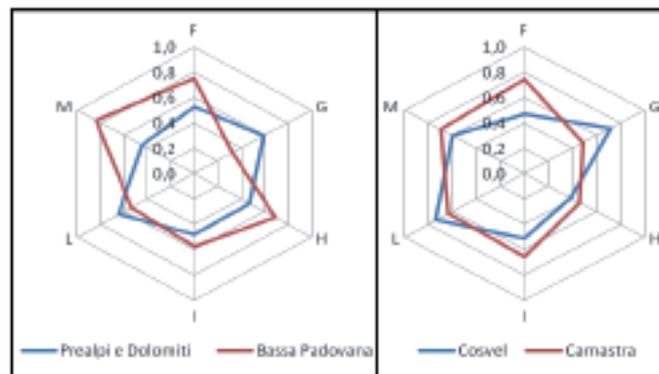
Fig. 4 – Network of trust among members of Prealpi e Dolomiti LAG (Veneto region)
Source: own elaboration based on Gephi open source software.



The second type of outputs allows the different LAGs to be compared with respect to dimensions or sub-dimensions. Figure 5 matches the results obtained in 4 LAGs of 2 different regions, related to normative-cognitive social capital. Distributions are not homogeneous, and each LAG alternates peaks of excellence with weaknesses. In addition, LAGs belonging to the same region do not have the same strengths: for example, the Prealpi e Dolomiti LAG (in Veneto region) has

its highest peaks of excellence in those dimensions that represent the weaknesses of Bassa Padovana LAG, and vice versa. In any case the data must be interpreted with caution due to different historical paths and contextual factors regarding the organizations analysed.

Fig. 5 – Values of the 6 dimensions (F, G, H, I, L and M) of normative-cognitive social capital for LAGs in Veneto and Basilicata regions



This is also confirmed by the correlations analysis: all correlations between LAGs belonging to the same region are negative, while the only correlation value that is statistically significant (with α level of 10%) is the one between Prealpi e Dolomiti LAG (in Veneto) and Cosvel LAG (in Basilicata region). Shifting the focus from LAGs to dimensions and sub-dimensions, table 4 highlights which are the LAGs with the excellences for each dimension and sub-dimension of the normative cognitive social capital. Interestingly, 8 LAGs out of 9 are “leaders” in at least one aspect of social capital, where they are likely to be considered a model for those LAGs that wish to improve specific weaknesses (for example 247! by providing sets of ‘best practices’).

Tab. 4 – Identification of the best LAGs for each dimension and sub-dimension of normative cognitive social capital

Sub-dimension	Best LAG	Dimension	Best LAG	Region
Fa – Intra-trust	Ternano	F – Trust and reciprocity	Ternano	VENETO – COGNITIVE SOCIAL CAPITAL Basilicata
Fb – Beneficiaries’ trust	Camastra			
Ga – Institutional trust	Ternano	G – Trust in institutions	Ternano	
Ha – Benefits achieved through the network	Merlano	H – Network quality	Merlano	
Hb – Partners’ contribution to the network	B. Padovana			
Ia – Participation quality in Assembly	B. Padovana	I – Participation quality	Valle Umbra	
Ib – Participation quality in Directive	Ternano			
La – Beneficiaries’ proactivity	Valle Umbra	L – Shared values	Cosvel	
Lb – Values in the network	Merlano			
Lc – Civic virtues	Valle Umbra			
Ld – Territory identification	P. Dolomiti			
Ma – Conflict	B. Padovana	M – Conflict	B. Padovana	
Mb – Satisfaction	Sulcis			

4. Conclusions

Since the 1990s, the definition and measurement of social capital have been strongly contested as ill-defined and tautologically present in every observed outcome. Taking cues from these criticisms, our study proposes a new methodology to assess the value of social capital in Local Action Groups, i.e. specific rural development organizations related to the LEADER Approach in Europe. Our results, based on a sample of 9 LAGs in Italy (pilot case studies), include: (i) an analytical description of the values of the various indicators (grouped into dimensions and sub-dimensions) for each analysed LAG; (ii) a comparison among all the indicators to underline the excellences in each dimension. It is also possible to follow the aggregation process from single indicators to composite indexes to highlight overall elements of strengths and weaknesses in each LAG. Despite it being impossible to use the values we calculated for the various indicators in our 9 LAGs for generalisations (i.e. the values, being LAG-specific, cannot be used for understanding other LAGs), we have proved the method is applicable in any type of LAG, and can thus be replicated in other LAGs, not only in Italy but also in other European countries. With adaptations, we believe it could also be used for analysing other types of public-private partnerships or multi-actors networks.

We have also pointed out some critical elements that need to be carefully considered in order to understand which variables have a relevant impact on social capital endowment of the LAG and on its capacity to promote the development of social capital in the specific territory. On the basis of our pioneering experience with the set of indicators and 9 LAGs, we list below three of the many research questions that we believe should be further explored in the future:

- How are collaborative networks and opportunistic networks going to influence the creation of new economic relationships among the LAG members and between the LAG and its beneficiaries?
- What is the role of participation in determining the reputational power of the members and the level of trust within the LAG? Are reputational power and trust correlated?
- How and to what extent does the LAG's impact (measured in terms of its inherent capacity to animate the territory) determine the future motivations of private and public actors to participate in the LAG itself, and vice versa?

Many other research questions and related hypotheses can be suggested, for example on the role of sharing social values for improving interpersonal trust among LAG's members. We hope they will attract the attention of social capital and governance scientists, as the proposed method might have interesting potentials for deepening social capital analysis.

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APPENDIX

A.1. Indicators of structural social capital aggregated in sub-dimensions and dimensions and composite index

Question to Director	Question to Member	Question to beneficiary	Code of the indicator	Indicator	Sub-dimension	Dimension	Composite index
	M		A1	Motivation for entering the LAG by its members	A/a – Access to LAG	A – Context	STRUCTURAL SOCIAL CAPITAL
		B	A2	Level of direct knowledge of the role of the LAG by beneficiaries	A/b – Knowledge of the role of LAG		
		B	A3	Level of indirect knowledge of the role of the LAG by beneficiaries			
D			A4	Composition of the public-private partnership of the LAG			
	M		B1	Level of knowledge of the general functions of the LAG by its members	B/a – Knowledge of the actions of the LAG	B – Actors of the network	
D	M		B2	Level of knowledge of the effective functions of the LAG by its members			
		B	B3	Level of knowledge of the effects produced on the territory by the projects promoted by the beneficiaries	B/b – Knowledge among the beneficiaries of the LAG		
D		B	B4	Level of mutual knowledge of the beneficiaries of the LAG network			
		B	B5	Level of knowledge of other beneficiaries of the LAG			
D	M		C1	Level of participation of the members of the LAG in the Board of Directors (annual average)	C/a – Internal participation of the LAG	C – Horizontal structure of the network	
D	M		C2	Rate of participation of the members of the LAG in the General Assembly (annual average)			
	M		C3	Rate of continuity of attendance at formal meetings by members of the LAG			
D			C4	Rate of participation in promotional events by members of the LAG			
D			C5	Rate of activation of communication channels by the LAG	C/b – Openness of the LAG		
D			C6	Level of ability in reaching new social categories of the territory by the LAG			
	M		C7 *	Density of the information network among members of the LAG	C/c – Density of the network of the LAG		
	M		C8 *	Density of the collaborative network among members of the LAG			
	M		C9 *	Rate of deviation in the private-public composition regarding the information network of the LAG	C/d – Public-private relationships within the LAG		
	M		C10 *	Level of public-private collaborative ties within the LAG			
		B	C11 *	Level of public-private ties between members and beneficiaries of the LAG			
	M		C13 *	Role of the LAG as mediator of relations among members	C/e – Pro-activity of the network		
	M	B	C12 *	Role of the LAG as mediator of relations among members and beneficiaries			
D		B	C14	Level of interactions of the beneficiaries of the LAG			
D	M	B	D1	Level of accessibility to information published on the LAG website	D/a – Transparency of the network	E – Reputational power	
D			D2	Level of monitoring activity regarding access to the LAG website			
D		B	D3	Level of collection and use of beneficiaries' proposals	D/b – Accountability of the network		
	M		D4	Level of accountability of the LAG members			
D	M	B	D5	Level of administrative services offered by the LAG to its members and beneficiaries			
D	M		E1	Reputational power of the LAG members	E/a – Reputational power of the network		
D	M		E2 *	Matching rate between reputational power of the members and their belonging to the Board of Directors			
D	M		E3 *	Level of individual contribution of the members to the heart of the LAG information network			
D	M		E4	Level of matching of members' internal and external evaluation regarding their information contribution			

* based on SNA

A.2. Indicators of normative-cognitive social capital aggregated in sub-dimensions and dimensions and composite index

Question to Director	Question to Member	Question to beneficiary	Code	Indicator	Sub-dimension	Dimension	Composite index
D	M		F1	Level of members' trust in the General Assembly	F/a – Internal trust within the LAG	F – Trust and reciprocity among the actors	COGNITIVE-NORMATIVE SOCIAL CAPITAL
	M		F2 *	Level of interpersonal trust of the LAG members			
	M		F3 *	Level of isolation of the members of the General Assembly in terms of trust			
	M		F4 *	Level of trust in the LAG Board of Directors			
D	M		F5	Rate of inter-temporal change of members' trust in the LAG	F/b – Trust in the LAG by its beneficiaries		
	S	B	F6	Level of trust of the members and beneficiaries in the LAG			
D	M	B	G1	Level of trust of the members and beneficiaries in the governmental organizations	F/c – Institutional trust	G – Institutional trust	
D	M	B	G2	Level of trust of the members and beneficiaries in the religious organizations			
D	M	B	G3	Level of trust of the members and beneficiaries in the professional associations			
D	M	B	G4	Level of trust of the members and beneficiaries in the voluntary associations			
D	M		H1	Concordance rate in the perceived benefits	H/a – Benefits achieved through the network	H – Quality of the network	
	M	B	H2	Level of added value received perceived by the members and beneficiaries of the LAG			
		B	H5	Level of innovative capacity of the LAG perceived by the beneficiaries			
	M		E5	Level of information potential arising from membership in the LAG	H/b – Contributions of the members to the network		
	M		H3	Perceived level of the value added given by members to the LAG			
D	M		H4	Level of attention to beneficiaries perceived by members and director of the LAG			
D			I1	Level of coordination mechanisms of the LAG	I/a – Quality of the participation in the General Assembly	I – Quality of the participation in the General Assembly	
D	M		I2	Level of the quality of the participation in the General Assembly perceived by the LAG members			
D	M		I3	Level of the interest perceived by the members and director in the topics discussed in the General Assembly			
D			I4	Rate of formal participation in the LAG General Assembly			
	M		I6	Level of members' perception of the efficacy of their participation			
D	M		I5	Perceived level of representativeness of the LAG Board of Directors			
	S		I7	Perceived quality of relationships within the LAG Board of Directors	I/b – Quality of the participation in the Board of Directors		
		B	I8	Rate of pro-activity (internal and external) perceived by the beneficiaries of the LAG			
D	M	B	L1	Level of perception of the civic values in the territory of the LAG	L/a – System of civic values in the network	L – Shared values	
D	M	B	L2	Level of perception of the change in the civic values in the territory of LAG			
D	M	B	L3	Level of perceived capacity to identify civic value promoters in the territory of LAG	L/b – Promoters of civic values in the network		
D	M	B	L4	Rate of presence of perceived promoters of civic values among the LAG members			
D	M	B	L5	Level of perceived identification with the territory by the members and beneficiaries of the LAG	L/c – Identification with the territory		
D	M		M1	Level of perceived internal conflict in the LAG	M/a – Conflicts among the members and beneficiaries of the LAG	M – Conflict	
			M2	Rate of presence of perceived conflict areas within the LAG General Assembly			
D	M		M3	Level of perceived skills in conflict management within the LAG	M/b – Dissatisfaction by the LAG and beneficiaries		
	M		M5*	Rate of conflict among the LAG members			
D		B	M4	Level of perceived conflict of the beneficiaries with the LAG			
		B	M6	Perceived dissatisfaction rate in selecting the beneficiaries of the LAG			

* based on SNA



A.3. Indicators of local governance and social capital aggregated in sub-dimensions and dimensions and composite index

Question to Director	Question to Member	Question to beneficiary	Code	Indicator	Sub-dimension	Dimension	Composite index
D	M		N1	Rate of a suitable temporal programming perceived by the LAG	N/a – Internal programming capacity of the LAG	N – Decision making processes	LOCAL GOVERNANCE AND SOCIAL CAPITAL
D	M		N2	Level of methodological capacity in the programming activity perceived by the LAG			
D		B	N3	Level of management skills perceived by the LAG			
		B	N4	Level of ease of access to the call for proposals or notices perceived by the beneficiaries of the LAG			
D	M	B	O1	Perceived level of integration of the LAG in the territory	O/a – Integration in the territory	O – Efficiency and effectiveness	
D	M	B	O2	Level of understanding of the role of the LAG in the territory	O/b – Coordination within the LAG		
	M		O4	Rate of spread of useful information within the LAG			
	M		O5	Level of the coordination capacity within the LAG			
D	M	B	O3	Level of functional overlap between organs of the LAG	O/c – Efficiency		
	M		O6 *	Level of efficiency in the LAG			
D			O7	Level of efficiency in the use of the website			
D		B	P1	Level of information on the functional subdivision of tasks of the LAG	P/a – Communication capacity	P – Organizational capacity and culture	
D			P5	Level of the communication capacity of the LAG	P/b – Internal operativity and monitoring		
D			P3	Level of internal monitoring of the LAG			
D			P4	Level of self-evaluation and transparency within the LAG			
D		B	P6	Level of relevance of the action of the LAG			
		B	P9	Level of perception of the organizational capacity and culture of the LAG			
D			P2	Level of training of the human capital of the LAG	P/c – Innovation capacity of the LAG		
D			P7	Fund Raising capacity of the LAG			
D			P8	Capacity in research and innovation			
D			Q1	Level of openness to external relations of the LAG	Q/a – Openness to external relations		
		B	Q2	Level of presence of communication networks between beneficiaries not mediated by the LAG			
D	M		Q3	Level of the relations of the LAG with the regional authority	Q/b – Linking vertical		
D			Q4	Level of the quality of the relation with the regional paying authority			
D	M		Q5	Level of the capacity of the LAG to influence the programming phase of the Rural Development Programme (RDP)			
		B	Q6	Level of knowledge of the complexity of the planning and management activities related to the RDP			

* based on SNA



Capturing the impacts of LEADER: the aggregative role of Local Action Groups

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Abstract:

Over the last 20 years, the LEADER approach has acted as a main driver within European policy to implement the principles of community-led local development. According to the neo-endogenous rural development concept, the LEADER method envisages external support (networking and funding) to local communities in achieving their goals. The implementation of this approach calls for a comprehensive evaluation practice accounting not only for the effectiveness of spending, but also for less tangible and locally-rooted effects such as the production of social resources (social capital). Have the Local Action Groups (LAGs), namely the operative local agencies of the LEADER Programme, actually contributed to the enhancement of the social capital of their partnerships? Which is their real contribution in terms of the network enhancement? This work attempts to answer these questions, analyzing, through some basic tools from the Social Network Analysis, the data gathered in some Italian LAGs. Specifically, the work focuses on the internal network of the local partnerships, highlighting how the LAGs have affected the quantity and quality of the social links among the partnership.

JEL: O20, P25.

Keywords: Rural development, LAGs, Social Capital, Social Network Analysis

1. Introduction

Over the past 20 years, at EU policy level, there has been a shift from supporting sector policies such as agriculture, to supporting integrated rural policies. The latter relies on the development of rural areas' capacity to sustain themselves through 'capacity building', 'community-based initiatives' and 'partnerships' (Ray 2000; Shortall, 2004).

To this aim, the European Commission (2013) encourages the adoption of a Community-Led Local Development (CLLD) approach to rural development policy. It should be community-led and implemented by Local Action Groups (LAGs), that is the local development agencies of the LEADER Programme. The underlying idea is that socio-economic well-being can be best achieved by focusing on needs and valorisation of local resources.

This policy direction leads unavoidably to the decentralization of responsibility for intervention design and implementation to local communities (Ray, 2006). However, this power devolution is strongly associated with the formalisation of the evaluation tools as the programme evaluation (Moseley, 2003). According to the endogenous rural development logic, the evaluation should account not only for the effectiveness of spending, but also for less tangible and locally-rooted effects such as the quality of participative process, the identity raising of the local community (Ray, 2006) and the social resources (social capital) improvement.

The aim of this paper is to investigate the changes in the structure of the partnership of the LAGs and then, in their structural social capital. In this view, the research questions are: did the LAGs contribute to the enhancement of social capital of their partnerships? Which was their real contribution in terms of the structural of social capital?

