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PhD Thesis

THE ROLE OF CAPITAL STRUCTURE IN FIRM'S ALLIANCE STRATEGY

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CHAPTER 1

INTRODUCTION

1.1. Introduction

Finance and strategy are closely interrelated both in theory and in the practice of management. Finance research suggests that a firm's financial condition may constrain its ability to undertake and maintain strategic discretionary investments, such as those in R&D or innovation, which are fundamental to compete in today's economy (Hall, 1990; Jensen, 1986; Stearns & Mizruchi, 1993). Accordingly, financial policies should be aligned with firm's strategic plans in order to obtain a competitive advantage (O'Brien, 2003; Kochhar, 1996; Simerly and Li, 2000).

While this seems a rather theoretical argument, its implications are clearly evident in most businesses' everyday life. For example, the dramatic consequences of the recent global financial crisis have made the interconnection between the sphere of strategy and finance painfully salient. The collapse of Lehman Brothers in 2008 caused a wave of fear in financial markets, which rapidly spread over the globe. Banks refused to lend and raised the cost of corporate borrowings, while consumers drastically reduced their demands for products and services. Projects that had seemed attractive before the crisis suddenly were deemed excessively risky, while large capital investments were canceled or shelved. These effects have been further magnified by the globalized nature of today's competition, which has made inter-firm networking a widespread phenomenon. Indeed, firms in financial troubles also experienced problems in honoring the claims of their customer, supplier and alliance partners, with further costs imposed on these stakeholders. All these factors generated a domino effect, which in turn caused probably the worse economic recession of the modern era.

Although integrating financial and strategic decisions seems such a relevant and important task, this topic is yet to receive adequate attention by extant research. Indeed, finance and strategy literature have, buy and large, developed independently from each other and with little cross-contamination even in important topics that have received much attention in both fields, such as inter-firm relationships. Finance needs strategy in order to better understand aspects of financial decisions that cannot be explained exclusively through financial theory. At the same time, strategy scholars needs finance in order to understand how functional decisions contribute to the overall achievement of the firm's long-term objectives. For these reasons, several scholars called for a thorough integration of the two fields although their reciprocal influence has been still insufficient (Bettis, 1983; Balakrishnan and Fox, 1993; Barton and Gordon,1988; Barton and Gordon,1987; Bromiley, 1990; Kochhar, 1996; Kochhar and Hitt, 1998; Parsons and Titman, 2007).

This thesis answers to this general call and investigates the interconnection between finance and strategy in the important strategic context of inter-firm relationships. While strategic alliances have been studied both by strategy and finance scholars, there is a lack of research explicitly integrating the insights provided by both streams of literature. This research does precisely so and shows that important aspects of alliances can be better understood when partnering firms financing policies are taken into consideration. The insights provided enhance our understanding of the financial implications of inter-firm collaborations and contribute in many ways to extant finance and strategy research. The results have also important implications for managers and corporate business professionals involved in alliance management.

1.2. Research context and motivation

Strategic alliances have become an ubiquitous phenomenon in today's global economy. Extant literature defines an alliance as "any voluntary initiated agreement between firms that involves exchange, sharing, or co-development, and it can include contributions by partners of capital, technology or firm specific assets" (Gulati, 1995a, 1995b). This broad definitions includes different forms of collaborations, such as joint ventures, equity investments, R&D partnerships, technology licensing or transfer agreement, some forms of long-term buyer-supplier relationships, procurement and manufacturing agreements, marketing and promotion collaborations, among others.

In 1996 Peter Drucker, who was called the father of modern management theory, stated that "the greatest change in corporate culture, and the way business is being conducted, may be the accelerating growth of relationships based not on ownership, but on partnership" (Drucker, 1996). Following trends in alliance formation provided large support for Drucker's farsighted prediction and the importance and diffusion of these forms of corporate development is now comparable to other established practices such as M&As. Booz-Allen and Hamilton (1997) report that during the nineties the number of strategic alliances almost doubled, with more than 20,000 alliances formed worldwide between 1998 and 1999 (Harbison and Pekar, 1997; Farris, 1999). During the same years, in the US alone the number of alliances has grown by 25 percent each year since 1987 (Farris, 1999). This upward trend has steadily continued over the last decade and it is not expected to change in the future. For instance, results from a corporate development survey conducted in 2012 by Deloitte suggest that more 50 percent of the managers interviewed expected the volume of strategic partnerships to grow over the next two years, and this percentage rises to over 60 percent for young firms. Moreover, this trend is expected not only for high-tech firms where alliances have traditionally be very common, but also for those operating in traditional manufacturing sectors (Deloitte, 2012).

The rapid surge in the number of inter-firm alliances has been generally viewed by academic research as the result of the shift experienced by most businesses today towards a hyper-competitive environment. This new environment puts pressure on firms to constantly deliver new products while keeping up with rapidly changing technological developments and customer demands. Furthermore, with the process of globalization geographic and economic barriers to commerce have been removed. This created new opportunities for firms to expand into new markets but also exposed them to fierce international competition. These challenges highlighted firms' internal resource inadequacy and the urgent need to resort more and more often to external expertise and resources in order to preserve competitive advantage. Strategic alliances have emerged as an organizational response to endure these pressures.

Extant research has traditionally analyzed alliances from the perspective of the resources and capabilities possessed by partnering firms (Das and Teng, 2000). Accordingly, this stream of literature has suggested these forms of collaboration provide firms with many advantages. Several studies show that by forming collaborations firms can gain access to new or emerging markets (Kogut, 1991), improve their market power (Hagedoorn and Schakenraad, 1994), or enhance their status and legitimacy among other business partners (Podolny, 1994;

Baum and Oliver, 1991). Moreover, alliances have also been found to be a means of acquiring the technical know-how needed to master new technologies or of sharing the risks and costs of developing and bringing to the market innovative products (Pisano, 1990; Pisano and Teece, 1989; Teece, 1986, Berg and Friedman, 1981; Mowery et al., 1996; Gomes-Casseres et al. 2006). However, these benefits come at a cost, as these forms of collaborations are inherently unstable and they can be problematic to manage. Indeed, when an alliance is formed a firm becomes exposed to various ex-post risks that can potentially impede the realization of synergies (Das and Teng, 1998a; 1998b; Arino et al. 2008). In this regard an important concern is the risk of unplanned termination (Pangarkar, 2009), that is, the risk of one partner unilaterally withdrawing from the relationship before its objectives have been achieved (Sadowski and Duysters 2008, Reuer and Arino 2002, Reuer and Zollo 2005). The costs associated with such unanticipated termination can be substantial because the efforts devoted to the alliance and the resources developed within it (such as joint technologies or marketing knowhow) are often sunk, idiosyncratic, and cannot be fully recovered if the relationship is prematurely terminated (Pangarkar, 2009). As a result, an important challenge for both managers and academic researchers has been to better understand what firms should do in order to preserve the long-run stability of an alliance, while facilitating the realization of synergies by pooling resources together.