The definition of social capital¹ adopted in this paper is from the work of Bourdieu (1986: 249) which, conceiving it as “the sum of the actual and potential resources embedded within, available through and derived from the network of relationships possessed by an individual or social unit”, fits particularly well with the objective of the paper. Others relevant theoretical contributions to this aim are that of Burt (1992) which, focusing on the presence of structural holes, considers network variables, and the multidimensional approach of Nahapiet and Ghoshal (1998) that identify three specific dimensions of social capital: structural, normative, and cognitive. Specifically, we have analyzed the internal networks of four Italian LAGs in order to understand how they have affected the quantity and quality of the social links in the partnership’s network. The reason for choosing the LAG as survey unit is threefold. First, because the LAG is the expression of local public-private partnerships among entrepreneurs, local authorities, rural associations, voluntary organizations, etc. representing the organizational form of the local development agency (Romeo and Marcianò, 2014). Second, because the LAGs are the units targeted for intervention under the CLLD approach at the local level. Third because, despite the huge literature on LEADER and rural partnerships, relatively few empirical studies investigate social capital features processes within these partnerships applying quantitative analyses of networks characteristics. Therefore, in an attempt to overcome some of the limits affecting previous researches, this work aims to contribute to the evaluation process by proposing a framework for assessing the quality and quantity of social capital developed in the LAG partnership.

2. Methodology

To measure the aggregative role of the LAGs we adopted the Social Network Analysis (SNA) (Wassermann and Faust, 1994), that allows to analyze the *relationships* between different social entities. Within this frame, the social entities, representing the units of analysis, can be individual or collective and are defined *actors*. This does not imply that social entities have necessary a will or the ability to act. Some examples of actors can be the single persons in a group, the different departments in a company, the different towns of a country, etc.. The *relationship* can assume different forms and may include interpersonal relationships (e.g. friendship, affinity, etc.), the transfer of materials or resources from one entity to another (e.g. business transaction), affiliation relationships (belonging to the same group), behavioral relationships (e.g. exchange of information). The data used for the analysis were collected through face-to-face interviews, during a research project aiming at studying the social capital, either structural and normative-cognitive, promoted by selected Italian LAGs.

In this study, the units of analysis (i.e. the *actors* under investigation) were represented by the members of the LAGs. The *relationships* considered in this work were behavioral in nature, and were represented by: 1) exchange of information (this is referred to strategic or economic information transmitted by telephone, paper, e-mail etc..) and 2) projects cooperation (this is referred to the collaboration between the LAG’s members in one or more projects). We collected information on all the relationships belonging to these groups among LAGs’ members, regardless to their association with the implementation of the local development plan of the LAGs. Indeed the aim of the survey was to depict the overall information and cooperation exchange among the investigated actors.

The analysis was dynamic, that is it focused not only on the number of the relationships but also on their evolution. Specifically, to measure the aggregative role of the LAG, the study took

1. The literature on social capital can be distinguished in: the micro level carried out by two of the most important researchers on social capital, Bourdieu and Coleman, who focused on individuals or small groups as units of analysis, and the macro level that considers social capital not an individual asset but an attribute of the community itself. This approach argues that nations or regions can have different stock of social capital affecting the level of democracy, crime rate, corruption or economic growth (Fukuyama, 1995; Putnam, 1993).



into account how the relationships were formed, without the LAG (members already knew each other or already cooperated in one or more projects before the LAG intervention) and through the LAG (members exchanged information or collaborated in one or more project following the LAG intervention).

In order to trace the evolutionary dynamics of these relationships we used the following variables:

- *tie* ($t_{i,j}$), it indicates the kind of relationship between each pair i,j of LAG’s members and takes the following values:

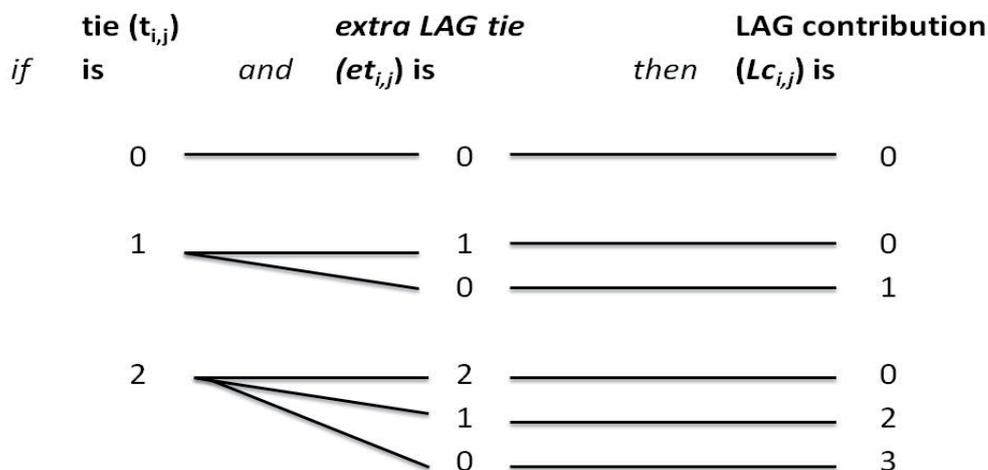
$$t_{i,j} = \begin{cases} 0 & \text{if the relation does not exist at all} \\ 1 & \text{if the pair exchanges information} \\ 2 & \text{if the pair cooperates in one or more projects} \end{cases}$$

- *extra LAG tie* ($et_{i,j}$), it takes positive values if the relationship between each pair of members i,j was established regardless of LAG, as specified below:

$$et_{i,j} = \begin{cases} 1 & \text{if the pair exchanges information independently of the LAG operation} \\ 2 & \text{if the pair cooperates in one or more projects independently of the LAG operation} \\ 0 & \text{otherwise} \end{cases}$$

The LAG contribution for each pair of members i,j ($Lc_{i,j}$) was then defined on logical basis by the comparison of $t_{i,j}$ and $et_{i,j}$ as explained in the following diagram:

Figure 1 - A computational system for LAG contributions



Explicating, the values assumed by $Lc_{i,j}$ are:

- 0 if the LAG had no impact on the relation dynamics in the pair i,j ;
- 1 if the LAG favored the information exchange in the pair i,j ;
- 2 if the LAG favored the collaboration in one or more projects between the pair of i,j but they exchanged information independently from the LAG operation (i.e. they knew each other before becoming LAG members and they kept in touch);
- 3 when the LAG favored both information exchange and collaboration between the pair of i,j .

The analysis was facilitated using matrix calculation. The variables were represented in matrix form using the *adjacency matrix* reporting the relations between each pair of actors.

The basic assumption of this computational experiment were:

A1: the relations evolve, along a fashion of three stages of intensity: 1) not existing, 2) information exchange, 3) project collaboration. Implicitly we assume that the late stages include also the characteristics of the earlier stage, that is the project collaboration also implies an information exchange.

A2: We also assume that the higher the overall intensity of the relations the better the quality of the network social capital.

The former was assumed to characterize the contributions of the LAGs, the latter gave a direction in the interpretation of the results.

3. Results

The investigation was conducted in two Italian Regions, Veneto in the North-East and Apulia in the South of Italy, from September 2012 to February 2013. All the members of four LAGs were interviewed through face-to-face questionnaires lasting about 20-30 minutes. The interviewed members were asked to compare their relations before and after the first edition of LEADER initiative to which their LAG participated.

In Veneto region two LAGs were selected as case studies: Prealpi LAG in Belluno Province, and Bassa Padovana LAG in Padova Province. They represent two different areas of the region, with different social and economic backgrounds.

The former, Prealpi LAG, has a long history and includes 26 municipalities in a large, but fragmented, mountain territory. It is characterized by the presence of the National Park of Belluno Dolomites, 19 Natura 2000 areas (covering about 36% of the area), 8 national natural reserves and 2 regional reserves. Its territory is considered a rural area affected from marginality in relation to the main infrastructures of the region.

Bassa Padovana LAG is a recent LAG, and is located in a flat area, including 30 municipalities, in the Southern part of the Province. Its territory presents a composite landscape, with a rich naturalistic, historical, and gastronomic heritage, and it is characterized by historic towers and castles of the medieval period and elegant villas born during the Republic of Venice.

In Apulia region, the investigation was conducted in collaboration with two LAGs (Meridaunia, and Gargano) operating in the Province of Foggia. Their socio-economic background is quite similar. They share the most important social and economic features common to nearly all parts of the province. Except for the capital town of Foggia, the rest of the territory is rural. On average, more than 15% of total production in these areas comes from the agricultural sector and agricultural employment varies between a minimum value of 20% and a maximum of 40%.

In particular, the Meridaunia LAG is located in a mountainous area, characterized by a severe emigration flow and aging of the current residents. The main activity is the agriculture, particularly based on the cultivation of wheat and on the rearing of goats and sheeps. It was formed during the second edition of LEADER and accumulated a certain amount of experience in planning activities but they faced different problems.

Most of the GDP of coastal areas of the Gargano comes from tourism. On the contrary, the economy of internal areas relies on the agricultural sector. This LAG faces problems related to the failure of local initiatives during the first edition of LEADER. As a result, this area experienced a loss of faith in local institutions which prevented the formation of a partnership during the second edition of LEADER. The current partnership was formed with LEADER +.

Table 1 - Key features of the study cases

Key features	Gargano	Meridaunia	Bassa Padova	Prealpi
Number of Municipalities	14	30	30	26
Surface(Km ²)	1,700	2,275	526	1,344
Inhabitants	126,000	98,100	110,000	138,871
Population density (Inhabitants per Km ²)	74	43	209	103
Members	61	85	12	25
Total fund (euro)	25,285,770	21,757,985	9,515,451	18,103,048
public funds (euro)	15,231,048	14,564,803	5,538,834	10,141,914
Public Expenditure per inhabitants (euro)	121	159	87	130

Source: our elaboration on data from ISTAT and LAGs' Local Action Plans

Table 2 shows the contribution of the LAGs in creating and transforming the relations among their members. Row (a) represents the number n of members belonging each LAG, row (b) is the number of possible relations occurring within each LAG. This number is calculated as $n*(n-1)$. Row (c) reports the amount of relations among the n members of each LAG, existing independently of the LAG's operation, that is the relations generated by other (alter) mechanisms or mechanisms external to the LAG. These relations are distinguished in information exchange (row d) and projects cooperation (row e). Each measure is expressed both in absolute terms and as a proportion on the total number of possible relations (in brackets).

Most interesting is the row (f) showing the amount of relations affected by the LAG's activity. These amount was split into three parts: relations of information exchange created *ex-novo* by the LAG (row g), projects collaborations created *ex-novo* by the LAG (row i), and existing information exchange evolved in projects collaborations thanks to the LAG (row h).

Table 2 - The aggregative role of the LAGs

Indexes	Gargano	Meridaunia	Bassa Padovana	Prealpi
# Actors (a)	61	85	12	25
# of possible relations (b)	3660	7140	132	600
Alter(%tot) (c)	933(0.255)	214(0.030)	61(0.462)	254(0.433)
alt-info(%tot) (d)	653(0.178)	191(0.027)	41(0.303)	160(0.255)
alt-Coop(%tot) (e)	280(0.077)	23(0.003)	20(0.152)	94(0.168)
Lag(%tot) (f)	474(0.129)	399(0.056)	47(0.356)	247(0.411)
Lag-info(%tot)[%potential] (g)	177(0.048) [0.065]	262(0.036) [0.038]	7(0.049) [0.098]	78(0.123) [0.223]
Lag-info_into_Coop(%tot) [%potential] (h)	280(0.075) [0.429]	0(0.0) [0.0]	40(0.278)[1]	155(0.245) [0.969]
Lag-Coop(%tot) [%potential] (i)	17(0.005) [0.006]	137(0.019) [0.020]	0(0.0) [0.0]	17(0.027) [0.049]

Source: our elaboration

For each measure, three kinds of data are available: the absolute amount, and two relative measures expressed as the ratio of the relations affected by the LAG on 1) the total number of possible relations (in brackets) and, according to the A1, 2) the number of relations potentially under the effect of the LAG [in square brackets], that is those relations the LAG can potentially improve according to the computational system depicted in figure 1. Consequently, the potential of improvement depends on the kind of the relations under scrutiny. For the information exchange (row g), the potential is represented by all the possible relations that do not exist yet (b-c). For the projects cooperation (row i), the potential is represented by all the potential relations that are not yet projects cooperation (a-e). Finally, for the information exchanges transformed in cooperation (row h), the potential is represented by the relations that are already information exchanges (d). As shown, the LAGs impacted on a large part of the potential relations. Their contributions are various and range from 5.6% to the 41% of the total relations. In absolute terms the largest contribution comes from Gargano LAG that affected 474 relations, however, as it has a large number of members, this represents the 13% of the potential. On the other hand, the best contribution in relative terms comes from Prealpi that reaches the 41% of the potential.

Some peculiarities emerge looking at the kind of links created by the LAGs. The LAG Meridaunia has created 262 information exchanges, but none of the 191 information exchanges due to alter mechanisms have been upgraded to the cooperation status. On the contrary the other three LAGs are very good in doing this. They transformed a large part of pre-existing information exchange in cooperation (Bassa Padovana reaches almost a 100% rate of transformation). On the other hand, their contribution are marginal in producing cooperation *ex-novo* (row h). This is not true for Meridaunia that fostered the cooperation among 137 couples of members.

The analysis is completed with a visual inspection of the transformation of the relational patterns operated by the LAGs. The visual inspection is provided with the following 4 figures representing the status of the network *pre* (panel A) and *post* (panel B) LAG's operation. Neglecting the nature of the relations (information exchange and cooperation), the figures depict the overall relational patterns of the groups. The visual analysis vividly sketches the role of the LAGs in enhancing the aggregative of the partnerships. In order to have more in-depth hints on the overall contribution of the LAGs, we also represented a specific actors' attribute, namely their category of interest: public (red circles) or private (blue squares).

As shown, the networks become more dense when they pass from status A (relations generated independently from the LAGs) to status B (all the relations, including those generated by the LAGs). In absolute terms, the highest increase is related to Prealpi that improved its density from 42% to 58% (that is, after LAG operation the 58% of members are connected) and the average degree from 10 to 14. This corresponds to an improvement in connectivity around the 40%.

Figure 2 - The relational transformation of Gargano



Figure 3 - The relational transformation of Meridaunia

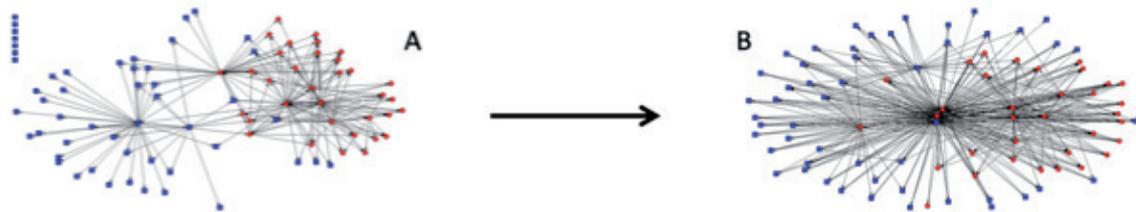


Figure 4 - The relational transformation of Bassa Padovana

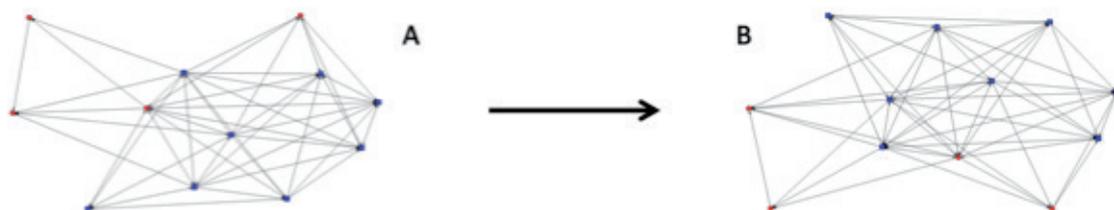
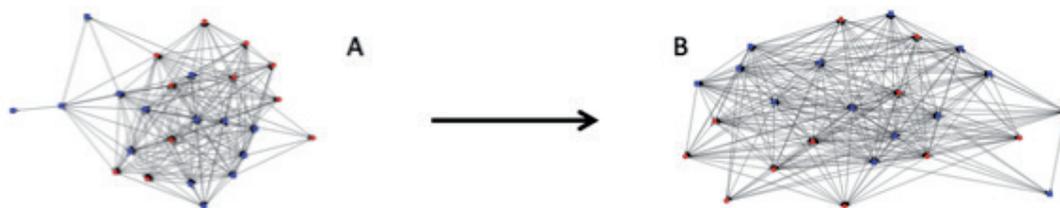


Figure 5 - The relational transformation of Prealpi



The highest contribution in relative terms comes from Meridaunia that produced an overall enhancement of 58% (that is an increase of the density from 10% to 16%). Concerning the average degree, its level was 3.74 in the pre-LAGs status (panel A) and 5.90 in post-LAG status (panel B). The contribution of Gargano in relative terms is a 20% improvement in the aggregation of the

group. It is an important increase in connectivity: the density improved from 25% to 30%, and the average degree from 15.21 to 18.18.

Bassa Padovana was already highly connected in status A (46% of density and 5 average degree) thus it shows the lowest improvement margin. In status B the density became 52% and the average degree 5.67. This corresponds to an overall improvement of 11%.

In addition, the visual inspection allows to grasp information on the role of some actors and on the public-private inter-connectivity. Some central actors seem to play as relational hubs, as their removal from the diagram would disconnect many actors from the net. This is true in particular for the LAGs from Apulia, and especially for Meridaunia, that has a couple of very central actors. Meridaunia is interesting also for another aspect: in its A status, it appears very polarized with two, highly centralized, groups of homophiles actors. That is the two groups are formed of actors belonging to the same category (private on one hand, and public on the other hand) with a couple of private actors playing the roles of bridges among the two groups. More than in the other cases, in this case the LAG acted as a facilitator, reducing the social distance from the two groups and increasing the connections among them.

4. Concluding remarks

The contribution of the study is twofold, on one hand it is directed at finding empirical validation of the hypothesis that LAGs activity can foster the social capital of the local partnerships, on the other hand it sought advancement in detecting social capital methods.

Concerning the former aspect, the specific focus of the work is the structural dimension of social capital that is the structural characteristics of the network of relations among LAG's partners. Two kinds of relations were considered: information exchange and project cooperation. The analysis reveals that the LAGs enhanced the social capital of their partnerships producing a diverse contribution in terms of kind of relations activated/enhanced. The LAGs modified the morphology of their networks fostering the connectivity of their members, connecting different groups of partners (public/private) and exalting the role of some actors as bridges among different polarities.

Another aspect that calls for a more close scrutiny is to investigate the kind of norms established within these networks, entering the domain of the cognitive social capital.

Regarding the latter aspect (methodological advancement), a relational computational system is set, allowing to answer to the research question. Specifically, starting from the available data, the contribution of the LAGs emerges on logical basis by the comparison among the relations actually existing and the relations created independently of the LAGs' activity.

The variables studied in this work can contribute both to LAGs evaluation and selection processes by Managing Authorities (MAs). Concerning the evaluation, the indicators used can complete the assessment framework in order to evaluate the enhancement by the local agencies in the domain of social interaction, especially for the ability shown by these agencies to transform the social interaction in actual cooperation relationships. For what concerns the selection issue, the idea is to use these indicators as additional criteria to justify rewarding mechanisms for LAGs that exhibited virtuous interaction processes in previous editions. In particular, in order to endorse social resources as elements of rural development processes, these indicators can help in taking into account the social capital issue since the earlier phases of program elaboration (e.g. the set of intervention logic and the context analysis according to Reg. UE 1305/13 art. 8). The analysis presented rests in the structural domain neglecting the outcomes of the structure investigated. However, the peculiarity showed by these structures deserves further investigation in order to study their attitude toward information spread and behaviors diffusion, that are the basic mechanisms in local development processes. In particular, the next step of the research

will focus on the type of two-way impact, if any, between the endowment of LAG's social capital and all over the territory of the local community concerned by the implementation of the CLLD approach.

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Economics of Social Capital: theoretical and empirical approaches. The case study of the Basilicata Region

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Abstract:

The aim of this paper is twofold: (i) to propose a theoretical contribution on social capital (SC) as an economic category; (ii) to evaluate how structural and normative-cognitive SC concurs to the development of two different areas of the Basilicata Region (South of Italy). In the theoretical section of this research, the thesis is affirmed that in order to contribute to overcoming the dichotomy between economy and society, SC has to be considered as an analytical category within the relational economy. The methodology is based on the application of the Network Analysis for the elaboration of the data deriving from the direct interviews of both members and beneficiaries, of two Local Action Groups (LAGS). This approach can be considered an instrument of bottom up rural development within the LEADER Approach. The results obtained, highlighted the strengths and meaningful weaknesses, in the network of social relationships, and also recommendations on policy guidelines for the increase in the level of trust and collaboration among the members of each LAG.

keywords: Social capital, Social network analysis, Local Action Groups

1. Introduction^{1*}

Adam Smith recognizes economy as an activity strongly incorporated in social life. He also considers market as an institution which cannot function if it is not characterized by *sympathy* and *fellow-feeling*. This means that market is a dense network of social relationships within which the individuals, although they are motivated by the *self-interest*, cooperate among them, for a reciprocal advantage (Bruni and Sugden, 2000). In brief, market generates social capital (SC). The theory of SC may be elaborated as a result of the progresses of economics, in particular economic development. Not only physical and human factors but also social interactions contribute to this complex phenomenon. However, given the complexity of the elements which constitute SC, it is necessary to recognise both the structural and cognitive dimensions if we want to examine its contribution. This distinction is useful in order to find those bonds between social networks which is a characteristic of social and economic structure of a community, and mental and cultural factors (such as trust, values, etc.). Furthermore, it has an analytical value at the territorial level since not only horizontal and vertical social networks but also personal social relations are more active in local communities². In our empirical evaluation we have taken into account such distinction.

From this point of view, it is opportune to consider SC as a producer of territoriality, i.e. as an analytical category which may help to comprehend the individuals and local communities through their actions to produce territory. Given SC capable to perceive the bonds among terri-

1* . This paper is the result of a joint work. In particular, the sections 2 and 3 are attributed to Alba Distaso, while, introduction and conclusions have been jointly elaborated.

2. Vertical social networks refer to those networks of “strong” relationships among the members of the family or among the persons who belong to a same community. They form the bonding SC, while horizontal social networks are “weak” bonds and they correspond to bridging SC (Granovetter, 1985). A political action which is aimed at increasing SC should promote horizontal social networks. These are more easily pursued through personal social relations, if reciprocal trust is widespread in local communities.

torial interactions and social relationships, it is legitimate to suppose the existence of a *territorial* SC. Accepting the idea that the characteristic of local development is the production of collective goods³, we can put forward the hypothesis that such production depends on the higher endowment of SC. Such hypothesis, which is the basis of our research, may be so formulated: how can we intentionally build SC? Should SC be promoted in territories where it is at low levels? This justifies, for the empirical level, our recourse to local communities such as LAGS⁴.

From the discussion above, we can highlight that the theory of economic choices is enriched by the insertion of relational variables. Given this aim, it seems interesting to briefly examine the search of synergies between *social capabilities*⁵, according to Amartya Sen's *Capability Approach* (CA), and SC. Through this concept, we can reach a different perspective to SC, in the sense that an extension of the normative foundations of the economic analysis may bring some new elements to the theory of SC if one considers the impact of social policy not only in terms of economic advantages, but also in terms of *functionings* and *capabilities*.

The relational shape of SC consists of the increase in value of goods and services through exchanges of social reciprocity. This form of capital is relevant to "those relationships allowing any person (individuals or groups) to mobilize some resources which may be activated through those relationships" (Donati 2007, p. 14, *our translation*). In those widespread situations of reciprocity, a relational network whose qualities may generate a kind of "multiplier of trust" (Akerlof and Shiller, 2009) is produced, and, thus, other cooperation and further reciprocity is produced. In other words, it deals with relationships which incorporate *relational goods*. Therefore, in this context, the core of SC is constituted of those-above mentioned social relationships, which in determined cultural and institutional conditions, may become resources. This means that the increase in the value of these goods may be obtained if the relative investments are guided not only by the above mentioned intrinsic reasons, but also by the pragmatic ones⁶. These considerations contribute to shape a view of development as acquisition of spaces of freedom. In such a way, freedom assumes an intrinsic relevance for the achievement of well-being and the capital accumulation is not seen as the final aim but as an instrument to achieve both social and individual well-being. The meaning of the arguments above can be also expressed: a certain endowment of SC contributes to the expansion of the set of the individual *capabilities* in such a community and it is strengthened if there is a higher level of trust, cooperation and reciprocity.

2. Methodology

In our work we have taken into account the Basento-Camastra and the COSVEL LAGS. The choice of these two case studies is based on two criteria: 1) on behalf of the Basilicata Region which considers them as the most active and dynamic realities; 2) among all the consulted LAGS, the respective Directors have shown interest to the object of this research.

3. "[Local development is characterized by the] capacity of local subjects to collaborate for the production of collective goods which enrich externalities, but also for the valorization of commons, such as environmental and historical-artistic heritage" (Triglia, 2005, p. IX, *our translation*).

4. For a further widening of economics of SC, cpr. (Distasob, 2014).

5. The concept of capability has passed from a dimension originally referred to the individual to the possibility that it can be extended to social groups (Stewart, 2005; Ibrahim, 2006). In brief, it indicates the aggregation of the individual capabilities, such as the capability of each individual relative to his/her well-being and human development. In other words, social capabilities concern those aspects of the interpersonal relationships whose dynamic may characterize the same institutions and social organizations such as trust, rules, the network of relationships. For a review of these aspects, we allow ourselves to refer back to our previous work (Distaso and Ciervo, 2011).

6. The investments in SC have also a pragmatic value which is expressed as investment both in time and in money. This may be useful in order to establish social connections and increase the possibility of gaining benefits from the interactions (Lollo, 2011, p. 11).

We have selected, among the 96 indicators of the wider research⁷, a set of 45 indicators, whose construction has been facilitated by the subdivision of SC into three dimensions: structural and cognitive SC and the link between SC and governance. The raw data was obtained from 3 *face to face* questionnaires, which were distributed to LAGS directors, members of LAGS, and beneficiaries who have presented some projects⁸. The results were normalized and aggregated, while Social Network Analysis (SNA) was used for describing the relations among stakeholders. Some of indices were adopted as indicators in the evaluation approach.

The Basento-Camastra LAG was constituted in 2003 both by public⁹ and private bodies¹⁰. The Assembly of the members of the Basento-Camastra LAG is comprised of 33 members, 19 of whom are public members (16 towns¹¹ and other 3 bodies¹²) and 14 are private members. The collection of data collected during October-November 2012 focused on the questionnaires directed to the Director of the LAG and its members¹³.

The COSVEL LAG (Consortium for the Development of the Local Economy) consists of 9 towns¹⁴. The Assembly of the members of the COSVEL LAG, which was launched in 1995 through the Community LEADER II and LEADER + LAG initiatives, is comprised of 32 members, 9 of whom are represented by the 9 towns and 23 are private members.

3. Results

Structural SC

Each elaborated and calculated indicator was useful in order to define the overall picture of SC of the two LAGS which we have taken into account. These indicators¹⁵ are meaningful because they allow to make comparison between two different realities especially from the territorial point of view. The high values of some of the indicators highlight a point of strength of one or the other LAG, while the low values mark a point of weakness. Thus, the most useful indicators concerning the structural characteristics of both LAGS are reported in Tab. 1.1¹⁶. Each chosen indicator reports the code, the description, the range and its value. With reference to A1 indicator, the higher value for the COSVEL LAG in comparison with the Basento-Camastra's one (whose entrance has been characterized from the fact that the LAG offered some benefits without any perception of the potential relational implications linked to their participation) shows that the majority of its members entered the LAG in order to be involved in the implementation of the

7. The wider research is in course of publication (Distaso, 2014).

8. The beneficiaries belong to the Basento-Camastra LAG. They have been interviewed during May-June 2013 and they have been chosen among those who have presented some projects of productive innovation for the firms. These projects have been approved and financed from the Basento-Camastra LAG on the grounds of a notification of competition.

9. The public bodies are represented by towns, consortium of communes in a mountain area and National and/or regional Parks.

10. The private bodies are constituted of professional associations, trade unions, syndicate unions, but also cultural and environmental associations, voluntary work and no-profit sectors.

11. Abriola, Albano di Lucania, Anzi, Avigliano, Brindisi Montagna, Campomaggiore, Castelmezzano, Calvello, Cancellara, Filiano, Laurenzana, Pietragalla, Pietrapertosa, Pignola, Trivigno, Vaglio Basilicata. These small towns belong to Potenza's province.

12. Alto Basento Consortium Communes in a mountain area, Camastra Alto Sauro Consortium Communes in a mountain area, the Chamber of Commerce, Industry, Handicrafts, and Agriculture (CCIHA) from Potenza.

13. It is useful to highlight that we did not have the possibility to supply the questionnaire to the beneficiaries of the COSVEL LAG because the relative announcements have been emitted, in a following time which did not correspond with the time of this research.

14. Bernalda, Colobraro, Montalbano, Nova Siri, Pisticci, Rotondella, San Giorgio Lucano, Tursi, Valsinni. These small towns belong to Matera's province.

15. In this work we have considered 4 sub-dimensions for structural SC: context (A1-A4), actors of the network, (B2) (horizontal structure of the network (C2-C12), reputational power (E1,E3).

16. At the same way, the most useful indicators referring to the other two dimensions are reported in Tabs. 1.2 and 1.3.

activities aimed at the development of SC in the territory. An element of weakness is represented by the low level of the effective acquaintance of both LAGS effectiveness. In order to increase this low level, both LAGS (in particular the Basento-Camastra) should encourage the capacity to promote synergies among the various actors through which they operate (B2). We should note that a common aspect concerns the nature of the members which take an active part to the LAG life. In both of them, the public organs, although they do not constitute the majority as the indicator A4 for the COSVEL LAG shows, are the most active agents, while the private members have only a formal role than an effective one. Consequently, the implications are not certainly positive in terms of both informative and collaborative network. The purely structural aspects of the network of both LAGS are represented by the C7-C12 indicators which are based on the SNA.

Tab 1.1. *Structural Social Capital: Basento-Camastra and COSVEL LAGS*

Indicators	Description	Range	Basento-Camastra LAG	COSVEL LAG
A1	Reason of entrance into the LAG from its members	[1-4]	1,89	2,57
A4	Rate of presence of the private members to the total of the LAG members	[0-100]	40,63	88,89
B2	Effective rate of acquaintance of the members about the LAG effectiveness	[0-100]	11,35	36,11
C2	Yearly average rate of participation to the Assembly of the LAG's members	[0-100]	82,5	56,82
C3	Rate of continuity of the members in the formal meetings	[0-100]	73,33	87,5
C4	Rate of agreement to the LAGS aggregative promotional events	[0-100]	0	22,22
C5	Rate of the activation of the LAGS communication channels	[0-100]	20	30
C6	Rate of reaching new social categories of the LAG territory	[0-100]	16,67	16,67
C7	Rate of density of the "informative" network among the LAG's members	[0-100]	18,75	23,54
C8	Rate of density of the "collaborative" network among the LAG's members	[0-100]	7,58	3,17
C9	Rate of shifting in the private-public composition in the LAG informative exchange	[0-100]	67,07	56,56
C12	Rate of the connection role of the LAG as to members and beneficiaries	[0-100]	6,40	2,25
E1	Rate of perception of the LAG's institutional organisms on the informative contribution	[0-100]	91,3	33,33
E3	Rate of the informative contribution in the heart of the LAG network	[0-100]	55,55	63,64

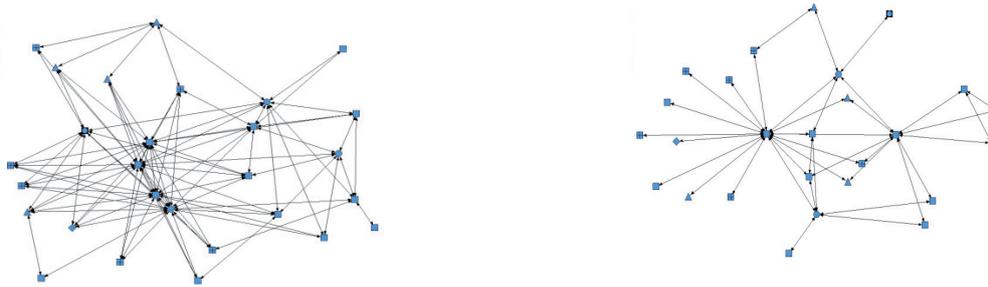
Source: Our elaboration on data directly obtained

As to the Basento-Camastra LAG, from the graphs 1.1 and 1.2., it emerges that the information exchange (C7) and, in particular, the collaboration relationship (C8) are rather weak owing to the poor synergies between the public and the private sphere. From the same graphs it is possible to note the relationships between the public and private partnership. With reference to the information exchange (C9), the shifting of network composition is quite high. This is a sign of a

less density of information among public and private members. Furthermore, the Basento-Cam-
astra LAG has only occasionally (C12) carried out an aggregative role. Regarding the COSVEL
LAG, from the graphs 1.3. and 1.4., it reveals that the level of the informative network is much
higher than the collaborative one (C7, C8).