Extant research suggests that the chances of alliance unwanted termination and instability can be magnified by a firm's financial condition. If one alliance partner encounters financial difficulties and is facing growing bankruptcy concerns, out of either desperation or necessity it may unilaterally withdraw from the relationship, with substantial costs imposed on the firm. Similarly, a firm may decide to walk away from a weakened alliance partner, as continuing the relationship would imply very limited returns in terms of synergies. In this respect, a telling example of the costs stemming from partners financial health is the alliance between two of the most important players in the airline industry, namely Alitalia and Air-France. This collaboration has been recently put under pressure by Alitalia weak financial condition, which required a capital injection of 300 million euros in order to avoid financial distress. Although Air-France was initially willing to judiciously invest in its partner under to condition of a change in financial policy, it finally withdrew its offer and wrote-off the value of its equity position in Alitalia. This decision also had strong repercussions on the Italian carrier, as it was forced to turn to alternative partners with dubious complementary

resources or capabilities in the airline business[1]. Recent empirical evidence provides further support for similar costs imposed by financially weak firms on their alliance partners. For instance, Boone and Ivanov (2012) find that firms experience a significant negative stock price reaction when an alliance partner files for bankruptcy. Moreover, they also find that non-bankrupt alliance partners experienced a significant drop in profitability and investment levels in the subsequent two years. More generally, other studies document that a firm financial difficulties can generate strong and broader wealth effects that rapidly extend, through a sort of 'contagion', also to its customers, suppliers and even competitors. For instance, Hertzel et al. (2008) find that customer and suppliers of distressed firms experience negative stock price reactions around the event of their partner filing for bankruptcy. Similarly, other scholars suggest that a firm financial distress can have negative repercussions even for industry rivals, who may experience not only declining stock prices (Lang and Stultz, 1992) but also increased spread terms on new or renegotiated corporate bank loans (Hertzel and Officer, 2012).

The existence of costs stemming from partners financial condition suggests that financial health is at least as important as resource considerations in the context of an alliance. In other words, firms forming alliances should be concerned not only about the resources possessed by prospective partners, but they should also pay close attention to their financial policies as these directly influence the risks they are exposed to in the collaboration. However, while partners' financial health seems to play such a relevant role, this aspect is yet to receive adequate attention by existing literature. Indeed, alliance scholars have traditionally looked at firm financial condition exclusively through the perspective of resources. Based on this perspective, firm-level financial policies have been shown to be important only to the extent that they determine the availability of financial resources within a firm. For instance, Lerner et al. (2003) show that the need for additional funds prompt many firms to enter into alliances. Similarly, Patzelt et al. (2008) suggest that financial resources influence a firm's ability to develop and acquire the capabilities made available through alliances. While this body of works confirms the importance of financial resources in alliance formation, it completely overlooks to consider the broader implications that partners financial condition have in terms of risk. In particular, very little is known as to whether and how the risks implied by firm-level financial decisions (such distress-driven

[1] Indeed, after refusing alliance offers from long-standing competitors, such as Ryanair, Alitalia finally resorted to Poste Italiane, the major provider of postal services in Italy, who participated with

unplanned termination) influence the various aspects of its alliance activity. Similarly, still unanswered questions remain about whether alliance partners concerns of instability are relevant enough to affect the financial policies adopted by firms.

This lack of knowledge about the implications of firm financial condition suggest that our understanding about alliance related risks and how firms deal with them could be greatly enhanced by a consistent effort to integrate insights from both alliance and finance research. The general goal of this thesis is to explicitly fill this void by proposing partners' financial health as another relevant dimension to better understand several aspects involved in alliances. Indeed, while extant research has mainly looked at the importance of resources, I take a different angle and complement this perspective by suggesting that resource considerations should be traded off with considerations about risks stemming from a prospective partners financial health. Accordingly, partnering firms should have incentives to consider each other financing policies and take them into consideration when structuring their alliances. In particular, in this thesis I focus on one of the most important aspects of a firm's corporate financial policy, that is capital structure, and investigate its interconnection with the firm's overall alliance strategy.

Financial research has shown that capital structure critically influences a firm's ability to deal with external stakeholders such as customers, suppliers, and employees. These stakeholders often in invest in assets that are relation-specific (R-S) in the sense that their value is preserved as long as contractual parties transact with each other (Parsons and Titman, 2007; Williamson, 1985). If financial distress resulted in a firm's liquidation, these relationships would terminate and the value of these assets would decrease substantially. As liquidation risks increase with the amount of debt in a firm capital structure, these stakeholders are either reluctant to deal with highly leveraged firms, or they require risk-adjusted prices in order to do so (Titman, 1984; Cornell and Shapiro, 1987). Accordingly, firms should carefully devise their capital structure whenever they want to stabilize their relationship with external partners, while preserving the latters' incentives to invest (Titman, and Wessels, 1984, Banerjee et al., 2008). However, while the ramifications of the above argument have been explored with respect to different kinds of stakeholders, this logic has never been applied to alliance partners. In the following chapters, we extend this intuition to the context of strategic alliance, where the costs associated with instability and unplanned termination make firms' financial condition particularly relevant. Accordingly, the general

research purpose of this thesis is *to investigate whether and how capital structure decisions affect and are affect by a firm's alliance activity*.

In analyzing this reciprocal relationship I show that, in light of the risk of unplanned termination, a firms' capital structure and the associated potential for bankruptcy and financial distress have a profound impact on external partners willingness to collaborate with the firm and undertake alliance-specific investments. Moreover, I also suggest that capital structure exacerbates various hazards involved in alliances even when financial distress is still remote and bankruptcy is not an immediate chance. These risks are shown to have very important consequences for managers' decision-making. In particular, by explicitly integrating insights from both capital structure and alliance literature, I am able to enhance our understanding in two key research areas of interest to both fields. On the one hand, I contribute to finance research by analyzing how a firm's alliance activity influences its capital structure decision. In this respect my analysis supports the idea that alliance partners' concerns about bankruptcy and other related risks are relevant enough to significantly influence a firm's decision in terms of debt and equity financing. On the other hand, I also contribute to alliance research by investigating the reverse causal link, that is, how capital structure decisions, once adopted, impact various aspects of a firm's alliance strategy. In this regard, the analysis clearly corroborates the view that the risks implied by firm's capital structure have a critical impact on its perceived attractiveness as an alliance partner, and thus on the characteristics of the partners it is able to attract in the market for inter-firm collaboration. Similarly, firms appear to adopt specific governance forms (such as equity joint ventures) in response to the instability brought about by a partner's financial condition with the ultimate goal of protecting the value of their R-S investments. Finally, I also derive the performance implications of the proposed theoretical framework and investigate whether firms that adopt capital structure decisions consistent with their alliance strategy indeed enjoy higher financial performance.

1.3. Research methodology and thesis outline

The general goal of my thesis is to integrate insights form both alliance and capital structure literature in order to enhance our understanding in several key aspects of managers decision making. In order to pursue this objective I adopt both a theoretical as well as an empirical research approach. Accordingly, four distinct phases of the research emerge which are

individually addressed by each of the following chapters. In each phase, I develop a set of theoretical arguments and test them empirically with suitable datasets.

The first part of the thesis (Chapter II) starts off with an extensive discussion of relevant studies in both alliance as well as capital structure literature. This review shows that while alliances have been a central topic of interest for both strategy and finance scholars, these two streams of literature have surprisingly developed independently from each other. Accordingly, important research gaps and promising areas of integration of the two fields are first introduced.