Graph. 1.1 – Informative network among the members

*Graph 1.2- Collaborative network among the members of theof the Basento-Camastra LAG
of the Basento-Camastra LAG*

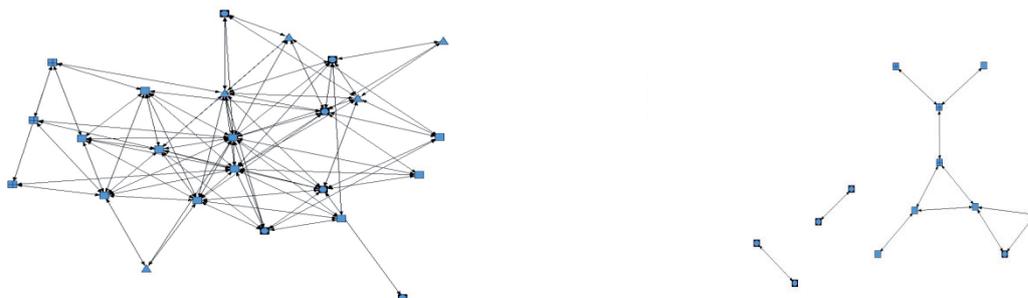


- Towns
- Professional associations
- Other LAG/ Leader I
- Other Public Body/ Consortium Communes in a mountain area
- Environmental socio-cultural Association

We can assume that the collaborative relationships among members are rather scarce owing
to the slow announcements. Also the public-private composition in the information exchange
resulted to be low (C9). It is opportune to highlight that the rate of activation of the LAGS
communication channels is very low (C5). Furthermore, if the Basento-Camastra LAG does not
organize any aggregative promotional event, the COSVEL LAG organizes very few of it (C4).
Consequently, the interested users are not efficaciously involved (C6). A point of strength
of the Basento-Camastra LAG is represented by a high rate of participation to the Assembly of the
LAG’s members, while both of them present a quite high level of continuity of the members in
the formal meetings. The indicator E1 presents the highest value for the Basento-Camastra LAG.
This means that almost all the members of the LAG are able to bring a useful contribution during
the meetings.

Graph.1.3-Informative network among the members

Graph. 1.4- Collaborative network among the members of the COSVEL LAG





Cognitive SC

The Tab.1.2. shows the most meaningful indicators and its assumed values¹⁷.

Tab. 1.2. Cognitive SC – Basento-Camastra and COSVEL LAGS

Indicators	Description	Range	Basento-Camastra LAG	COSVEL LAG
F1	Rate of trust in the LAG's Assembly	[0-100]	100	76
F2	Rate of interpersonal trust among the LAG's members	[0-100]	3,22	9,14
F3	Rate of isolation of the members of the LAG's Assembly	[0-100]	60,61	64,29
F4	Rate of trust towards the board of Directors	[0-100]	50	60
F5	Level of temporal variation of trust among the LAG's members	[1-3]	2,14	2,1
F6	Level of trust of the members and beneficiaries toward the LAG	[1-4]	3,58	3,30
G1	Level of trust of members and beneficiaries towards the government	[1-4]	2,43	2,55
G2	Level of trust towards religious institutions	[1-4]	2,58	3,05
G3	Level of trust towards different associations	[1-4]	3,21	2,96
G4	Level of trust towards voluntary work	[1-4]	3,19	3,38
H1	Rate of agreement in the perceived benefits	[0-100]	33,33	
H3	Level of the added value brought from the LAG's members	[0-4]	0,86	1,13
I4	Rate of formal participation to the Assembly of the LAG's members	[0-100]	46,88	0
I7	Level of relationship within the LAG's board of Directors	[1-3]	3	3
L1	Level of perception of the civic virtues of the LAG's territory	[1-4]	3,06	3,04
L2	Level of perception of the change of the civic virtues of the LAG's territory	[1-3]	2,33	2,35
L3	Level of the capacity of identifying promoters of civic virtues in the LAG territory	[0-5]	1,39	1,96
L4	Rate of presence of promoters of civic virtues among the LAG's members	[0-100]	58,64	56
M1	Level of the LAG's internal conflict	[1-4]	3,32	2,80
M5	Rate of conflict among the LAG's members	[0-100]	95,24	83,33

Source: Our elaboration on data directly obtained

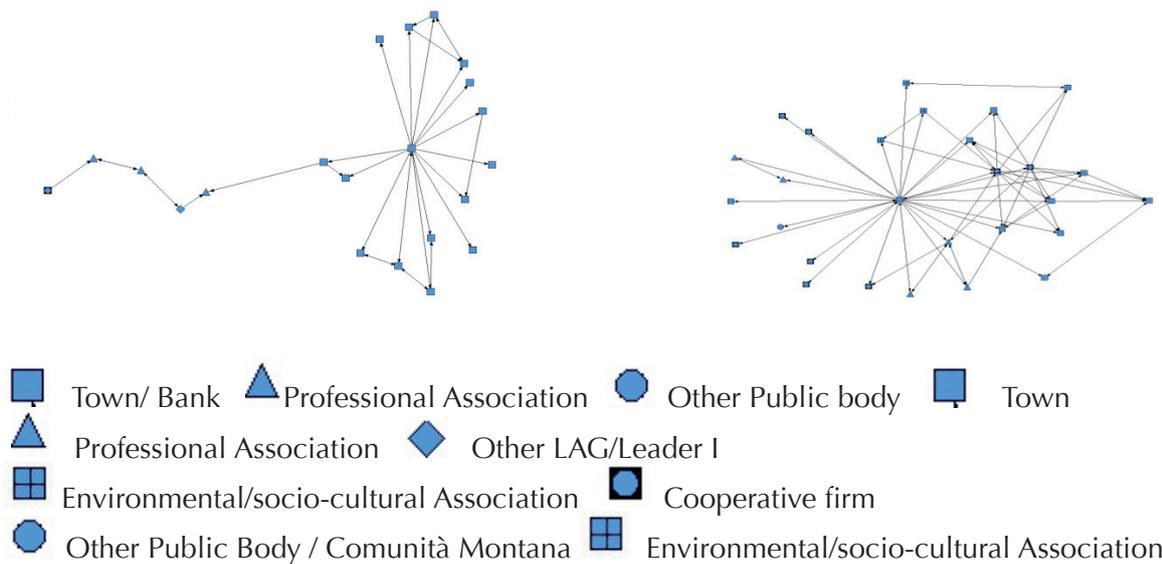
With reference to the dimension F, it emerged that the rate of trust in the LAG's Assembly is very high (the value of the indicator F1 reaches the maximum in the case of the Basento-Camastra LAG). However, although the level of trust is generally high, in both LAGS, the density of the

17. In particular, 6 dimensions are considered for cognitive SC: trust and reciprocity (F1-F6), institutional trust (G1-G4), quality of the network (H1, H3), quality of the participation (I4, I7) common values (L1-L4), conflicts (M1, M5).

trust network is averagely very low (F2) owing to a presence of personal mistrusts. Further, the majority of the LAG's members appeared to be isolated as to the central core of the network. (F3). Instead, in presence of an institutional body, the rate of trust increases with reference to the members and beneficiaries toward the board of Directors (F4), but especially towards the LAG (F6). The graph 1.6 is one of the most dense networks of trust while the graph 1.5. is relatively less dense compared with the other three. However, the level of trust has been increasing over the time (F5) which is a sign that Basento-Camastra has been having over the years a positive impact on the territory.

Graph. 1.5. Trust network among the members

Graph. 1.6. Trust network among the members of the Basento-Camastra LAG



If we investigate the dimension of trust toward the institutions of different nature, we note how all indicators from G1 to G4 referring to both LAG assume an intermediate value, and rather homogeneous among the various categories of the interviewees. This value results medium-high in the case of trust towards the voluntary work and different associations. Belonging to a network in order to achieve a competitive advantage can be measured through the internal and external evaluation which members and beneficiaries do about the added value coming from being a member of a network of social relationships. For the LAG's members the expectations on the main benefits derive from the fact that the LAG is considered an instrument able to promote not only the increase in value of the territory but also an economic support for their activities. Such expectations coincide only for the 33% with those of the Director of the Basento-Camastra LAG (H1) which should be interpreted as a scarce common view of territorial development. Furthermore, each member bring to the LAG a very low added value (H3). With reference to the indicator I4, while in the COSVEL LAG, the rate of formal participation to the Assembly of the members is nil, in the Basento-Camastra LAG about half of the members formally participate to the Assembly. The level of relationship within the Board of Directors of both is high (I7). A rather contradictory situation is noticed focusing the analysis on the indicators (L1-L4). In this scenario, a note of weakness is represented by the absence of individuals who can be of example in terms of *civicsness* in the LAG's territory and who may carry out an active role in promoting the growth of this "civic virtues", although in both LAGS the perception of the civic virtues in the LAG's territory is averagely high (L1). Furthermore, if on one hand, Directors, members and

beneficiaries (in the case of Basento-Camastra) have a generalized awareness on the presence of individuals promoters of civic virtues (L3), and on the other hand, when the focus is on the possibility to materially identify the individuals promoters of *civicsness*, the performances of the indicators suddenly decrease (L4). On the dimension “conflict” we can point out that the situations of internal conflict are few (M1) as well as the rate of conflict among LAG’s members (M5). These values are obtained following the statistical rule of inversion.

Governance and SC

Tab. 1.3 Governance and Social Capital - Basento-Camastra and COSVEL LAGS

Indicators	Description	Range	Basento-Camastra LAG	COSVEL LAG
N1	Rate of the perceived temporal adjustment of the LAG planning	[0-100]	62,5	73,68
N2	Level of perception in the methodological rigorousness of the LAG planning	[0-7]	0	5
N3	Level of perception in the management of the LAG planning	[0-5]	0	4
N4	Level of access facility to the LAG announcements	[1-4]	3,75	
O1	Level of perception integration of the LAG in the territory	[1-4]	3,10	3,16
O2	Level of understanding of the LAG role in the territory	[1-4]	2,73	2,17
O3	Level of functional overlapping among the LAG bodies	[1-4]	3,47	3,21
P4	Level of auto-evaluation and transparency within the LAG	[0-infinito]	0	0
Q1	Level of relational openness extra LAG	[0-15]	9	10
Q3	Level of the structure of the LAG vertical linking	[0-2]	0,79	1,08
Q4	Level of the quality of the vertical linking	[1-3]	1,5	3

Source: Our elaboration on data directly obtained

The indicators relative to the dimension of governance may offer other precious information in order to complete the analysis of both LAGS SC. The most representative indicators are reported in Tab. 1.3¹⁸.

Concerning the evaluation of the governance of each LAG, we refer to the modalities of implementation of the decisional processes. The decisional and organizational structure of the LAG has an influence on the capacity to create SC especially for the impact on the territory. Given such aim, the members of both LAGS think that the period of planning is a period of time sufficient in order to reach some concrete results on the territory (N1). With reference to the financed projects, the COSVEL LAG has the capacity of monitoring them (N3), even if a total methodological rigorousness is not applied to some projects (N2). The situation regarding the Basento-Camastra LAG is different since if on the one hand, the beneficiaries receive technical advice on the questions of participation to the announcements (N4). on the other hand, the Basento-Camastra LAG is not able to monitor neither the whole planning *iter* (N3) neither to follow all the phases of the decisional process, from the diffusion of information to the divulgation of the

18. The dimensions regarding the link between SC and governance are four: governance decisional processes (N1-N4), effectiveness and efficiency (O1-O3), capacity and organizational culture (P4); vertical structure (Q1, Q3, Q4).

final decisions (N2). With regards to the measure of the efficiency and efficaciousness, from the Tab. 1.3 observed that both LAGS can be considered integrated institutions in the territory where both of them operate (O1), although their roles are not fully understood by the population (O2). Further, both LAGS may sometimes overlap to other institutions already existing on the territory (O3). An element of weakness is given from the fact that a level of auto-evaluation and transparency do not exist within both LAGS (P4). In terms of the linking structure, both LAGS but in particular the COSVEL one, is evaluated as active in terms of relationships with other LAGS, not only at national and regional levels, but also at the international level (Q1). The members of the COSVEL LAG have collaborative relationships with the Region compared to the Basento-Camastra members who give a neutral evaluation of the relationships with the Basilicata Region (Q4), maybe because they have the feeling that the observations and the criticisms formulated during the meetings rarely find an effective reply (Q3).

4. Conclusions

The results obtained highlighted the main strengths and weaknesses in the network of social relationships and also recommendations on *policy* guidelines for the increase in the level of trust and collaboration among the members of each LAG. During the period of greater effectiveness of the action of both LAGS, we can affirm, on the basis of direct information, that they have created the premises for growth of the relationships between members and future beneficiaries. However, the level of the network of interpersonal trust is still very weak owing to personal mistrusts. Furthermore, it emerges that the LAGS should mainly promote SC through cultural meetings and support activities of types of association, and should carry out further efforts aimed at the understanding of the positive effects coming from an increase of such capital. Nevertheless, in building the process of SC for the long term, the network of relationships should be dense and stable if the interventions were to be more sharable in such a way to involve also the interested population.

Lastly, it is necessary to highlight the relevance of the regional institutions which allow for both continuation and innovation in policy guidelines. One of the innovations of the Basilicata Region has been the adoption of the policy of European cohesion and the consequent adjustment of the regional institutions to it, including the valorization of the role of the stakeholders of the civil society which may contribute to a higher level of SC and the realignment of the role of the related local governance institutions. Another innovation is the nature of the approach to rural and local development which forecasts on the whole regional territory an integrated activity of the European Investment Structural Funding. Concerning the rural development plan (RDP) of the Basilicata Region 2014-20, a strategic role is recognized to LAGS in the definition of the local participatory development (Community-Led Local Development). The priority action of the Leader Measure considered in the same RDP is "to do one's best for social inclusion, reduction of poverty and economic development in rural areas".

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Social Capital and Rural Development in Southern European Regions: The Case of EU-funded LEADER Projects

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Abstract:

In the present article, we wish to examine the role of social capital in regional, rural development in the South of Europe through the EU-funded LEADER programme. We begin with an overview of technical reports and case studies to examine the role of social capital in the new rural paradigm and the LEADER approach. Funding and decision-making bodies at all levels have still not explicitly and formally addressed and assessed the role of social innovation dynamics and specifically of social capital in promoting rural development and exploiting LEADER funds. We argue that this must be remedied if we wish to enhance the effectiveness of LEADER. Based on the theoretical and empirical findings of case studies in Greek and Italian rural areas in Southern Europe we discuss alternative perspectives and measures of social capital that take into account: economic and non-economic dimensions of local development; process-oriented evaluation methods; and context-specific characteristics of regions. In the final section we suggest ways to re-contextualise social capital in development to improve project design, implementation and evaluation.

keywords: Social capital, LEADER Approach, Evaluation methodology, Greece, Italy

1. Introduction

In the present article, we wish to examine the role of social capital in regional, rural development in the South of Europe through the EU-funded LEADER programme. LEADER is inextricably connected to the endogenous approach and participatory governance structures and thus relies heavily on local social capital. It has considerable appeal in rural areas of Southern Europe, which have been hit hard by the recent crises and are characterised by specific cultural and historical conditions and chronic structural problems that lead to underdevelopment.

Despite the pressing needs that arose with the crises in Europe and the inspirational EU initiatives proposed (Europe 2020), funding and decision-making bodies at all levels have still not explicitly and formally addressed and assessed the role of social innovation dynamics and specifically of social capital in promoting rural development by exploiting LEADER funds. We argue that this must be remedied if we wish to enhance the effectiveness of LEADER.

In Sections II and III we conduct an overview of policy reports and case studies to examine the role of social capital in the new rural paradigm and the LEADER approach. Then, in Section IV we use the lessons learnt from theoretical and empirical findings of case studies in Greek and Italian rural areas in Southern Europe to discuss alternative perspectives and measures of social capital that take into account: economic and non-economic dimensions of local development; process-oriented evaluation methods; and context-specific characteristics of regions. In the final section we suggest ways to re-contextualise social capital in development to improve project design, implementation and evaluation.

2. Rural Development and Social Capital

The concept of social capital in its contemporary sense as norms and networks of reciprocity, trust and cooperation gained popularity during the 1990s by the works of Becker (1974, 1996), Bour-

diou (1980, 1986), Coleman (1988, 1990) and Putnam (1993, 2000). The World Bank (World Bank, 1996) perceived social capital as the 'missing link' to local development and funded community-based and -driven development programmes (CBD/CDD programmes) in Third World countries. CBD is an umbrella term that refers to projects which actively include beneficiaries in their design and management, while CDD, originally coined by the World Bank, refers to CBD projects where communities have direct control over key project decisions as well as the management of investment funds (Mansuri and Rao 2003: 3). Also local development programmes founded on various forms of social capital, that is, networks and partnerships that span across different local groups, communities, states and levels of administration and policy, were also influenced by the OECD via the New Rural Paradigm (NRP) (OECD 2006). Partnership building is at the heart of this new paradigm, as part of a new governance of rural development policy. In the 2014 policy review on the innovation and modernisation of the rural economy we find a more comprehensive account of 'hard' and 'soft' aspects of territorial assets. This is based on seven forms of capital, namely financial, built, natural, social, human, cultural and political capital, which constitute part of the so-called 'Asset-Based Community Development' (ABCD) (OECD 2014: 84-85).

However, in practice, these approaches encountered serious obstacles and drawbacks. For example, Mansuri and Rao (2003) point to the appropriation of funds in World Bank projects by the local elite and suggest a shift to Bourdieusian perceptions of social capital that emphasise the relational contexts within which development and social capital are embedded. On the other hand, Horlings and Marsden (2012) try to confront the dangers that lurk in reductionist interpretations of 'modernisation' in the OECD's NRP by appealing to Woolcock and Narayan's synergistic view to social capital that integrates the compelling work emerging from the networks and institutional perspectives. In their study they provide evidence that a territorial-based approach considerably depends on social capital to build local identity and new ideas, and on governmental authorities and European programmes to facilitate local agencies and entrepreneurial networks and to embed these in coherent regional development plans and policies. Notably, the authors refer to the LEADER initiative and see it as part of the institutional/policy framework that supports this territorial-based approach (2012: 13-14).

3. LEADER and social capital

Briefly LEADER is not viewed simply as another 'development programme' funded by a national or supra-national authority; it is seen as an alternative 'method' or 'approach' oriented toward HOW to act, rather than WHAT to achieve. It is more often employed for 'soft' investments: to cultivate new individual and collective beliefs, attitudes, behaviours, relations, institutions and rules, in order to enrich social capital and support further the developmental objectives of the programme. To this end, it introduces elements of integration, participation, networking, and local governance capacities as rural development objectives alongside the enhancement of conventional socio-economic indicators like income, employment and competitiveness (Metis 2010: 45-47, 56-59; European Commission 2006).

Practically, social capital is related to the core processes of the LEADER development programmes: activities of LAGs that animate and mobilise rural actors to participate in development projects; interactions of LAGs and rural actors with administrative bodies and policy-makers at the local, national and EU levels; the participation of the beneficiaries of projects and their links with LAGs and administrative bodies; and the impact of these projects on the entire rural population which benefits from local capacity building and the promotion of development objectives and decides to take active part in these efforts. Based on case studies and project reports that were carried out in a number of European regions, the Metis ex-post evaluation report for LEADER+ (2000-2006) documents the programme's success in promoting economic activity,



protecting the environment and creating 'social' capital in the form of willingness and capacity of local people to cooperate (Metis 2010: 124).

This report goes on to specifically evaluate the programme's contribution in a number of areas; here we focus on three that we consider central to the LEADER method: innovation, governance and marginalised/disadvantaged groups. Firstly, we discover that social capital appears to produce the basis for the relationships and exchanges needed to support the so-called innovative *milieu* created by local productive systems and clusters thanks to private-public partnerships (2010: 158, 163, 180). But the LEADER method is also associated with social innovation, that is, the formulation of new governance structures that combine top-down and bottom-up initiatives to promote the neo-endogenous approach (Bryden 2006; Dax et al. 2013). Reports document the formidable work done by LAGs in creating horizontal relationships at the local level and mediating with policy-makers for local needs. Nonetheless, these efforts occasionally stumble upon rigidities in decentralisation of regional policy at the national level and high administration costs that weigh heavily in deprived rural areas (Metis 2010: 126-128). The idea behind LEADER is to create participatory democratic structures to exploit local resources and enhance rural development. This is similar to Ostrom's conception of polycentric-linked systems for the organisation of local public economies in which social capital plays a crucial role in sustaining the networks that support horizontal and vertical complex governance systems by building a sense of local identity and extending social learning across the diverse groups of the local population (Ostrom 2010; Ostrom and Ahn 2003). Some LAGs have been successful in enhancing identity and social learning. But, according to recent and past ex-post evaluation reports of LEADER marginalised groups find it difficult to gain access to these projects and this has to be remedied (Metis 2010: 108-109; ÖIR 2003: 148).

Evaluation procedures also raise concerns. Some authors argue that, based on the general objectives imposed by the EU, the evaluation process tends to be an impact-oriented system. This misses the so-called 'forgotten middle', which covers the stage between agenda setting (targeting) and performance (outcomes, results and impact) and refers to the cooperative processes involved in design, implementation and evaluation (RuDI 2010: 1-2; Papadopoulou et al. 2012: 84-85). Therefore, programme evaluation should not only focus on the impacts and results of development projects; it should also provide ways to identify advantages and drawbacks in the processes to support participation and innovation. In particular, neither the Metis report nor the Common Monitoring and Evaluation Framework (CMEF)¹ (ENRD 2010) provide a clear distinction of the various dimensions of social capital – bonding and bridging – and a systematic treatment of spatial contexts.

Both documents claim to assess social capital by exploring changes in the mindsets and behaviours of key local stakeholders that are connected with each other by bonding, bridging and linking ties. Yet the Metis report explicitly refers to the term 'social capital' only in one question under THEME 4 concerning the impacts of the LEADER projects, even though it uses the concept in discussions of other themes (e.g., THEMES 3, 5, and 8).² On the other hand, the CMEF emphasises non-economic dimensions of development and quality of life and suggests relevant environmental and economic indicators, but so far has not suggested any common social indi-

1. http://ec.europa.eu/agriculture/rurdev/eval/index_en.htm

2. The evaluation questions in this report cover a total of 24 questions that are separated into 7 themes: THEME 1 – Relevance and Community Added Value; THEME 2 – The Actions of LEADER+ (Action 1: Integrated territorial rural development strategies of pilot nature, Action 2: Support for cooperation between rural territories, Action 3: Networking); THEME 3 – The Implementation of the LEADER method; THEME 4 – Impacts; THEME 5 – Governance and rural citizenship; THEME 6 – Managing, controlling and financing systems; THEME 7 – Monitoring and evaluation. There is a final THEME 8 on Rural activity and excellence clusters.

cators. The CMEF assessment criteria explicitly related to social capital focus on 'Local identity and coherence' that capture forms of bonding social capital and 'Networks and openness' that capture forms of bridging (apparently inclusive of vertical links with administration authorities/bodies). They produce evaluation questions and impact indicators that measure: the number/composition of participants in collective investments and projects; relative number/volume of business and employment arising from cooperation and network relationships; number of external relationships to key stakeholders that would ensure a considerable flow of knowledge/ideas, finance, and legitimacy (ENRD 2010: 38). In this way, the CMEF revised by ENRD tends to focus on the impact of cooperation, participation and networks on local identity/social cohesion, economic performance and innovation, and gives limited attention to process indicators that would explore the conditions under which the local capacity for participation, cooperation, and networking can be built.

A process-oriented evaluation would involve a thorough analysis of the qualitative and quantitative aspects of local-specific features – like trust, values, power relations, structures of networks, politico-administrative environment – and how they pose obstacles or open opportunities for networks and partnerships to be organised and support development objectives.

4. South Europe and LEADER: The Role of Social Capital in Greece and Italy

Generally, LEADER projects seem to have contributed to expanding cooperation by enhancing local identity, transforming governance structures for local mobilisation and building links between stakeholders (Metis 2010: 258-269; 285-305). Yet in Greece a case study in the Northern region of the Peloponnese shows that participants in LEADER+ encountered difficulties in pursuing innovation goals, investing in social services and support for the disadvantaged (women and younger cohorts), and operating in other sectors beyond agriculture, tourism and physical infrastructure (266-267). In an Italian case study in the Abruzzi region the critical point was the time factor: LAGs had to wait 44 months from the inception phase of the programming period to start their activities, quite a common problem for many Italian LAGs not only in the LEADER+ period but also in the LEADER Axis period. So many LAG activities had to be changed due to the limited time available (296).

A series of interesting case studies have been taken up in Greece and Italy by independent researchers to examine various aspects of social capital in LEADER. These studies substantiate, empirically and theoretically, the central role that social capital can play particularly in promoting social innovation, building new multi-level governance structures, incorporating marginalised/disadvantaged groups, and enhancing the participatory dimensions in the design, implementation and evaluation of projects (e.g., Arabatzis et al. 2010; Cecchi et al. 2008; De Devitiis et al. 2009; Efstratoglou and Mavridou 2003, 2004; Franceschetti 2009; Franceschetti et al. 2014; Koutsouris 2008; Nardone et al. 2007, 2010; Papadopoulou et al. 2011, 2012; Pisani and Franceschetti 2011; Pisani et al. 2013; Pisani 2014).

It is worth noting some of the obstacles so we could develop proper definitions and measures of social capital that respond to the context-specific characteristics of these regions, which do not differ only *between* countries, but also *within* countries against conventional divides (e.g., Putnam's clear-cut North-South division in terms of socio-economic development, institutional effectiveness, and civicness). For example, beneficiaries display lack of prior knowledge and experience on participatory, bottom-up projects (culture to implement/evaluate projects), or lack of trust toward the 'new', not only because of ignorance, but also because of distrust toward the local elite who appropriate projects and divert resources away from the rest of the community. Indeed, LAGs find it difficult to enable the collaboration between groups with different configurations of economic and non-economic resources (cultural, social and institutional capital), and

mediate in the social and political struggles groups engage in to apply for and manage external funds, a process that often excludes marginalised groups. Public officials impose further impediments by: not providing clear definitions of innovation, governance, types of social capital; focusing less on projects' core processes namely networks and participation; intervening for appropriation of projects that crowded out bottom-up initiatives; by maintaining a theoretical, technocratic logic as opposed to a practical knowledge of the local context (nature and source of inequalities, conflicts).

5. Conclusions

Our analysis suggests that the effectiveness of the LEADER method and the endogenous approach depend on a deeper understanding of networks and partnerships as core processes of development programmes. To accomplish this, we must confront the many hurdles that emerge in the design, implementation and evaluation of development programmes promoted under these innovative approaches. Therefore we introduce new perspectives and measures by re-contextualising social capital in LEADER. For this task we consulted the theoretical and empirical findings of the research conducted in Greece and Italy.

First of all, we must create concepts and measures that distinguish between the various dimensions of social capital (bonding, bridging, and linking; structural, cognitive and relational social capital) that combine to differentially affect participatory processes and development outcomes (e.g., Krishna 1999; Uphoff 1999; Pisani and Franceschetti 2013; Franceschetti et al. 2014; Pisani 2014). Then we should theoretically and empirically investigate the relationship of these different dimensions of social capital with the processes and outcomes of development programmes, and particularly with the dimensions of the quality of life that these programmes ultimately aspire to achieve: social innovation, multi-level governance structures and all-encompassing forms of participation, inclusive of marginalised groups. Special emphasis should be given to indicators of various types of trust (see Papadopoulou et al. 2011; Pisani et al. 2013), as well as contextual factors that reflect social inequalities and power relations which is consistent with a Bourdieusian approach (Koutsouris 2008). We argue that network analyses could unravel these underlying factors by detecting the pyramid of relationships and the circulation of material and immaterial resources between actors (see Papadopoulou et al. 2011; Pisani et al. 2013). Methods and measures should always be examined against the historical background of regions in a way that highlights local contexts and specificities, without historical and cultural determinism posed by Putnam, as Franceschetti et al. (2014) show in more recent studies.

Some of these measures and methods appear in the broader social capital literature, but have received limited attention in LEADER evaluation procedures. One reason for this is that so far reports have focused on project outcomes, rather than processes referred to as the 'forgotten middle'. Thus a shift to a more process-oriented assessment is needed to shed light on the various aspects of social capital and the ways it can support the LEADER method. This would also mean a shift away from traditional communitarian conceptions of social capital toward a synergy view that stresses complementarities and embeddedness between public and private actors at supra-national, national and regional levels.

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PREMIO ANTONIO CIOFFI



The Role of EU Agri-environmental Programmes. A Farm Level Analysis by Propensity Score Matching and by Positive Mathematical Programming Incorporating Risk

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Abstract:

The increasing attention to the relationship between agriculture and the environment and the rise in price volatility on agricultural markets has led to a new emphasis on agri-environmental policies in EU as well as to a search for new risk management strategies for the farmer. This paper aims at investigating the agri-environmental schemes (AESs) from two viewpoints. First, an ex post analyses on the effects of their adoption shows that participation into AESs is effective in promoting greener farming practices in some countries only. In addition, the impact of participation on farm income largely differs across countries and in some countries the level of AE payment should be revised. The second analysis aims at exploring the potential role of an AES as farm risk management tool under scenarios of increasing crop price volatility. This second analysis proposes a new methodological approach to integrate farm risk into a Positive Mathematical Programming model, which is able to estimate farmer specific coefficient of absolute risk aversion.

keywords: agri-environmental schemes, propensity score matching, difference in differences, positive mathematical programming, risk modelling

1. Introduction

In recent years, the agricultural sector in the European Union (EU) is facing new challenges. The increasing attention to the relationship between agriculture and the environment and the rise in price volatility on agricultural markets has led to a new emphasis on agri-environmental policies as well as to a search for new risk management strategies for the farmer. These trends are strengthened by the evolution of the Common Agricultural Policy (CAP) towards an higher allocation of the EU budget to the agri-environmental schemes (AESs) over the years and towards a liberalisation of agricultural markets in the EU.

AESs are voluntary contracts stipulated between the farmer and the government and they have been the main policy instrument to integrate environmental goals into CAP. Under these contracts, the farmer provides environmental goods that go beyond the minimum requirements of the cross compliance and they receive a fixed per hectare payment to face the additional costs and the loss of income linked to these commitments. The main objective of the AESs consists of reducing agricultural pollution risks as well as protecting biodiversity and landscape. As part of RDPs, the AESs can be designed at national, regional or local level and this allows to take into account the heterogeneity of the natural characteristics and agricultural systems throughout the EU Member States. The agri-environmental, together with the animal welfare, are the only measures that are compulsory present in all RDPs and they absorb the highest share of EU budget allocated to RD and this share has increased over time. The expectation is that the focus on environmentally-friendly practices of agricultural policy will be further strengthened in the future and the 'greening' of the direct payments introduced by the new CAP reform supports this prediction.

Another recent challenge that EU farmers must face is the increase in agricultural price volatility that has been experienced in recent years. Looking at the long term development of

agricultural commodity prices there is no evidence of a rising trend in volatility, but if we look at the medium term, since 2006 volatility has been higher compared to the previous two decades and it shows an increasing trend since 1990. The expectation is that the recent price volatility is likely to persist in the future on agricultural markets (OECD, 2011). In addition, in EU farmers will be no longer protected from world volatility by policy instruments given the evolution of the CAP towards liberalisation of the markets. Most empirical studies showed that farmers are averse to risk, hence high commodity price volatility is negative as it may lead to non-optimal production decisions in the short run and may discourage farm investments. In order to reduce the negative impact of large price variations on farmer income, there has been a large debate in order to identify market stabilisation tools that may be implemented (see for example OECD, 2011).

The research objective of this paper, which belongs to a PhD thesis, is in line with this challenging context, since it provides an analysis of the EU AESs from two viewpoints. First, an ex-post analysis aims at investigating the AESs in five EU Member States for their traditional role as measures which encourage sustainable farming practices while compensating the farmer for the income foregone. The second study considers the AESs from an innovative viewpoint and it performs an ex-ante analysis to explore their potential role as farm income stabilizer by the application of a new methodological approach which integrates farm risk into a farm level Positive Mathematical Programming (PMP) model. Section 2 and its subsections present the ex-post analyses on AESs while Section 3 and its subsections describe the integration of risk into a PMP framework and its application to the analyses of AESs.

2. Impact of agri-environmental schemes on farm performances in five EU Member States: a difference-in-differences approach

2.1 Background

Most of the literature about AESs tries to analyze the factors affecting farmer's participation to agri-environmental contracts (Vanslebrouck et al., 2002; Defrancesco et al., 2007). Another widely studied topic concerns the analysis of the environmental effectiveness of farmers' environmental practices. A few studies analyse the effects of AESs on farms' practices and economic results. An ex-post analysis tool recently applied to analyse the effects of agricultural policy measures on farm's performances is the Propensity Score Matching (PSM) and the most recent applications integrates PSM with a Difference-in-Differences (DID) estimator. Pufahl and Weiss (2009) and Chabé-Ferret and Subervie (2013) applied a DID PSM estimator in order to evaluate the effect of AESs on farm choices in Germany and France respectively. The PSM estimator has also been applied to compare voluntary and compulsory environmental measures in terms of their impact on farm production choices (Sauer et al., 2012; Jaraitė and Kažukauskas, 2012) and to the analyses of some rural development measures in North America (Lawley and Towe, 2014; Liu and Linch, 2011).

Despite the increasing use of PSM method to rural development analyses, to the best of our knowledge there are no studies that compare the effects of agri-environmental contracts on farmer's choices and economic performances in different EU countries. In addition none of the studies found in the literature focus on the impact of AESs on the farm economic variables, such as farm income. AESs are expected to differently affect farmers in different EU Member States given the different climatic conditions, the different characteristics of agriculture as well as the different national implementations of AESs. The comparison among EU countries may indicate the countries where the AESs adoption is more effective in promoting greener practices and where the effects on farm income are stronger. The analysis may also indicate whether the amount of the AE payment provides a fair compensation to participants. This paper aims at fill-

ing this gap by applying a DID PSM estimator in order to perform comparative analysis on the effects of AESs on farmer's practises and economic performances across five EU Member States: France, Germany, Spain, the UK and Italy.