In the second phase (Chapter III) I explicitly address the gaps existing in capital structure research. In this respect, I build on stakeholders' theories of capital structure (Banerjee et al., 2008; Titman, 1984) and derive arguments linking the characteristics of a firm's alliance activity to its decision in terms of debt and equity financing. These predictions are then tested through two empirical analyses. In particular, in the first analysis I focus on a sample of firms operating in the biotech industry, where the recourse to inter-firm collaboration has been of paramount importance. In the second analysis, I extend the validity of previous results and focus on a large multi-industry sample of firms. Both analyses are based on archival data collected from multiple databases (Orbis, Compustat, SDC Platinum). These data sources and the related datasets collected are also consistently used during the following research phases.

In the third phase (Chapter IV) I change perspective and explore the implications of a firm's capital structure for various aspects involved in alliance formation. In this part of the analysis I suggest that, once a firm has adopted a given capital structure, the implied risks are relevant enough to be reflected in the transaction-level characteristics of the alliance it forms. In this respect, my theoretical arguments propose that a firm's capital structure impacts its attractiveness as an alliance partner, and thus it has relevant implications in terms of partner selection. Similarly, the risks implied by capital structure will be reflected in the choice of appropriate governance forms that effectively mitigate concerns arising from partners' weak financial condition. An empirical analysis conducted on a large sample of alliances from multiple industries provides support for these predictions and it shows that a firm's capital structure is systematically related to the characteristics of the partner it is able to attract as well of the alliances it forms.

In the fourth phase (Chapter V) I derive the performance implications of the proposed theoretical framework. Given the profound consequences that a firm's financial condition can have in terms of the risks involved in alliances, firms should carefully devise their capital structure or otherwise they may experience serious problems. Accordingly, in this last part of my analysis I propose that firms failing to consistently align capital structure with their overall alliance strategy should find themselves at a competitive disadvantage and thus experience a decline in performance (Kochhar, 1996). To explore these points I adopt a broader perspective and investigate the importance of a firm's financial condition in the context of alliance portfolio management, that is, the management of a firm's collection of ongoing relations with alliance partners. This level of analysis is particularly suited to my purposes as the contribution of individual alliance to firm's outcomes is difficult to isolate (Lavie, 2007). Moreover, since capital structure is a firm-level construct it is also conceptually meaningful to analyze its impact at the level of the overall alliance portfolio, rather than only at the level of individual dyads. In order to test this argument I conduct a third empirical analysis on a sample of firms operating in the automobile industry and find that a firm's alliance strategy and capital structure decision critically interact in order to determine its financial performance.

Finally, the last important methodological consideration is related to econometric issues involved in my study. This thesis shows that a firm's financial condition and its alliance activity are intimately related by a reciprocal relationship. A firm's financial condition impacts its alliance strategy and vice-versa. As a result, both a firm's capital structure and the characteristics of the alliances it forms could be jointly determined and represent endogenous variables in the study. This situation is known as *reverse causality* and it is typically of studies linking corporate financing decisions with corporate strategy ones (Parson and Titman, 2007). Accordingly, in Chapter 3 an instrumental variables approach is adopted. Similarly, further endogeneity may arise from the fact that firms' decision to enter alliances could be self-selected with respect to their financial condition, as for example firms characterized by excessive financial risks may find systematic problems in finding partners to ally with. In this respect, both in Chapter 4 and Chapter 5 I control for the effects for self-selection with appropriate statistical techniques (such as the Heckman's procedure).

CHAPTER 2

LITERATURE REVIEW

2.1. Research on strategic alliances

Although the literature on alliances is vast and multi-form, most alliance research can be thought of as be directed towards understanding the generic strategic alliance making process. This process is known to be complex and lead many scholars to divide it into several phases (Das & Teng, 1997; Devlin & Bleackley, 1988; Parkhe, 1993). While many classifications are provided in literature, most studies agree that the alliance process can be conceptualized along three main and subsequent phases: the decision to enter an alliance, the choice of an alliance partner and the planned management and coordination of the relationship (Devlin & Bleackley, 1988). Studies analyzing the first phase focus their attention on the antecedents of alliance formation, trying to isolate those firm-specific factors and environmental conditions that prompt firms to collaborate with other entities (Stuart, 1998; Gulati, 1999; Colombo, 2006; Patzelt et al., 2008). Once a firm has established the need to collaborate, the next step is deciding whom to ally with. Indeed, not all opportunities to collaborate actually materialize as alliances (Gulati, 1995b). Accordingly, research in this stream has traditionally looked at various partner characteristics – such as technological overlap (Mowery et al., 1998), organizational fit (Zaheer et al., 1998; Lavie et al., 2012), resource complementarity (Chung et al., 2000; Hitt et al., 2000; Li et al., 2008), and so on– and has analyzed how they impact the process of partner selection. Finally, a third stream of literature analyzes the issues related to alliance implementation and has developed around two main themes. A first body of works focuses on the problem of choosing an appropriate governance structure for the alliance and studied the different mechanisms employed by firms to facilitate coordination, curb opportunism, and deal with other transaction-level hazards (Oxley, 1997; Oxley and Sampson, 2004; Santoro and McGill, 2005). On the other hand, a second body of works deals with the performance implications of alliances and

concentrates on analyzing those factors helping a firm improve its alliance management capabilities (Sampson, 2004; Kale et al., 2002; Kale and Singh, 2007; Sarkar et al., 2001).

In a related vein, extant literature can also be classified according to the unit of analysis adopted in approaching alliance-related issues. Most studies focus on the single dyad as their main unit of analysis and study the antecedents, structure and performance of individual alliances (Kale et al., 2002). Others studies adopt the firm as their unit of analysis and focus on alliance portfolios, defined as a firm's collection of immediate relationships with alliance partners (Lavie, 2007). These scholars stress the need to study alliances within the strategic context in which they are embedded and they investigate the implications of portfolio characteristics for firm outcomes. Still others embrace even a broader view and look at the implications of structural characteristics of the network of relationship in which the firm is embedded through alliances (Gulati, 1999).

In this research we focus on several key aspects involved in the alliance process across different units of analysis, such as partner selection, governance choice and alliance portfolio management. Each of these aspects has been previously analyzed by adopting a variety of perspectives and theoretical lens including – transaction cost economic (Williamson, 1985), resource based theory (Eisenhardt and Schoonhoven, 1996), game theory (Parkhe, 1993), real option theory (Kogut, 1991), exchange theory (Gulati, 1995a, 1995b), and the list may be further extended. Thus, for the sake of clarity and parsimony, the approach adopted is to focus the review of literature mainly on studies that either built on the transaction cost view or resourced based view of alliances. These theories represent the two most popular approaches in the study of alliances, and they have been consistently applied to study most of the aspects involved in the alliance making process (Yasuda, 2005). As a result, a focused review of these two streams of research is necessary in order to identify relevant gaps and motivate any effort to integrate insights from alliance and capital structure research, which is the general purpose of this thesis. Moreover, considering these theories is also important in order to reconcile the proposed arguments, based mostly on finance research, with the general findings of traditional alliance research. Accordingly, in the present chapter I focus the review of literature on extant studies that built on either the transaction cost economics or the resource based theory of strategic alliances. In addition, I further integrate into each of the following chapters of the analysis an extensive discussion of the relevant literature regarding the specific issues covered (i.e. partner selection, governance choice and alliance portfolio management) in order to highlight more clearly the contributions.

The resource-based view of strategic alliances

The essence of strategic management is to understand those factors that determine a firm level of profitability. Accordingly, strategy scholars have long analyzed the question of why firms possess different levels of profitability and how they should be managed in order to obtain a competitive advantage over their competitors (i.e. higher than normal levels of profitability). Traditional strategy research based on the work of Porter (1990), posits that a firm's performance can be better understood by looking at the structural characteristics of the industry in which it operates (bargaining power, barriers to entry, etc.). Thus, strategic choices are just a matter of selecting those industries which are most attractive, that is, whose structural properties are more favorable to the firm (and all its competitors). However, while the inherent simplicity makes such an approach appealing, its predictive and normative power is limited as it does not directly explain why firms operating in the same industry show marked differences in performance, although being subject to the same industry and market forces. For this reason many scholars suggested that firm performance and behavior can be better understood by looking at firm resources and prompted a resource-based view (RBV) of the firm.

According to the resource based view firms can be viewed as bundles of resources tied-semi-permanently to the firm (Wernerfelt, 1984). These firm-specific assets possess the greatest value when employed within firm boundaries and usually cannot be traded under secondary markets. Moreover, as they are rare and both difficult to copy by competitors and to transfer to other firms, these resources are the source of firm competitive advantage, that is above-normal returns (Barney, 1991). Firm-specific resources include both tangible assets – such as plants, production equipment, financial resources etc. – as well as intangible assets – such as the knowledge and capabilities embedded in a firm's workers, access to valuable information, etc. (Das and Teng, 2000). The central point is that, whatever the nature of the resource considered, only those possessing the above characteristics can be considered as strategic, and thus provide the firm with a competitive advantage which is sustainable in the long-term.

Several scholars extended this general framework to the context of inter-firm collaborations and developed a resource-based view of strategic alliances (Das and Teng, 2000; Das and Teng, 1998a; Dyer and Singh, 1998; Eisenhardt et al., 1996). In essence, this research stream

conceptualizes alliances as a means to access resources held by others, yet which are fundamental to develop a competitive advantage over their competitors. Dyer and Singh (1998) suggest that a firm's critical resources may span its boundaries and may be embedded in inter-firm routines and processes. By forming ties with other entities the firm can access these resources and combine them with its internal resources to create sources of *relational rents*. Therefore, successful alliances are those that help firms combining assets that are complementary, thus creating synergies that would not be realized if they operated separately.

Eisenhardt et al. (1996) argue that firms resort to alliances when they are in weak strategic positions, that is, in urgent need for additional resources, a situation that can be triggered by both market conditions and firm strategy. For instance, higher levels of competition reduce margins and make product differentiation more difficult, thus weakening a firm's strategic position. By forming alliances the firm can access prominent or emergent technologies of cutting-edge partners and embody them in its products in order to differentiate from competitors. Similarly, firms pursuing a strategy of innovation must develop technical competence and know-how, which is usually a very resource-consuming, long-term oriented and uncertain activity (O'Brien, 2003). In this context, if an alliance involves joint development or research activities it helps the firm sharing the risk and costs of its investments. Also, a firm pioneering a new technology may improve its strategic position by leveraging its partners in order to establish a new technology standard (Eisenhardt et al., 1996). In any of these instances the underlying logic is need, and the focus is on the resources delivered by each partner.

The RBV has also been employed to point out the importance of social aspects involved in alliances. Specifically, it has been argued that firms collaborate not only when they need more resources, but also when they are in a strong social position (Chung et al., 2000; Eisenhardt et al., 1996; Gulati, 1995b). A firm enjoys a strong social position when it can capitalize on advantages such as contacts, reputation or status (Eisenhardt et al., 1996). Firms whose managers are well connected through personal networks of business and professional contacts are facilitated in reaching out potential alliance opportunities or to be offered new ones. Moreover, extensive contacts also help establishing reputation, which is fundamental when negotiating an alliance deal. Accordingly, this body of works has shown that alliances emerge not only as a result of strategic pressures, but also when firms want to capitalize on strong social assets or when low status partners want to associate with higher-

status ones characterized by a strong reputation (of quality, of technical competency, etc.) (Podolny,1994).

Taken together, these streams of literature suggest that most of the issues involving alliances can be better understood by focusing on partnering firms' resources. In particular, firms appear to join alliances both when their weak strategic position prompts the need for more resources, and when they find themselves in a strong social position (which itself can be though of as an intangible resource). Thus, according to the resource-based view, the inherent irony underlying the strategic alliance process is that firm "must possess resources in order to get resources" (Eisenhardt et al., 1996). This logic has been applied to study many aspects of the strategic alliance making process.

Extant literature corroborates the view that resource characteristics represent probably the most important antecedent of a firm decision to enter alliances (Das and Teng, 2000; Yasuda, 2005). Several studies have further explored this point by analyzing the process of partner selection and shown that the decision of *whom to ally with* can be largely explained by looking at complementarities between firm capabilities and resources. For instance, Rothaermel and Boeker (2008) show that complementarities arising from non-overlapping market niches, or the combination of upstream and downstream competences in the value-chain, largely explain alliance formation decisions between pharmaceutical and biotechnology firms. Similarly, Chung et al. (2000) find that complementary capabilities increase the likelihood of alliance formation between US investment banks and firms during corporate stock offerings. Other studies confirm the importance of the social capital arising from both direct and indirect ties with other firms. For instance, Gulati (1995a; 1995b) suggests these ties represent valuable means to share partner-related information and to establish reputation and reliability. Accordingly, he finds that the existence of prior ties between semi-conductor firms affects the chances of alliance formation.

The resource-based view has also been used to predict firm choices in term of governance. This stream of research builds on the assumption that the typology of resources contributed by partners critically impacts the way in which an alliance is structured. Das and Teng (2000) argue that the mechanisms through which resources are to be shared in the alliance are largely determined by whether these resources are property-based or knowledge-based. In particular, they show that resource profiles determine structural preferences in terms of four types of alliances, i.e. equity joint venture, minority equity alliance, bilateral and

unilateral contract-based alliances. Similarly, Chen and Chen (2003) analyze how partners' resource profiles influence a firm's decision between exchange alliances – much more similar to outsourcing contracts – and integration alliances – where partner firms explicitly integrate each other's resources and activities in a separate entity. Mayer and Salomon (2006) find that firm technological capabilities help reducing the costs of governing outside transactions, thus increasing the likelihood that a firm will chose sub-contracting over vertical integration in the presence of specific hazards. More recently, Dunne et al. (2009) focused on pharma-biotech alliances and showed that the financial, technical and social resources of the biotech firm impact the governance of such alliances and the extent of control that it is willing to give up in the relation.