2.2 Methodology

In applied research, matching analysis is generally applied to evaluate the impact of a treatment in a non-experimental setting where selection bias problem is likely to raise. Matching estimators aim at overcoming the selection bias on observables by matching each treated individual with one or more non treated individuals that have similar observed characteristics, and interpreting the difference in their outcomes as the effect of the treatment. If the observed characteristics are summarised in the probability of being subject to the treatment and this probability is used in the matching procedure, matching is called propensity score matching (Rosembaum & Rubin, 1983). In order for the matching estimator to be unbiased conditional independence assumption and common support condition must be satisfied. Heckman et al. (1997) proposed to combine the PSM estimator with a DID estimator. After matching on propensity score, the conditional DID estimator compares the conditional before-after outcome of the treated individuals with that of the matched counterparts and allows to remove selection bias due to time-invariant unobserved characteristics. The combination of PSM with DID estimator is suitable for our goal as it is likely that farmers who decide to participate into such schemes have different characteristics compared to those who do not and these characteristics may also affect the outcomes. We have conducted the analyses of the effects of AESs participation on farmer choices and performances separately for each country farm panel and considering the time horizon 2003-2006. Farms of the country panel have been assigned to the country treated group if they did not participate in AESs in 2003 but they did participate in 2006, and to the country control group if they did not participate for the whole period 2003-2006. Each country treated group has been split into two subsamples according to the share of the AE payments on farm income and the analysis has been carried out for each subsample (subsample 1 and subsample 2). The cutoff point in a country treated sample has been the median of this share. The farm level data used in this study come from the Farm Accountancy Data Network (FADN). The AESs data included in the FADN database are aggregate data, no information are available neither on which scheme has been applied by each farm nor on the hectares of farmland committed to AESs. Despite this data limitation, some interesting findings and policy implications may be drawn.

In the first step of the matching procedure, we estimated a country-specific logit model for participation in AESs considering the pre-treatment period 2003. We started from a large set of variables derived from economic theory and results of applied research, and we performed likelihood ratio tests on groups of variables in order to select the best specification of logit models. The groups of variables considered in our models are: age of the farmer, altitude of the farm location, farm size, farm production intensity, use of chemical products, farm labour, farm profitability, level of farm dependence on subsidies, regional gross domestic product per capita and the share of the agricultural value added over the total value added of the region. Finally, dummy variables have been used to indicate farm type (livestock or arable crops) and geographical location. The results of each country logit model are the predicted values of the farm's propensity scores that are used in the matching.

Different matching algorithms have been implemented and finally we chose the nearest neighbor matching with ten neighbors, with replacement and with a caliper of 0.1. The matching quality of each algorithm has been tested by three different indicators: the t-test on the differences of the covariates means of the two groups, the standardized bias and the pseudo R-square before and after the matching (Caliendo & Kopeinig, 2008).

Once the matching has been performed on 2003 data, the average treatment effect on the treated (ATT) for different outcomes has been calculated by using the DID estimators. The outcomes considered refer to farming practices related to the environment, farm size, farm labour and farm economic results. The ATT indicates the mean difference in the 2003-2006 outcome growth between farmers who adopted AESs after 2003 and farmers who did never adopt AESs over the period 2003-2006. Finally, we have implemented a placebo test (Chabé-Ferret and Subervie, 2013) to test whether our data verify the DID mean independence assumption, meaning that in the absence of treatment the outcomes of the treated and matched control groups would have followed parallel path conditional on the observed variables.¹

2.3 Results

As expected, the AESs affect more heavily the production choices of the treated subsamples 2, the subsamples for which the share of agri-environmental payments on farm income is larger than the median of the full treated sample, while in subsamples 1 the impact is lower (Table 1). We will consider the effects of AESs on the country treated subsamples 2 first, then we will draw some considerations on the subsamples 1.

In the country subsamples 2 the AESs participation leads to an increase in farm size in four out of five countries: Germany, the UK, France and Italy; in the last two countries this is the consequence of a rise in farm rented land. Farm crop diversification, fertilizer and crop protection expenditure per hectare and share of grassland on the farm may be considered as indicators of the effectiveness of the AESs of promoting greener practices. Crop diversification is positively affected by AESs adoption in France, Italy and UK. The participation in AESs is effective in reducing the fertiliser expenditure per hectare in France, UK, and Italy, while Spanish adopters surprisingly rise their fertilizer expenditure in contrast to a fall of the Spanish non adopters. Germany is the only country where the AESs adoption has a statistically significant effect on crop protection; however, the effect is opposite to what we may expect. This may be explained by the higher prices of environmentally friendly products. The share of grassland is positively affected by the adoption of AESs in France, Germany and Italy, even though the percentage increase is small. In our study the AESs participation does not seem to affect family labour while hired labour is negatively affected by participation only in Germany and Spain.

The differences in the effects of the AESs adoption on farm practices may be explained by the heterogeneity of the measures adopted in each country. In Italy, France and Germany the most widespread measures are the ones concerning the management of landscape, maintenance of pasture and high nature value (Eurostat, 2013), in Spain the actions to maintain habitats favourable to biodiversity are the most widespread, while in UK most AESs are classified as Entry Level Scheme (ELS).

If we consider the treated subsamples 1 and their matched counterfactuals we see a few technical outcomes affected by AESs participation.

AESs adoption does not affect only the farmer production choices but also the economic results of the farm. We may consider the farm income per hectare without AE payments as an indicator of the effect of AESs adoption on the farm economic performances, while comparing the evolution of this variable with the path of the farm income per hectare including the AE payment we have an indication of the ability of the payment to compensate the income foregone resulting from the adoption. Spanish farmers of subsamples 2 are strongly negatively affected by AESs adoption as their income per hectare without AE payment falls on average by 700 euro compared to a rise of non adopters of 394 euro over the period 2003-2006. The AE payment is not sufficient to compensate the income foregone of Spanish adopters, since in this case their

1. The results of the placebo test are available from the authors upon request



income per hectare still drops on average by 472 euro. A statistically significant drop in income per hectare as a consequence of participation appears also in France and Italy subsamples 2, where the AE payment is again not sufficient to compensate this drop. However, in these two countries the income foregone is much lower than the one of Spanish farmers. The time lag between expectation and realisation may explain the actual negative impact on income of AESs adoption in these countries. In addition, once the farmer enters an AES is obliged to adopt it for at least five years. In Germany the smaller rise of per hectare income of participants compared to non-participants is compensated by the AE payments. Finally, UK farmers of the treated subsample 2 shows the same negative growth of income per hectare of the corresponding matched control group with and without the payments. The fair compensation of German and English adopters is confirmed by the higher uptake rate of AESs in these two countries compared to the other three countries considered.

If we consider the treated subsamples 1 the farm income per hectare not considering the AE payment is negatively affected by participation only in Spain. If we consider the income per hectare including the payment this is still negatively affected in Spain, while in Germany and UK it shows a positive value for the ATT indicating a potential overcompensation.

Table 1. Average treatment effect on the treated (ATT) of AESs participation in the five countries over the period 2003-2006

Farm outcomes	Subsamples 1					Subsamples 2				
	France	Germany	Spain	UK	Italy	France	Germany	Spain	UK	Italy
UAA (ha)	0.317	5.544***	5.148***	1.209	5.009*	1.645 *	4.379*	0.190	4.815**	5.577**
Rented land (ha)	-0.243	3.839	1.294	2.107	3.444	2.289 **	1.397	2.567	1.925	5.050**
Number of crops grown on farm	-0.011	0.167	-0.076	0.014	0.015	0.155 **	0.043	-0.039	0.157**	0.288***
Fertiliser expenditure per ha	-2.428	0.424	9.040	0.803	-24.06**	-4.405 **	-1.217	42.607**	-6.624***	-19.168***
Crop protection expenditure per ha	1.630	-2.778	36.325*	1.369	-18.544*	-1.474	6.966*	34.298	-0.236	-11.336
Share of grassland(%)	0.271	-0.666	0.324	0.765	0.055	0.783**	1.891 ***	0.063	-0.160	3.175*
Family working hours	38.913	40.295	-183.468	121.844*	77.604	-26.800	-39.438	-128.837	59.005	39.184
Hired labour working hours	-19.514	188.622	145.052	34.267	21.508	34.939	-504.7 **	-307.013**	-159.946	322.764
Output value per ha(000 euro)	0.040	-0.057	-0.726***	-0.035	-0.244	-0.074*	-0.14 ***	-1.179***	-0.049	-0.599***
Variable costs per ha (000 euro)	0.062 *	-0.10**	0.245***	-0.049	-0.157	-0.041*	-0.072 **	0.335***	-0.062	-0.068**
Farm income (000 euro)	6.621**	11.444*	-10.460**	7.495**	14.689*	-4.225**	22.72 ***	-12.623***	6.529**	0.420
Farm income without AE payments (000 euro)	3.504	8.799	-14.665***	4.248	9.827	-10.38***	13.973 *	-19.445***	-0.619	-15.190***
Farm income per ha (000 euro)	0.031	0.080 *	-0.516***	0.076**	0.199	-0.050 **	-0.025	-0.866***	0.059	-0.245**
Farm income without AE payments per ha (000 euro)	0.006	0.065	-0.647***	0.052	-0.061	-0.104***	-0.080 **	-1.094***	0.014	-0.542***

Source: estimation results

3. Incorporating Risk in a Positive Mathematical Programming Framework: the Role of agri-environmental Schemes as Income Stabilisers

3.1 Background

Risk is an important component of agricultural production and it affects farmers' production choices as farmer is risk averse. Ignoring risk in farm modelling is likely to lead to biased results. Another important issue in farmer behaviour analyses concerns the calibration of farm model. Although normative mathematical programming models, which lack of any calibration, dominated the efforts in agricultural economics modelling for decades, nowadays a wide divergence between the modelled outcome and the observed outcome is unacceptable in policy analysis. PMP is a powerful calibration method introduced in the '90s which is able to recover a non linear cost function that allows to exactly reproduce the observed activity levels (Howitt, 1995).

In this section we developed a new methodological proposal which incorporates farm risk in a farm level PMP model. We think that the incorporation of the risk component in a PMP framework will be one of the new research frontier in farmers' behaviour analyses and so far there have been a few attempts (Paris and Arfini, 2000; Severini and Cortignani, 2012; Petsakos and Rozakis, 2011). Our proposal presents some innovation compared to the previous literature, since it merges the first linear phase with the second non-linear phase of the PMP in a farmer's expected utility maximisation problem. This allows us to estimate simultaneously the farmer's risk aversion coefficient, the farm non-linear cost function as well as the shadow prices of limiting resources by imposing the dual conditions of optimality. The proposed model has been applied to three representative farm samples in order to check the ability of the model to calibrate to the base year observed activity levels and to estimate a farmer specific absolute risk aversion coefficient. Then, the calibrated model has been used to perform some simulations of different crop price volatility scenarios aiming at testing the ability of the model to represent the farmer's reaction to changes in economic conditions. Although the empirical application mainly aimed at the goals mentioned above, it also allowed to explore the potential role of an agri-environmental scheme (AES), the option to convert a share of cropland to grassland, as risk management tool. The idea is that, since the adoption of AESs guarantees a fixed payment to the farmer independent of market conditions and crop yields, these measures may act as an insurance against revenue risk.

3.2 Methodology

Our new proposal for the integration of agricultural risk in a farm level PMP model consists in two phases: an estimation and a simulation phase. In the estimation phase our approach merges the first linear phase of PMP with the second non-linear phase by using the dual relationships of a farmer's expected utility maximisation problem and the problem incorporates the risk term according to the mean-variance approach. The model specification is the following:

$$\begin{aligned} & \min_{\mathbf{u}, \mathbf{y}, \boldsymbol{\lambda}, \alpha} \frac{1}{2} \mathbf{u}' \mathbf{u} + \mathbf{y}' \mathbf{b} + \mathbf{c}' \bar{\mathbf{x}} + \boldsymbol{\lambda}' (\bar{\mathbf{x}} + \boldsymbol{\varepsilon}) + \alpha \bar{\mathbf{x}}' \mathbf{V} \bar{\mathbf{x}} - E(\tilde{\mathbf{p}})' \bar{\mathbf{x}} & (1) \\ \text{subject to} & \quad \mathbf{c} + \alpha \mathbf{V} \bar{\mathbf{x}} + \mathbf{A}' \mathbf{y} + \boldsymbol{\lambda} \geq E(\tilde{\mathbf{p}}) & (2) \\ & \quad \mathbf{c} + \boldsymbol{\lambda} = \mathbf{Q} \bar{\mathbf{x}} + \mathbf{u} & (3) \\ & \quad \mathbf{y} \geq 0, \boldsymbol{\lambda} \geq 0, \alpha \geq 0 & (4) \end{aligned}$$

where $\bar{\mathbf{x}}$ is the vector of observed activity levels, \mathbf{c} is the vector of accounting costs per unit of activity and $E(\tilde{\mathbf{p}})$ is the vector of expected prices, \mathbf{Q} is the quadratic matrix of the non linear cost function which is common to all farms of the same sample while \mathbf{u} is the specific farm deviation from the common cost function, \mathbf{b} represents the vector of available resources and \mathbf{A} is the matrix of technical coefficients, \mathbf{V} is the variance-covariance matrix of activity prices, while α is the farmer's absolute risk aversion coefficient, $\boldsymbol{\gamma}$ and $\boldsymbol{\lambda}$ are the vectors of resource shadow values and of the shadow values of the calibration constraints respectively and $\boldsymbol{\varepsilon}$ is the perturbation term vector which prevents linear dependency between the constraints (Paris and Howitt, 1998). The objective function (1) minimises the square of the individual farm deviation, $\frac{1}{2} \mathbf{u}'\mathbf{u}$, from the common cost function and the difference between the primal and the dual objective function of the farmer's expected utility maximisation problem. The constraint (2) represents the economic equilibrium condition, while the constraint (3) establishes the relationship between the marginal cost of the first phase of the standard PMP and the marginal cost of the farm non linear cost function. Calibration constraints are not introduced in the model. The estimation phase results in the simultaneous estimation of the differential marginal cost and the shadow price of resources as well as the farm non-linear cost function and the farmerspecific coefficient of absolute risk aversion. A set of Karush-Kuhn-Tucker conditions provides the solution of the model and the estimated model can be applied in simulation analyses.

The proposed approach to integrate farm risk into a farm level PMP model has been applied to three representative crop farm samples located in flat areas in Emilia-Romagna. Each sample is composed by fourteen farms and the samples differ for the size of the farms (small, medium and large). The crop considered in this analyses are wheat, barley, corn and sugar beet, which are the most grown crops in Emilia-Romagna. First, the estimation phase has been applied to each farm sample separately in order to check the ability of the estimated model to reproduce the activity levels observed in the base year and to estimate a farmerspecific absolute risk aversion coefficient and a farm non linear cost function. Then, the estimated model has been applied to simulate farmers reaction to increasing crop price volatility. Specifically, we run five scenarios where we introduced a new activity, the option to convert a share of farmland to agri-environmental grassland (AES), and we rose crop price volatility. By scenario simulations we checked the ability of the model to represent the farmer's choices changes and we investigated the potential role of the AES as a strategy to cope with price risk. In scenario 1 the option of converting a share of farmland to agri-environmental grassland has been introduced while the crop price volatility has been set equal to the baseline; in scenario 2 and in scenario 3 the crop price volatility has been set equal to zero and half than the baseline volatility respectively, while the AES is still keep as an option in the model; scenario 4 and scenario 5 are the 'high volatility' scenario, as this is set 50% and 100% higher than the baseline volatility. The potential role of grassland programme as income stabiliser has been checked by detecting the share of farmland committed to grassland under the different scenarios.

3.3 Results

In this section the results of the model estimation and of each simulated scenario will be presented for the three farm samples.

The estimated model calibrates well to the observed situation in all the three farm samples as the deviation between the reproduced and the observed activity levels is lower than 0.3% for most farms in the small farm sample and for most of medium and large farms this deviation is smaller than 0.05%.

The model estimates a neutral attitude towards risk for five farmers of the small farm sample, two farmers of the medium farm sample and five farmers of the large farm sample, while all the other

farmers exhibit risk averse behaviour (Table 2). In order to check the reliability of the model estimates for the farmer risk attitude we need to consider the relative risk aversion coefficients, which is a dimensionless number, thus it allows comparison with a benchmark. Most scientific studies on farmers risk attitude have indicated values for the relative risk aversion coefficients between 0 and 7.5 (Chavas and Holt, 1996). In our model all the relative risk aversion estimates of the farmers belonging to the small farm sample are between 0 and 6.4. Three medium farms and two large farms exhibit values slightly above the suggested range. Given that few farmers deviate from the range indicated in the literature and the divergences are small, we can conclude that our model provides reliable estimates for the risk aversion coefficients.

In order to check the potential role of the agri-environmental grassland option to act as a farmer income stabiliser we have considered the share of farmland allocated to grassland under different simulated scenarios. Under scenario 1, where the volatility is set equal to the baseline and the new activity, grassland under environmental commitment is introduced, most of the farmers commit a share of their land to grassland program independently of their attitude toward risk. The adoption of grassland under environmental commitment by risk averse farmers substitutes mainly the less profitable crops, sugar beet and barley, and the highest-risk crop, wheat, while the share of land allocated to corn, the highest profitable activity, increases. The risk neutral farmers who convert a plot of their land to grassland make their decision based on marginal profitability only as they do not care about risk. The share of land contracted by these farmers will be the same under the different scenarios of price volatility as their decisions are not affected by the risk level.

The share of farmland allocated to AES increases from scenario 2 to scenario 5 for risk averse farmers and some farmers who do not contract under scenario 2 and 3 start to contract under scenario 4 and 5.² Under scenario 4, where the crop price volatility is set 50% higher than the baseline volatility, the share of farmland allocated to AESs is larger than 30% for most of the risk averse farmers. If the volatility is doubled compared to the baseline volatility (scenario 5) the land allocated to agri-environmental grassland is larger than 50% of farmland in most risk averse farmers from small and large farm samples and it is larger than 30% for most risk averse farmers from medium farm sample.