Finally, the role of resources has also been explored to understand the performance implication of alliances. This body of research has analyzed the impact of partner characteristics on alliance success (Sarkar et al. 2001, Hitt, Dacin, Levitas, Arregle, and Borza 2000; Saxton 1997). For instance, Sarkar et al. (2001) analyze the influence of resource complementary and capability as well as of relationship capital on alliance performance. Their findings suggest that value creation in alliances is enhanced when partners possess complementary resources yet share similar social institutions. On the other hand, other scholars have analyzed how alliances contribute to the overall performance of the firm and proposed that, since alliances represent access relationships, the advantages a firm derives from collaborating largely depend on both the firm and its partners resource profiles. For example, Stuart (2000) studies alliances in the semiconductor industry and finds that organizations with large and innovative partners perform better in terms of sales growth and innovation rate as compared to firms lacking such associates. These benefits are also greater for younger than for older firms consistently with a signaling and status based explanation of alliances. In a related vein, Kale et al. (2002) find that firms with greater alliance experience and established alliance management capabilities enjoy higher abnormal stock returns after alliance announcement. Finally, other studies adopt a broader view, and analyze the performance implications of alliance portfolios. These studies stress the fact that firms often access resources through multiple alliances simultaneously and that it is often difficult to isolate the contribution of individual alliances on firm's outcomes. As a result, the impact of alliances is better understood by studying the resource profile of the entire alliance portfolio (Lavie, 2007; Lavie, 2008; Mouri et al., 2011; Jiang et al., 2010). For example, some scholars proposed that alliance portfolios characterized by greater diversity in

terms of partner resources enhance firm performance by providing access to non-redundant information and to a broader pool of assets (Goerzen and Beamish, 2005; Jiang et al., 2010).

The TCE view of strategic alliances

Transaction cost economics (TCE) originated from the work of Coase (1937) and was developed as a theory to explain why firms exist and what factors set the limits to their boundaries. More specifically, this theory accepts the dichotomy between two stereotype economic institutions, namely market and hierarchies (vertical integration), and analyzes what factors push economic actors towards organizing their transactions according to one of them (Oxley, 1997). When exchanges happen via market or spot contracts, the identities of buyer and seller are trivial and activities can be coordinated simply defining the price and quantities of the exchange. On the other hand, in vertical integration a firm performs the transaction internally, and achieves coordination through formal authority (Williamson, 1985).

The central idea behind TCE is that both vertical integration and the market provide the firm with alternative mechanisms to minimize the transaction costs incurred during exchanges. Transaction costs are "the economic equivalent of friction in physical systems" (Williamson, 1985:19). They include not only the direct costs to produce and deliver the goods/services involved, but also the costs arising from writing and enforcing the contract, coordinating activities, safeguarding the interests of transacting parties, while inducing appropriate adjustments to unfolding contingencies. These costs arise out of bounded rationality coupled with pervasive behavioral uncertainty, which makes complete contracts too costly or even impossible to write, thus leaving room for opportunistic behavior to take place. Under these circumstances standard market contracts are not efficient and firms must resort to the formal authority provided by hierarchies in order to govern the exchange and minimize transaction hazards.

TCE focuses on contractual hazards arising from two main features of transactions, namely assets specificity and uncertainty. Relation-specific assets are not easily redeployable because their value is maximized as long as contractual parties transact with each other. This creates the so called *small numbers bargaining*, where the firm undertaking the investment faces high switching costs, while being subject to hold-up by the counter-part which may try

to extract more favorable conditions (Klein et al., 1978; Williamson, 1985). Similarly, high levels of uncertainty about outcomes or activities to be performed make coordinating and monitoring more difficult, as it becomes unfeasible and too costly to contractually specify and enforce parties' behavior (Oxley, 1997). As a result, as the level of relation-specific investments and uncertainty increases, market contracts become too costly and exchanges should take place within the firm, where formal authority and greater information availability help reducing opportunistic behavior and fostering adaptation to unforeseen contingencies.

The transaction cost paradigm has been fruitfully employed as a theoretical lens to understand several aspects of alliances. In particular, scholars have conceptualized alliances as hybrid governance forms situated in the midway between market and hierarchies and sharing governance features of both institutions. Accordingly, this research stream suggests that the main rationale behind alliance formation is the minimization of transaction costs and studies the circumstances under which transactions are best executed via alliances, as opposed to being finalized through the market or performed internally within the firm (Chen and Chen, 2003; Yasuda, 2005). In particular, alliances tend to occur when transaction costs are high enough to discourage the use of market-contracts, yet not so severe to justify complete vertical integration.

Besides explaining the emergence of collaborations, the TCE paradigm has been mainly employed in alliance literature in order to explain why firms decide to structure their inter-firm relationships in a variety of ways (Oxley, 1997; Santoro and McGill, 2005; Pisano, 1990; Yasuda, 2005). In this respect, scholars characterized alliances along a continuum of governance forms between market and hierarchies, with some alliances including more hierarchical control (such as JV or equity-based alliances) and others resembling the characteristics of market exchanges (contractual alliances). These studies focus on alliance characteristics that may indicate the presence of high transaction costs, and analyze their impact on the choice of particular typologies of alliances. Governance forms must be aligned with alliance characteristics in order to minimize overall transaction costs, in such a way that greater transaction costs induce more hierarchical alliance forms.

Most scholars have focused on the distinction between equity and non-equity arrangements. Equity-based alliances usually take the form of joint ventures (JVs) and are most preferable when appropriability or coordination concerns are high (Pisano, 1989; Pisano, Russo and

Teece, 1988; Gulati and Singh, 1998; Oxley, 1997). These collaborations are more similar to vertical integration since they represent legally independent entities that provide formal coordination and control mechanisms over the collaboration. Moreover, the fact that they involve common ownership by partners creates a mutual hostage situation, which helps to align incentives and reduce opportunism (Klein et al. 1978; Pisano 1990). On the other hand, non-equity alliances represent hybrid contractual arrangements more similar to market contracts because they lack dedicated administrative structures and they are more preferable when contractual hazards are limited. Empirical evidence is consistent with this idea and shows that firms tend to adopt equity alliances when transaction costs are higher. For example, Santoro and McGill (2005) find that the presence of co-specialized assets increases the likelihood of hierarchical governance in alliance formed by biotech firms, and that partner and task uncertainty further strengthen this effect. Van de Vrande et al. (2009) analyzes technology sourcing agreements and finds that corporate venture capital investments are preferred over non-equity alliances when there is greater technological distance between the partners. In a related vein, Oxley (1997) shows that hierarchical alliances are also chosen when opportunism is high because the technology is difficult to specify or alliance activities are wider in scope.

Finally, although its implicit focus is on governance aspects, the TCE framework has also been extended in order to understand the performance consequences of alliances. According to TCE, firms should align transaction characteristics and governance forms in a cost minimizing way (Williamson, 1991a). Building on this assumption, several scholars analyze the performance implications of eventual misalignments between alliance characteristics and firm governance choices. For example, Sampson (2004) analyzes a sample of R&D alliances in the telecom equipment industry and shows that a misalignment between alliance characteristics and governance may result in excessive bureaucracy and reduce collaborative benefits. In a related vein, Hoetker and Mellewigt (2009) analyze how the choice between formal and relational governance is influenced by the typology of resource exchanged, and show that firms that fail to correctly match governance forms with asset types experience reduced alliance performance. Nelsen (2010) shows that different governance mechanisms mediate and moderate the relationship between condition for alliance formation and outcomes. Finally, few studies adopted a broader view and applied the transaction cost logic to study the consequence of alliances on overall firm performance. For instance, Goerzen and Beamish (2005) analyze alliance portfolios and suggest that greater levels of resource

diversity among alliance partners cause a loss of corporate focus and increase transaction costs by making the management of the portfolio more complex and unwieldy.