A rise in the crop price volatility does not only lead to an increase in the land committed to agri-environmental grassland but also to a reallocation of land among the other crops. In particular, if the price risk is set equal to zero the less profitable crops, sugar beet and barley, exits the production plans of most farmers and land allocated to corn increases. Under scenarios of high crop price volatility, medium and large farms combine the adoption of grassland programme with an increase in the share of farmland allocated to sugar beet, the lowest-risky crop, while small far

2. For space reason we do not report the results on the share of farmland allocated to agri-environmental grassland under the different scenarios. However, these data are available from the authors upon requests.

Table 3.1 Estimates of farmer's absolute and relative risk aversion coefficients

	Small farm sample		Medium farm sample		Large farm sample	
	Absolute risk aversion coefficient (α)	Relative risk aversion coefficient	Absolute risk aversion coefficient (α)	Relative risk aversion coefficient	Absolute risk aversion coefficient (α)	Relative risk aversion coefficient
1	0.001800	5.2410	0.000400	11.3560	0.000120	8.1050
2	0.000200	1.7280	0.000017	1.1850	0.000004	1.3570
3	0.000700	3.8470	0.000400	9.0240	0.000020	2.9600
4	0.000000	0.0000	0.000000	0.0000	0.000000	0.0000
5	0.002600	5.7380	0.000025	0.9510	0.000000	0.0000
6	0.000000	0.0000	0.000076	3.9920	0.000000	0.0000
7	0.000900	5.0380	0.000098	4.2120	0.000020	4.0850
8	0.000000	0.0000	0.000000	0.0000	0.000000	0.0000
9	0.001500	6.3790	0.000600	13.3550	0.000070	8.2110
10	0.000000	0.0000	0.000039	2.0870	0.000002	0.6350
11	0.001400	3.4220	0.000300	6.3180	0.000020	3.7450
12	0.000500	4.1060	0.000020	1.2680	0.000007	2.1010
13	0.000700	3.0090	0.000050	2.0570	0.000003	0.4280
14	0.000000	0.0000	0.000075	3.3500	0.000000	0.0000

Note: The absolute risk aversion coefficients are expressed in €^{-1}

4. Conclusions

Over the last decade the increasing connection between agriculture and the environment and the rising price volatility on agricultural markets has led to a new emphasis on agri-environmental policy instruments as well as to a search for new risk management strategies for EU farmers. This paper has dealt with both these issues by analysing the AESs from two viewpoints. First, the AESs have been investigated with respect to their traditional role of measures promoting environmentally-friendly practices while compensating the farmer for the income foregone; later their potential role as farmer's income stabilisers has also been explored. The results to the first research question have shown that AESs are effective in promoting greener practices in some countries, while in others their environmental effectiveness is not shown in this study. In addition, the effect of AESs on farm income are heterogeneous across countries and in some Member States the amount of the AE payment is worth to be revised to fairly compensate farmers for income foregone.

The answer to the second research question have outlined that the AESs seem to play an additional role besides the aforementioned one. Indeed, we have found that they may act as an income risk management tool available to farmers, especially in scenarios of high crop price volatility. Finally, from a methodological point of view, the approach presented in section 3.2 represents one of the few attempts of integrating risk in a farm level PMP model. The proposed approach is able to calibrate to the observed situation and to estimate farmer specific coefficient of absolute risk aversion consistent with the values indicated in the literature.

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Strategic quality choices in PDO Consortia with heterogeneous members¹

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Abstract:

This paper provides an economic analysis of PDO members' incentives to divert from the Consortia quality standard and how the possibility of strategic behavior affects the design of the control mechanism by the public supervisory bodies. The goal of analysis is to develop a theoretical model assuming the quality level such as endogenous and it is set by the Consortia strategically. I found that third-party control is necessary to keep a high quality level and keeping everything else constant – heterogeneity in producers' efficiency in delivering quality is negatively associated with the level of the quality standard. In the absence of third-party and producers are heterogeneous, the optimal control strategy for the Consortium is to set a high quality standard, and tolerate members' defection. This equilibrium describes a failure in the self-regulation principle and stresses the importance of external control.

keywords: PDO, Quality control system, Third-party certification

1. Introduction

This paper provides an economic analysis of the private incentives that drive producers of the typical products to divert production rules about the quality level and how this strategic choice firm's affects the programming of the control plan prepared by the public supervisory bodies. In European agricultural markets, the producers associations form a Consortium to promote the quality and they use as tool to quality signal the commons labels recognized as *Protected Geographic Indication* (PGI) and *Protected Designation of Origin* (PDO) which the quality control system is regulate by EU Regulation 1151/2012. The goal of this study is to understand if individual producers-in auspicious market conditions-operate independently from the Consortium causing a deviation from it. This paper suggests that the quality level imposed by Consortia is endogenous and there is a probability that producers can deviate from the product specification. Recent studies focus on the economic rationale for the protected geographical indications in terms of information asymmetries and reputation (Bramley and Kirsten, 2007) and how they may be efficient tools to signal the quality of products as well as to develop a competitive advantage on producers and consumers in terms of welfare. Moschini et al. (2008) show that the cost of certification of geographical indications are credible collective tools to signal the production of high quality products; Merel and Sexton (2012) showed that PDO consortia might overproduce quality, if they set the quality level strategically to maximize joint profits of producers and no defection is possible. However, the economic literature has shown that the existence of a third-party certification and public regulation can affect the stability of a quality certification system (Marette and Crespi, 2003). I developed a theoretical model suggesting that, in the absence of third party monitoring, PDO or PGI Consortia might underprovided quality, in order to prevent defection of the least efficient members. My analysis concludes that the economic rationale underlying strategic choice firm's to act independently from to Consortia can provide valuable elements to consider in planning control intervention by supervisory bodies.

1. The content of this paper is taken from the PhD thesis entitled "Strategic Management of Food Quality in the Agro-Food System" by author Antonella Di Fonzo, whose supervisor is Professor Carlo Russo.

2. Methodology: a game theoretical model

The game theoretical model is used to verify if there are strong incentives for participant of Consortia that encourage to violate the agreement under certain conditions, where the firm's decide to divert from Consortia and therefore to cause a non-cooperative game. The model provide a set of scenarios, where the Consortium strategically chooses to allow members to deviate from the quality standards, in order to benefit from consumers' imperfect information regarding credence attributes without incurring in the cost of producing high-quality goods.

In the model, economic agents move under the assumption of risk neutrality. I assume that there are M producers that provide one unit of the traded good each. They maximize the profit under a technology constraint. In particular, the M producers are heterogeneous with respect to their cost-efficiency in providing the quality level of product. For simplicity, I assume that there are two farmer-types only: M_E efficient farmers who have a cost function $C_E(\theta_E)$ and M_I inefficient farmers with a cost function $C_I(\theta_I)$ with $C_E(\theta_A) < C_I(\theta_A)$ for any $0 \leq \theta_A \leq \theta$ where θ_A represents the quality level of the product offered, $A = E, I$ and $M_E + M_I = M$. There are N homogeneous consumers with unit demand and $N > M$. The representative consumer has a willingness to pay for quality $W\theta_p > 0$ where Pq is the "perceived quality" and maximize their utility function with $U = W\theta_p - P$. The consumers cannot determine product quality level before purchasing and can detect the deviation from the product specification with probability $0 < S_C < 1$ after purchasing. The External Audit Authority can identify the deviation from the product specification with probability $0 < S_E < 1$. The probability that the deviation is identified (by the external authority or consumers) is equal to the $S_E + (1 - S_E) * S_C = \lambda$.

2.1. Model specification

The game occurs in a single period. The Consortium is formed if $M_E + M_I = M$ heterogeneous producers participating in Consortium. It establishes the quality level of the product specification θ_x and decide whether or not to activate the control system A (in the case of $A = 0$, the Consortium don't implement a control system, in the case $A=1$ the Consortium implement a control system). The consumer willingness to pay depends on the existence of the Consortium. The representative consumer has a willingness to pay for quality $W\theta_p > 0$ only if Consortium is formed. If the Consortium is not formed, consumers perceived the product as undifferentiated and exhibit zero willingness to pay for quality. The M producers can decide if: 1) join the Consortium or not 2) vote for a Consortium that implements the control system or not ($A = 0$; $A = 1$) 3.a) accept or defect the quality specification θ_x 3.b) if defection is chosen in 3.a, then producers must decide the optimal quality levels $\theta_E < \theta_x$ and $\theta_I < \theta_x$. The consumer's willingness to pay is $P = \theta_p$, with $\theta_p = \theta_x$ if producers are complying with the product specification (or violation of the product specification is not discovered); if any defection is discovered, $\theta_p = \theta_f < \theta_x$, with:

$$\theta_f = k\theta_x = K \text{ with } 0 < k < 1$$

The model assumes a fixed penalty $(1 - k)\theta_x$ that is invariant and independent of the number of defectors. As soon as the defection of one (type of) producer is discovered, the full fixed penalty is applied.²The cost function of the quality level production is assumed to quadratic form $C_A(\theta_A) = C_A(\theta_A^2)$, where C_A is a cost parameter and $C_E < C_I$.

Considering the consumer behavior and the cost function, producers' profit functions π_E and π_I are as follows:

2. Although restrictive, this assumption is consistent with an extreme reputation effect: it is enough that consumers perceive the slightest defection to have the full punishment extended to all producers.

$$1) \pi_E = \begin{cases} \theta_x - C_E \theta_E^2 & \text{if the product specification is respected by E and I} \\ (1-\lambda)\theta_x + \lambda k \theta_x - C_E \theta_E^2 & \text{otherwise} \end{cases}$$

$$2) \pi_I = \begin{cases} \theta_x - C_I \theta_I^2 & \text{if the product specification is respected by E and I} \\ (1-\lambda)\theta_x + \lambda k \theta_x - C_I \theta_I^2 & \text{otherwise} \end{cases}$$

The quality level of product specification θ_x depends on the objective function that the Consortium intends to maximize FO_{PC} . In this case, θ_x can perform the maximization of objective function:

$$FO_{PC}(\theta_x; A) = \{\max \pi_E\}$$

I assume to maximize the profit function of the producers E (i.e., it is assumed that process of setting up of the consortium is driven by excellence) by assuming that they represent a majority in the Consortium to decide on product specification and to decide on the implementation of the control system.

The game consists of three stages: at first stage both producers decide if to join or not join in the Consortium. The decision to enter or not in the Consortium is represented by the binary variable Z . If any of the producer group don't decide to participate in the Consortium it doesn't form ($Z_E * Z_I = 0$). In this case the game ends because there is not a product specification that establishes a quality level that producers can comply and there is not control system that the producers are subjected to. If producers decide to participate in the Consortium ($Z_E = Z_I = 1$) it is formed and Consortium decides on the quality level of the product specification θ_x . Decision moves to stage two. At second stage the Consortium decides if to implement the control system ($A = 1$) and quality level of the product specification is represented by θ_{x1} or not ($A = 0$) with quality level of the product specification θ_{x0} . In this stage, the goal of analysis is to maximize the objective function of the Consortium. In the model, the quality level of the product specification is determined by the producers of majority (E); they determine the value of the variable θ_x that maximizes the majority producer profit, both with control (θ_{x1}) that in the absence of control (θ_{x1} or θ_{x2}). Established θ_{x0} and θ_{x1} minority producers (I) can accept this quality level or don't accept it. In the third stage if the Consortium (E) don't decide to adopt a control system ($A = 0$) the producers (I) can adopt two types of strategic behavior: they can accept/defect with the quality level in product specification ($\theta_E \neq \theta_{x0}$ or $\theta_I \neq \theta_{x0}$) or accept/non defect ($\theta_E = \theta_{x0}$ or $\theta_I = \theta_{x0}$). If producers adopt the strategy accept/defect, starting with the primitive profit functions π_E and π_I it is possible to determine the levels of θ_{x0} (the value of variable θ_x).

2.2. Model solution

The game can be solved using backward induction. Stage 3 involves two distinct decisions: each producer must decide if a) defect or not and b) if defects, the quality level that he/she will provide. Again the two choices can be discussed using backward induction. Note that Stage 3 happens only if the Consortium agree that no internal control mechanisms are in place ($A = 0$). If the producer does not defect, the quality level is equal to the Consortium product specification θ_x . If defection is chosen, each producer will adopt the quality level θ_E or θ_I that maximizes own profits. Given the profit function (1), the optimal quality level for efficient farmer type can be found solving the following necessary (and in this case sufficient) first order condition which implies $\theta_E = 0$. Similarly, the optimal quality level for the inefficient producers is obtained from the FO_{PC}

of equation (2), which implies $\theta_I = 0$. As expected, under the fixed penalty assumption defection is total, which means that if producers decide to defect, they will set a quality level equal to zero.

Given these results, the matrix representation of the stage 3 sub-game is represented in Table 1 that shows that multiple Nash equilibria are possible. The pair {defect, defect} is always an equilibrium because $C_I(\theta_x)^2 > 0 \quad \forall \theta_x > 0$ by assumption. The pair {sustain, sustain} is an equilibrium if:

Table 1. Payoffs representation Stage 3.

		Farmer type I		
		Defect	Sustain	Exit
Farmer type E	Defect	$\pi_E = (1-\lambda)\theta_x + \lambda k\theta_x$ $\pi_I = (1-\lambda)\theta_x + \lambda k\theta_x$	$\pi_E = (1-\lambda)\theta_x + \lambda k\theta_x$ $\pi_I = (1-\lambda)\theta_x + \lambda k\theta_x - C_I(\theta_x)^2$	$\pi_E = 0$ $\pi_I = 0$
	Sustain	$\pi_E = (1-\lambda)\theta_x + \lambda k\theta_x - C_E(\theta_x)^2$ $\pi_I = (1-\lambda)\theta_x + \lambda k\theta_x$	$\pi_E = \theta_x - C_E(\theta_x)^2$ $\pi_I = \theta_x - C_I(\theta_x)^2$	$\pi_E = 0$ $\pi_I = 0$
	Exit	$\pi_E = 0$ $\pi_I = 0$	$\pi_E = 0$ $\pi_I = 0$	$\pi_E = 0$ $\pi_I = 0$

The pairs {defect, sustain} and {sustain, defect} are never Nash equilibria. Similarly, if any of the farmer type decide to exit (do not enter the agreement), the Consortium is not formed, all farmers must sell undifferentiated products and achieve zero profits. Because the profits from the pair {defect, defect} are always positive, the exit strategy is dominated by the defections strategy. The solution of the Stage 3 sub-game allows me to conclude that i) under a fixed penalty assumption, if a player defects, it is irrational for the other one to sustain the Consortium agreement. This result implies that the compliance to the product specification is driven by the behavior of the least efficient farmers. ii) If a player defects, he/she will produce an undifferentiated product and try to maximize the rent from the information asymmetry; iii) if defection is allowed, i.e., the Consortium does not implement a control system, farmers strictly prefer joining the agreement. The solution of stage 3 allows me to solve stage 2 and 1. However these steps require specific assumptions about the Consortium objective function. Section 2.2.1 assumes that efficient farmers prevail and therefore the objective function is the maximization of π_E under rationality and incentive compatibility constraints for the inefficient farmers.

2.2.1. Farmers type E prevail.

Assume that the Consortium is ruled by a majority vote and that $M_E > M_I$. In this case, the efficient farmers will set the control system (A) and the quality specification (θ_x) such that their own profit π_E is maximized under two constraints a) inefficient farmers must achieve a non-negative profit, otherwise they will not join in and the Consortium will not be formed (Individual Rationality constraint) (IR). b) In the absence of controls (A = 0), the inefficient farmers must have

3. Note that if condition (3) is satisfied, then $\theta_x < \frac{(1-k)\lambda}{C_E}$ as $C_E < C_I$ by assumption.



incentive to sustain the quality level θ_x (Incentive Compatibility constraint) (IC).

Note that since $(1 - \lambda) \theta_x + \lambda k \theta_x$ (i.e., the profit from defection) is always greater than zero, if the IC constraint is satisfied, the IR constraint is not binding. There are three possible cases that will be addressed separately.

Case 1: therefore both players sustain

In this case, the control system forces farmers to comply with the product specification.

Consequently, the IC constraint does not apply, and the IR constraint does. The objective is:

$$\max \pi_E$$

$$\text{s.t. } \pi_I \geq 0$$

From equations (1) and (2), I obtain that the solution of the program is:

$$\theta_{x1} = \min\left(\frac{1}{2C_E}; \frac{1}{C_I}\right)$$

where $\frac{1}{2C_E}$ is the unconstrained maximum and $\frac{1}{C_I}$ is the value of θ_x that equates the

profits of type I farmers to zero (and makes them indifferent between joining or not joining the Consortium).

Case 2: both players sustain

In this case, the Consortium does not monitor quality but both players must have incentive to comply with the product specification. In this case, the maximization problem is:

$$\max \pi_E$$

$$\text{s.t. } \pi_I = \theta_x - C (\theta_x)^2 \geq (1 - \lambda) \theta_x + \lambda k \theta_x$$

where the left-hand side of the constraint is the profit of the complying inefficient farmers and the right-hand side is the profit from defection.⁴ The solution of the problem is:

$$\theta_{x01} = \min\left(\frac{1}{2C_E}; \frac{\lambda(1-k)}{C_I}\right)$$

where $\frac{\lambda(1-k)}{C_I}$ is the value of θ_x that makes type I farmers indifferent between defecting or complying with the product specification.