2.2. Research on capital structure

In corporate finance capital structure refers to the particular mix of financial liabilities that a firm uses to finance its assets. Although financial markets allow firms to issue a broad portfolio of securities, there are two general forms of capital: equity capital and debt capital. Each of these securities is associated with different level of risks, benefits and control over the firm's operations and strategies. Debtholders exert lower control but collect a fixed and relatively secure stream of cash flows that is determined *ex-ante* by contractual obligations. Shareholders can exercise tighter control on the firm's activity through the board of directors but they bear most of the risks since they are residual claimants. Thus, broadly speaking, the term capital structure indicates the amount of debt and equity capital displayed on the right side of a firm's balance sheet and borrowed from the two most important financial stakeholders, bondholders and shareholders, respectively.

The importance of capital structure decisions goes beyond their mere financial implications and lies in the way they can influence the overall business of a company. On the one hand, capital structure determines the average cost of a firm's capital and has a direct impact on its ability to stay profitable in the long term[2]. On the other hand, the level of financial leverage, i.e. the ratio of total debt to total liabilities, determines the distribution of the economic rents among the suppliers of finance and, thus, the control they can exert over its valuable assets and activities. Since these stakeholders differ in term of risk-adversity and goals, the relative importance of their claims has a direct impact on how a firm shapes its corporate strategies, investments and, in general, on the way a business is ran.

The modern theory in capital structure literature starts with Modigliani and Miller's famous work (1958) that explains how in perfect capital markets corporate financing decisions

[2] When a firm's return on invested capital (ROI) is steadily smaller than its WACC (Weighted Average Cost of Capital), then the company is not able to run its business in a profitable way since it earns less than it owes.

should be "irrelevant"[3]. Indeed, adopting the discounted-cash-flows approach (DCF), the value of a company is determined by the net present value of the cash flows generated by its assets and their economic use. Since financial leverage (or "gearing") determines exclusively how such cash flows are sliced up and offered to investors, it is not possible to increase the value of a firm through financial alchemy. This result easily extends to all the types and mix of securities a firm can issue (long or short-term debt, straight or convertible bonds, etc.) and implies that a firm's "hurdle rate", i.e. the expected rate of return on the market value of its assets, remains constant regardless of the debt ratio.

In later studies, Modigliani and Miller (1963) acknowledged the importance of taxes and their impact on capital structure and the value of the firm. In several countries interests paid on debt are tax-deductible and generate interests tax shields by reducing the overall amount of taxes owed to the government. Accordingly, a firm's market value is made up of two parts: the value of the firm if it was all-equity financed and the value of interests tax deductions. The former is the present value of all cash flows generated by the unlevered firm, while the latter is the present value of tax-deductions discounted at the appropriate rate of return. Since it is always possible to increase the value of tax benefits by issuing more debt, then a value-maximizing firm should be completely financed through debt.

Modigliani and Miller's (M&M) seminal works started-off the debate on capital structure and inspired a huge amount of research. Although their underlying assumptions are quite unrealistic, M&M's propositions on both leverage-irrelevance or interest-tax shields are not end results, but instead they can be considered as the starting point for the debate on the importance of corporate financing decisions and the benchmark for every theory or prediction concerning capital structure. Subsequent research tried to relax the underlying assumptions of perfect capital markets and to identify significant market frictions that make financing strategies important. This body of works has developed over more than fifty years of research and it is naturally vast and heterogeneous. Therefore, a focused review strategy is needed in order to grasp those strains of literature significant for our research purposes. The proposed approach is based on the analysis of few prominent literature reviews (Harris and Raviv, 1991; Myers, 2001; Parson and Titman, 2007; Graham and Leary, 2011) and it is guided by the general focus of this thesis towards the strategic aspects of capital structure.

[3] M&M theorem assumes the absence of taxes, bankruptcy costs, agency costs and asymmetric information. Moreover, capital markets are assumed to be efficient and prices of assets and securities embed all the information available on their past and future value.

In particular, I suggest that extant literature can be filtered according to the source of frictions considered and the different facets of capital structure analyzed. Accordingly, two main research lines can be identified:

(i) theories of capital structure developed within the conversation of finance;
(ii) theories of capital structure developed from an integration of finance and corporate strategy research.

The first stream of literature analyzes capital structure according to finance theory and concentrates on issues such as the determinants of observed debt ratios, the decision to issue or repurchase securities, and the existence of an optimal capital structure. The second stream focuses not only on capital structure determinants but also on how capital structure decisions interact with the firm's environments and strategies in order to determine performance. In the next sections, we review both these macro-research lines and synthetize the most influential theories and the related empirical predictions.

Capital structure in finance research

Trade-off Theory

The trade-off theory is one of the most influent theories in capital structure literature. The main reason of its success among finance researchers is that, in contrast to previous models, it is the first approach that predicts moderate borrowing. Previous works by Modigliani and Miller came up with the unrealistic result that leverage is "irrelevant". Even after accounting for the effect of taxes the authors concluded that a value maximizing firms ought to be 100% debt financed in order to take full advantage of interest tax deductions. However, empirical research never ran into such type of firms; rather it is not rare to find industries in which firms prosper with no debt at all (since firms are mainly equity financed). Thus, there is something wrong with these approaches and the trade-off theory provides two possible explanations. First, the value of interest tax shields may be reduced under different circumstances, since tax deductions do depend on the ability of the firm to steadily generate economic rents that are higher than the cost of debt. Second, there are costs associated with excessive borrowing that may offset the benefits of tax deductions, i.e. financial distress costs do exist (Myers, 2002). Financial distress costs arise when a firm struggles to keep the

promises made to creditors and the cash flows generated by economic activities are not sufficient to cover the costs and to adequately remunerate the capital invested. This situation is different from bankruptcy, which is the legal process through which creditors step in and take over the firm's assets from shareholders. Sometimes financial distress leads to bankruptcy and in turn to the liquidation of the firm's assets; most often, it just indicates that the business has ran into difficulties. Both circumstances generate costs that can be classified as *direct* or *indirect.*

Direct costs include administrative and legal costs, the cost of shutting down operations, and other distress-driven losses such as the losses taken during "fire sales". *Indirect costs* of financial distress are defined as costs caused by the many obstacles that occur when trying to manage a firm that has ran into financial trouble. Unlike direct costs, indirect costs are incurred before financial distress is declared and when the mere threat of default can determine opportunistic behaviors among stakeholders. The majority of such costs are mostly due to agency problems between bondholders and shareholders (Jensen and Meckling 1976, Myers 1977), as the latters can gain at the expense of creditors when default is a chance by undertaking actions that reduce the value of existing debt (for instance by investing in riskier projects that might fail and further reduce the firm's value). Otherwise, they could give up valuable investment opportunities because part of the value generated would go to existing creditors and would increase the market value of debt. Other indirect costs of financial distress could arise from the relationships a firm establishes with non-financial stakeholders (i.e. customers, suppliers, employees, etc.) as a weak financial position may force the firm to default on their claims (such as the provision of spare parts or other after-sales services) (Titman, 1984).

Hence, given the costs and benefits of debt financing, the value of the firm can be expressed as the sum of three parts:

(4) *Firm Value = Value if unlevered + PV of interest tax shield - PV of distress costs*

When debt level goes up the present value of interest tax deductions increases first, then the marginal benefit associated with further borrowing drops off, since it is very unlike that the firms will be able to generate sufficient profits to steadily cover huge interest costs in the long term. In contrast, the more the debt, the more the present value of the associated distress costs. When the firm increases its borrowings, distress costs are trivial first, then they

suddenly pick up because excessive debt threatens the firm's long-term survival[4]. As consequence, financial managers can adopt financing strategies where the benefits and the costs associated with debt are equal at the margin: by adopting such "optimal" debt ratio firms maximize their market values. Building on this logic, scholars suggested that firms facing higher business risks, with valuable growth opportunities and intangible assets should borrow less, since they are more exposed to distress costs. Instead, more profitable firms generate higher cash flows and can afford higher levels of debt and interests expenses.

Pecking Order theory

Unlike tradeoff models, in the pecking order theory of Myers and Majluf (1984) we do not have firms seeking optimal debt ratios. Rather, firms seem to follow a mechanistic order in the choice of funds and observed leverage is the results of accumulated financial deficits over time. The theory draws from empirical evidence and aims at explaining why equity issues are relatively rare when compared to debt issues.

The model assumes perfect financial markets, except for the existence of information asymmetry between insiders and outsiders of the firm. Outsider investors have less information about the real investments outlays of the firm, and thus they cannot adequately value its assets in place and growth opportunities. Every time a firm decides to issue (repurchase) securities it transfers information to investors, and financial markets adjust the value of the firm accordingly. The announcement of a stock issue could be good news if it reveals growth opportunities with a positive net present value, but it could be also bad news because managers with poor prospects may want to delay leakages of information and try to sell overvalued shares. As a result, Myers and Majluf derive an equilibrium in which firms can issue share, but only at a market-down price (Myers, 2001). This intuition is based on extended empirical evidences that confirm how the announcement of stock issues drives prices down. For instance, Asquith and Mullins (1986) computed an average price drop of roughly 3% of the pre-issue market value of the firm, that is not much if compared to the overall value of the firm, but it is a much larger fraction of the amount issued. Furthermore, such price reductions depend on the relative importance of growth opportunities and assets

[4] During bad times a firm may experience a reduction in cash flows and fail to meet its financial obligations. If such difficulties are severe, then debtholders might step in and take over the firm's assets by declaring bankruptcy.

in place. Myers and Majluf stress the fact that investors' worries concentrate on the value of assets in place and that firms with large growth opportunities should be credible equity issuers. Empirical studies seem to confirm that price reductions are less severe for such companies (Pilotte, 1992; Jung, Kim and Stulz, 1996). Of course, there are *good* firms with undervalued shares but, in general, they will not issue large amounts of equity, because the price drop acts like a wealth-transfer mechanism from existing shareholders to new ones. After all, why should managers with good prospects issue undervalued shares and make new stockholders better off? For all these reasons, the existence of asymmetric information ends up increasing the cost of external capital and determines a pecking order among the sources of finance, according to which firms always prefer internal over external financial resources to fund new investments. Moreover, when internal funds are exhausted firms first issue less risky securities (such as debt, bonds etc.) and finally they raise equity, as a last resort. When a firm issues debt, price reactions are negligible because manager's superior information is minimized. Indeed, managers with promising future prospects will immediately exploit the chance to issue new debt, as they think that firm's earnings will be sufficient to cover higher interest expenses. Only pessimistic managers prefer to issue equity, because they think that higher interests would only create further problems, and that the new shares could be overvalued. As a consequence, investors will interpret every new stock issue as an attempt to sell something that is not good to buy. On the other hand, equity issues are credible when debt is too costly because the firm is at an already dangerous debt level or when the firm possesses large intangible growth opportunities. The pecking order explains why new stock issues are infrequent and why the bulk of external financing used by public corporations comes from debt issues. It also finds a rationale behind the negative relation between leverage and profitability: more profitable firms borrow less because they have more internal funds. Less profitable firms (whose internal financing is limited) will issue debt only when accumulated financial deficit exceeds available internal funds.

Capital structure and Corporate Strategy

The main problem with traditional financial theories of capital structure is the lack of clear empirical evidence (Graham and Leary, 2011). Despite several common predictions, the two most influent financial models–i.e. tradeoff models and the pecking order theory- provide different explanations to observed financing patterns (Fama and French, 2002). Moreover,

neither of them can be considered as a general framework to analyze financing strategies, since each theory works better in particular contexts and thus, they are *conditional* rather than *general* theories (Myers, 2001). In order to overcome such difficulties, several capital structure researchers adopted a slightly different point of view and pointed out whether a strategic perspective could fill in the gaps of previous literature.

Even though strategic and finance research are based on very different paradigms, both fields have reciprocally benefited from a closer analysis of market imperfections and firm heterogeneity (Vicente-Lorente, 2001). Researchers point out different areas of controversy between finance and strategy as research fields. First, finance assumes that firms' ultimate goal is to maximize shareholders wealth and that firms act efficiently in order to achieve this unique objective. Then, such simplistic model of the firm is employed in broader frameworks whose main focus is on the behavior of markets (Simerly and Li, 2000). On the opposite, strategic management states that a firm has multiple goals and that it may be impossible to simultaneously achieve all objectives. Individual managers must maintain control over the business and balance conflicting claims from shareholders, bondholders and several external stakeholders, while dealing with uncertain and dynamic environments (Simerly and Li, 2000). As a result, strategic research adopts a more complex model of the firm in the study of financing choices. The second area of conflict is concerned with the importance of firm-specific risk management. Strategy researchers investigate the importance of firm-specific risks and attributes, while financial theories overlook these effects since they assume away the fact that investors possess diversified portfolios and that unsystematic risk can be eliminated (Bettis, 1983). A third conflict arises when dealing with the importance of information management (Vicente-Lorente, 2001). Financial assets pricing models assume symmetric distribution of all relevant information among investors in order to adequately evaluate assets and liabilities. Thus, managers should make public any good news related to the firm's long-term survival and growth. However, the disclosure of information on new product development, innovations, forthcoming alliances etc., may severely damage the ability of a firm to achieve a competitive advantage over its competitors (Bettis, 1983). On the opposite, strategic research recognizes that market imperfections can be a source of competitive advantage (Barney, 1991) and accepts that managers have cognitive limits in gathering and processing information. In this vein, Simerly and Li (2000) state that strategic management focuses on decision-making in a context of uncertainty and

limited information, and suggest that financial decisions (such as capital structure) must be assessed from this perspective.