Case 3: both players defect

In this case, all farmers set the quality level to zero and collect the profits from the information asymmetry. The maximization problem is $\max \pi_E$, given defection.

Given equation (1), the solution of the problem is:

$$\theta_{x02} = 0.$$

As expected, if all farmers agree to defect, they have incentive to boost the quality requirements of the product specification, knowing that a) this will increase consumers' willingness to pay and b) they are not required to produce such high quality.

4. Note that if the IC constraint is satisfied for the type I farmers, it will hold necessarily for type E farmers as well.

3. Result

The results of the stage 2 sub-game allow me to achieve the solution of stage 1 and consequently of the full game.

From section 2.2.1, I obtained that three possible strategy outcomes are possible:

$S1 = \{A = 1, \Theta_X = \Theta_{X1}, SS\}$, $S0.1 = \{A = 0, \Theta_X = \Theta_{X01}, SS\}$, $S0.2 = \{A = 0, \Theta_X = \Theta_{X02}, DD\}$ where all symbols maintain the usual meaning, DD indicates that all farmers defect and SS indicates that all farmer sustain the agreement.

The choice among these three strategies depends on the value of the Consortium objective function (in this case π_E), which in turns depends on the relative heterogeneity in the cost functions. Consider a set of possible values of C_E between $(0; C_I)$. Comparing profits from section 2.2.1, I have the following results. If:

- $C_E < C_I/2$, there is a high heterogeneity scenario;
- $C_I/2 < C_E < C_I/[2\lambda(1-k)]$, there is a medium heterogeneity scenario;
- if $C_E > C_I/[2\lambda(1-k)]$, there is a low heterogeneity scenario.

In a high heterogeneity scenario strategy $S.02$ always dominates $S.01$ strategy $S.1$ dominates $S.02$ only if:

$$\frac{C_I - C_E}{C_I^2} > \Theta[(1-\lambda) + \lambda k]$$

In a medium heterogeneity scenario, strategy $S.1$ always dominates $S.01$ strategy $S.1$ dominates strategy $S.02$ only if:

$$\frac{1}{4C_E} > \Theta[(1-\lambda) + \lambda k]$$

In a low heterogeneity scenario, strategy $S.01$ weakly dominates $S.1$ and it dominates $S.02$ only if:

$$\frac{1}{4C_E} > \Theta[(1-\lambda) + \lambda k]$$

The results suggest that internal control may be suboptimal only if the degree of heterogeneity is low. If heterogeneity is medium or high, internal control is necessary but *not sufficient* to sustain $\{S,S\}$ type strategy. If external control (λ) is low and/or the punishment $(1-k)$ is low and/or the possible gain from opportunism is high, internal control is irrational and the Consortium prefer to tolerate defection.

4. Conclusions

I found that third-party control is necessary to keep a high quality level maintaining everything else constant - heterogeneity in producers' efficiency in delivering quality is negatively associated with the level of the quality standard. If producers are heterogeneous the consortium might underprovide quality (i.e., set a "low-quality" standard) in order to prevent defection of the least efficient producers. In the absence of third-party control (or if the probability of detection of the fraud is "low enough") and producers are heterogeneous, the optimal strategy for the Consortium is to set a high quality standard – to exploit consumers' willingness to pay – and tolerate members' defection. This equilibrium describes a failure in the self-regulation principle and stresses the importance of external control.

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Innovative Applications of Q Methodology in Socio-Economic and Environmental Research

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Abstract:

In this work Q Methodology is used to systematic study of human subjectivity outside the research field in which it was originally developed. In the thesis four empirical applications are presented. The aim is to deepen the knowledge of Q Methodology, demonstrating its potential value of revealing individuals' perspectives. Finally, this work has the objective of expanding the use of this methodology in socio-economic and environmental research.

keywords: Q Methodology Subjectivity, Dairy Innovation, Landscape, Transport Mode Choice

1 Introduction

In this thesis the Q Methodology approach was applied to a systematic study of human subjectivity in different fields. Originally developed by the psychologist and physicist William Stephenson in 1935 in medical research and political science this qualiquantitative method is now used in a broader range of disciplines. The big variety of applications of Q Methodology render this method suitable for exploring subjective perspectives, and add complementary information to the classical qualitative and quantitative researches when the human dimension is central to the study. The main aim of Q Methodology is to identify the existing perspectives on a specific topic; the representativeness of the sample and its width is not an issue since the breadth and diversity of the perspectives to be included in the participant sample is more relevant (Brown, 1980, 1993, 1996; Stephenson, 1953). The essence of this methodology is that it makes a non-conventional use of the multivariate statistical analysis; by shifting the attention from variables to persons, the correlation matrix expresses the degree of correlation of each person towards any other person (Watts and Stenner, 2012). Q Methodology gives more structure to subjective opinions and allows to identify those latent patterns across individuals that could not be revealed by non statistical methods. According to the methodology, this purpose is reached by asking the participants to rank-order a set of stimuli (i.e. verbal or non-verbal stimuli) basing on their point of view (McKeown and Thomas, 2013). Data collected – in the form of Q sorts – are then intercorrelated and subjected to factor analysis. The researcher is asked to conceptualize participants' point of view by interpreting the emerging factors.

In this thesis Q methodology was applied to four empirical applications. The first application regards mobility behaviour in 6 towns, all belonging to the province of Ancona. The second study explores the acceptability of some innovations in low input and organic dairy sector in four European countries (Italy, the United Kingdom, Belgium and Finland), within the UE project SOLID (“Sustainable Organic and Low Input Dairying”).

Then two studies, on the use of images to assess the subjective perception of familiar and unfamiliar landscapes follow: the first one is an assessment of the perceived impact of photovoltaic systems installations in rural and urban settings in the Marche region; while the second – within the Italian research project RITMARE – explores, the subjective importance of the Mediterranean deep-sea ecosystems services.

The thesis aims to deepen the knowledge of Q Methodology, by showing its potential value in revealing individuals' perspectives. Finally, this work has the objective of expanding the use of this methodology in socio-economic and environmental research.

2 Method

Q Methodology consists of five steps (McKeown and Thomas, 2013): construction of the *concourse*, development of the *Q sample* or *Q set*, selection of the *P sample* or *P set*, *Q sorting* process, and *Factor extraction*.

In Q Methodology, the *concourse* refers to “the flow of communicability surrounding any topic” (Brown, 1993). It is a collection of all of the possible items (e.g. statements) that exist around the topic under investigation. Once the *concourse* has been gathered, a subset of items can be selected from the general *concourse* to form the so-called *Q sample* or *Q set*. The third step is the selection of the participant sample, known as *P sample* or *P set*. The number subjects to be included in the *P set* is relatively limited:

“all that is required are enough subjects to establish the existence of a factor for purposes of comparing one factor with another” (Brown, 1980). The fourth step is the *Q sorting* process. During the *Q sorting*, participants are asked to rank the set of items about a specific topic, according to a specific condition of instruction (e.g., from disagree to agree). By performing a *Q sort*, each respondent models her personal thinking by rank-ordering the set of stimuli about a given topic.

This process represents the core of Q Methodology; it offers the opportunity to directly investigate the human subjectivity, enclosed in the respondent’s own point of view as a “self referent” perspective (Stephenson, 1953) without any artificial induction.

Once all the Q sorts are gathered, the analysis starts, using the PQMethod software specifically developed for Q methodology (Schmolck, 2002). At first the *correlation matrix* between all of the Q sorts is computed by correlating all the Q sorts (sort by sort). The correlation matrix is then subjected to *factor analysis* for the extraction of the significant factors. The factors extracted define a final *factor solution*. Each *factor* describes a specific point of view, relating to the topic under investigation, and related *factor loading* gives the extent to which a participant agrees or disagrees with any particular factor (McKeown and Thomas, 2013). According to the methodology, respondents who have sorted the items in similar way usually are loaded on the same factor. The analysis ends with the calculation of *factor scores*: a weighted average of the scores given to that statement by the Q sorts related to that factor (Addams and Proops, 2000). They indicate the relation between each item of the Q sample and a specific factor.

Finally, the interpretation of the factors completes the analysis. The aim of this phase is to develop an interpretation of the results. Mainly based on the most relevant *distinguishing* items – i.e. divergences – and *consensus* items – i.e. common points – between factors, and the motivations reported by the participants during the post sort interviews, it reveals uncovered patterns.

3 Data

For sake of simplicity, the following tables show the research questions and the related information for the Q sample and the P set (Table 1 and 2) for each of the Q study discussed in this thesis:



Table 1. Research Question for each Empirical Q study

	Q study 1	Q study 2	Q study 3	Q study 4
Research Question	Studying subjective preferences of travellers in six small towns of central Italy (Province of Ancona)	Investigating the expectations of organic and low-input dairy supply-chain members in relation to innovations within the European project SOLID	Assessing the perception of the landscape impacts for the photovoltaic systems in the Marche region	Investigating how people perceive Mediterranean deep-sea ecosystem within the frame of the Italian research project RITMARE

Table 2. Type and number of items for each Q sample

	Q study 1	Q study 2	Q study 3	Q study 4
Item type	Statements on mobility experience and behaviour	Statements on dairy supply-chain innovations	Images on photovoltaic plants in rural and urban areas	Images on Mediterranean deep-sea ecosystems
N° items	20	34	54	36
P set composition	Citizens (Ancona, Falconara, Osimo, Jesi, Senigallia, Fabriano)	Dairy supply-chain members (consumers, farmers, retailers and processors) from 4 European Countries (Belgium, Italy, Finland, and the United Kingdom)	Experts (1 surveyor, 4 engineers, 11 among architects and urban planners and 3 agronomists) and non-experts.	4 PhD students in Marine Biology and 4 from other faculties of Polytechnic University of Marche.
N° people	42	99	34	8

4 Conclusion

Q Methodology, by combining both qualitative and quantitative research methods, is applied to reveal and give structure to individuals' subjectivity and it is especially recommended for those research topics investigating aspects of human behaviour (Brown, 1980).

This thesis outlines the potential benefits of Q Methodology by applying this approach within the frame of socio-economic and environmental research fields: transportation research, agricultural research and landscape assessment. Q Methodology can be used to enrich data of qualitative studies and as a 'guide' for developing further and larger quantitative studies, in quantitative surveys and standard variance analytic methods. Q methodology is not an easy method to be applied; it requires the researcher having developed enough experience in the methodology and having a background in the topic under investigation. A Q researcher takes decisions at every step of a Q study (how to collect the concourse, how many statements, how many and which participants to include, how many factors to extract etc.); any of these decisions can influence the results. Having conducted several studies but also sharing problems and solutions, can help researchers to solve aspects that one researcher alone can overlook. Only an extensive exchange of opinions with other experts and the experience matured through the application of Q Methodology in four different studies allowed to provide some theoretical considerations about this approach and to produce this work.

Each of the five steps of Q methodology – construction of the concourse, development of the Q sample, selection of the P sample, Q sorting process, and Factor extraction – can be approached as opportunities and issues to be solved in order to obtain more reliable and valuable results. In

the concourse construction, the use of experts, not directly involved in the study, by ensuring the “stimulus representativeness” (Brunswik, 1947) can reduce bias in the data selection. Experts, not participating to the study, as in the deep-sea Q study, can be of help if involved to refine the image selection to provide a good representation of Mediterranean deep-sea ecosystems. The bias of a verbal concourse can also be reduced, but not removed, by using people’s natural statements.

The use of a ‘naturalistic’ language facilitates the participants’ task, when performing the ranking process. The use of a natural language facilitates the connections to subjective emotions or thoughts. Converting the impersonal language extracted from scientific journals, and other materials in “self-referent” expressions can be of help to facilitate the subjects sorting process. In the dairy Q study, where the statements reported a description of innovations in the dairy supply-chain, the substitution of technical words in a more comprehensive language was particularly challenging. In this case, the use of pilot studies, including non-experts, and explanations of participants helped to simplify the puzzling statements.

The use non-verbal *stimuli* – images instead of statements – can also be of help in specific situations. Images are expected to elicit higher emotional reactions than words (Brown, 1991). The visual Q study, applied to the investigation of people’s perceptions of the landscape impacts for the photovoltaic systems in rural and urban landscapes, and the one on the evaluation of the subjective importance of the Mediterranean deep-sea ecosystem, helped people to express their subjectivity. The use of statements during the Q sorting phase could have been too complex when referred to unfamiliar environments. In both studies the use of images, better than words, favoured the participants comprehensions and the completion of the task; they completed their Q sort more easily, bridging the gap between experts and non-experts.

Cross-country comparison is also an issue in Q Methodology. When several countries are involved, cultural and linguistic differences are relevant in the concourse preparation. Having knowledge of the country differences on a specific topic is recommended in order to prepare an exhaustive and complete concourse. For this reason, the concourse should be built by collecting materials from each country involved. To overcome the linguistic problems, statements, defined in one main language, usually English, and then back translated in the country language of each of the countries involved, are to be carefully checked.

Other decisions are associated to the definition of the number of items that should be included in the Q sample. Determining the number of items to be included is secondary respect to the variety of the Q sample (McKeown and Thomas, 2013). Only a broadly representative Q sample will allow to reveal any existing viewpoints. The researcher has the delicate task of assuring a adequate diversity of the final sample to cover the full range of aspects that stay behind the entire subject under investigation. Several approaches can be applied to reduce the items to those relevant and reflecting the nature of the concourse. Among those approaches the Fisher’s experimental design principles provide valuable data.

Other methodological considerations can be taken for the participant sample or P set. P set is not created randomly from a population; what really matter, for Q Methodology, is ensuring as much variability as possible in the composition of the P set. The use of a small P set reduces costs and times, but maintaining an equal degree of variety among the participants’ opinions in a small participants sample is not an easy task. A possible strategy is to include people with different backgrounds, interests, know-how and personality. For example, in the PV impact assessment, the use of experts and nonexperts helped to discover common patterns and to produce different assessments on how and which objects were relevant.

The factor extraction is also a crucial step in Q Methodology – as it is in conventional factor Analysis. Determining the ideal number of factors is a matter of interpretation. Unfortunately,

there is not a scientific approach, but several statistical rules can guide the determination of a 'good' solution. In Q Methodology statistic supports the analysis, but the Q researcher has the delicate task to interpret and produce social narratives, relying on his/her familiarity with the subject under investigation and the existing scientific background, avoiding to impose preconceived thoughts (Brown, 1980). In order to favour the interpretations of factors, the Q researcher has to describe carefully the participants' view and including as much material as possible (i.e. participants' explanations, reactions, demographic data). The logic of abduction, so far discussed by Stephenson (Brown, 1980) is to be applied. In relation to this aspect, some critics sustain that data can be influenced by the researcher's perspective. Contrary to other similar multivariate statistical methods – e.g. cluster analysis – Q Methodology imposes a certain 'commitment' of the researcher. For the Q researcher there is not a singular observable world to describe, and for this reason what emerges from a Q analysis is the manifest of the variety of thoughts on a particular matter of interest.

The reliability of the Q Methodology results is often subject to critiques by non-Q practitioners. In the Q approach, reliability is associated to the concept of replicability: that is to measure the same response under the same condition each time with the same subjects. Limitations to replicability exist since there are no elements to reject the hypothesis that some people could express different views on two separate times (Stainton Rogers, 1991). This critique can be disproved by considering that, Q sorting process is extremely subjective and the meaning impressed and expressed by a single person could change anytime. About the robustness of the results, it is important to avoid those solutions in which specific factor is defined by only one person. In this case, the risk is to obtain a social perspective that doesn't differ from the individual perspective. Though in some cases, one factor is defined by a 'strategic' participant (i.e. expert), it is important to pay particular attention to the opinion of this subject and to possibility of retaining this factor. Another controversial aspect is related to generalization. Like other quali-quantitative methods, Q methodology does not aim to produce generalization of the results to a wider population and there is no interest in estimating the percentage of people expressing a particular point of view (Kitzinger, 1987). Its aim is to identify the presence of certain views with very few participants. As noted above, R methodologies, such as surveys or questionnaires, can fail when the purpose is related to the investigation of the subjective structure of beliefs, because they can only provide external measurement of people's behaviour; they have to be built on preconceived ideas and hypothesis to be tested, as a consequence the unknown can be hardly revealed and if the hypothesis are wrong the results are biased by them.

The robustness of this methodology stems in its ability in revealing any perspectives and what stays beyond their structure is supported by the statistical approach of factor analysis. In applying Q Methodology to the socio-economic field, we gathered evidence that it is particular helpful when defining a problem or issue for further research, since it allows to consider all the subjective viewpoints in a systematic and comprehensive manner. As a conclusion, we believe that Q Methodology should have greater diffusion in the field of economics, especially in complex, multi-faceted research situations like those where environmental economists are engaged. Q Methodology has high potential in management science too, since it could help decision-making in multi-actors, multidisciplinary frameworks.

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