These areas of conflict fundamentally arise from the different focus of finance and strategy as research fields. Financial research is interested in studying the behavior of investors and capital markets, while strategic research analyzes the behavior of firms and their characteristics. Successful theories developed on the common ground of finance, organizational economics and strategic management helped to integrate both perspectives and to reconcile the points of controversy. As far as capital structure literature is concerned, researchers revisited the conflicts related to the "irrelevance" of firm-specific risks and information management by adopting theoretical approaches typical of industrial organization models. Indeed, the analysis of capital structure decisions from the standpoint of theories such as transaction cost economics (TCE), resource-based view (RBV) and agency theory (AT) provides useful insight into the importance of firm heterogeneity, firm-specific risks and assets (Jensen, 1986, Williamson 1988; Vicente-Lorente, 2001). Oviatt (1984) suggests that TCE and AT help integrating financial and strategic management as research fields and that researchers should concentrate on the complementary elements rather than stressing the differences in their predictions. As a result, these theoretical frameworks have represented the starting point for the integration of a strategic perspective in capital structure literature (Barton and Gordon, 1987; Barton and Gordon 1988). Their implementation first helped researchers to better understand the link between financing and investments decisions (Jensen, 1976; Myers, 1977; Williamson, 1988). Then, on the basis of these insights, subsequent works extended the range of factors related to capital structure and further elaborated on the link between financing decisions and firms' competitive behavior (Kochar and Hitt, 1998; O'Brien, 2003), the importance of its relationships with external stakeholders (Parsons and Titman, 2007), and factors related to the external environment (Simerly and Li, 2000).

In this section I analyze these more recent lines of research and review theoretical and empirical works that analyze capital structure from the perspective of ATs, TCE and RBV. Next, I discuss those works that employed these theories to develop the link between capital structure and a broad range of competitive strategies. Finally, I conclude by examining research that has looked at how capital structure decisions impact firms' behavior in input/product markets and the relationships established with employees, customers, suppliers and competitors.

Agency theory

Capital structure decisions determine how the value generated by the firm is sliced up and offered to its major financial stakeholders, i.e. shareholders, bondholders and managers. Since such stakeholders have very different characteristics and goals, the potential conflict of interest between their claims has a strong impact on how strategic plans are devised, which in turn could lead to inefficient managerial decisions and suboptimal investment choices. Agency-based models traditionally focus on the latter point and describe in detail the relation between financing strategies and investment decisions. The general idea behind AT is that conflict of interests among financial investors may cause agency costs and investment distortions that could hurt the firm's value. Capital structure can be used as a strong corporate governance tool to ease such problems. Indeed, by adopting "optimal" capital structures firms are able to set up corporate governance mechanisms that alleviate agency conflicts and prevent investment distortions from hurting value-maximizing strategies.

Several studies concentrate on the conflict of interest between managers and shareholders, which arises from the separation between ownership and control. Since managers usually own an irrelevant fraction of the firm, they can capture a small part of the economic rents from profit-enhancing activities, but they bear most of the associated costs. For this reason, managerial discretion over the firm's resources generates investment distortions that may induce managers to *overinvest* in order to increase their private welfare and not the value of the firm. *Overinvestment* thus indicates a situation in which the firm invests beyond the level that maximizes its value. When a firm has limited growth opportunities and excessive cash its managers may have strong incentives to use those resources to invest in *"perquisites"* (such as private use of company jets, bigger offices, etc.) or to increase manager's salaries, power, prestige and self-esteem (*empire building phenomenon*) (Jensen and Meckling, 1976; Jensen, 1986). These *free cash flows*, i.e. the cash resources left after the firm has undertaken all positive NPV projects, should be paid out to shareholders in the form of dividends, but selfish managers may use them to invest even in projects with negative NPV. Jensen (1986) suggests that debt (i.e. capital structure) can be employed as a corporate governance tool to discipline managers and reduce these costs. By increasing the level of debt the firm forces its managers to pay out cash to bondholders and reduces free cash flows available to overinvestment. Moreover, the stringent conditions associated with debt payments and the

implied risk of bankruptcy impose more discipline in that they stimulate managers to improve short-term payoffs while ensuring the firm's short-term viability.

Another important research stream suggests that overinvestment could also be related to the conflict that exists between shareholders and bondholders. This conflict relates to the different claims of these investors on the firm's cash flows, which in turn depend on the characteristic of the financial contracts that coordinate such transactions. Shareholders are *residual claimants* and their claims can be satisfied only after the firm has met its financial obligations towards external investors. Moreover, they have the chance to default when the company does not meet its financial obligations, in which case debtholders step in and appropriate the remaining value[5]. These features create investment distortions related to shareholders' preference towards certain types of inefficient investment. On the one hand, shareholders could prefer riskier projects because they would capture most of the value in case of success, but would not bear the related costs in case of failure[6]. Accordingly, the firm may end up overinvesting in projects riskier than bondholders would prefer, giving rise to the so-called asset substitution problem (Myers, 1977). On the other hand, shareholders could be more risk-adverse in the presence of debt because they could lose control of the firm in case of bankruptcy. Under these circumstances, they could even dismiss profitable investments since bondholders may appropriate most of the value generated from growth opportunities[7]. Regardless of the typology of inefficiency considered, the main point is that the asymmetric distribution of pay-offs among financial stakeholders gives rise to agency costs and "suboptimal" managerial decisions.

Transaction cost economics

Transaction costs economic is mainly concerned with the optimal governance of transactions between the firm and each of its internal and external constituencies. Market contracts and vertical integration are the two main governance mechanisms that help firms minimizing transaction costs that fundamentally arise out of incomplete contracts, bounded rationality, potential hold-up and uncertainty about the outcomes of the transaction (Williamson, 1985;

[5] Trade-off theory provides an extensive discussion of the costs that arise from financial distress. Such costs are generally borne by bondholders.
[6] Jensen and Meckling (1976) suggested that asymmetric distribution of payoffs among financial stakeholders may cause the "asset substitution problem", which is further discussed in section 3.2.3
[7] See Myers (1977)

Williamson, 1991a, 1991b). This dichotomy has been applied in the context of a firm's decision between debt and equity financing.

As for real transactions, debt and equity can be seen as two alternative governance structures to reduce the overall costs associated with transactions between the firm and suppliers of finance (Williamson, 1988). Debtholders have the right to a fixed amount of cash flows that is determined *ex-ante* in a contract. Furthermore, they exert limited control over business activities, since they normally have an arm's length arrangement with the firm and become intrusive only when it fails to meet its financial obligation (Dewatripont and Tirole, 1994; Simerly and Li, 2000; Berglof, 1994). As a result, debt is more similar to the market contract (Williamson, 1988). On the opposite, equity financing is more similar to vertical integration because it gives shareholders the status of residual claimants. Indeed, shareholders can appropriate economic rents generated from the business only after the preemptive claims of bondholders are completely satisfied and, thus, they do not benefit from a steady stream of cash flows. However, since they bear most of the risks associated with the business, shareholders can exert a tighter control over economic activities through the direct monitoring of the board of directors (Kochhar, 1996).

The choice between the two governance mechanisms depends on the nature of the assets involved in the transaction - namely their level of asset specificity - which in turn depends on the strategy pursued by the firm (Balakrishnan and Fox, 1993; O'Brien, 2003). Specificity is related to the concept of redeployability and refers to the characteristics of assets whose value is maximized in particular uses. In other words, firm-specific assets lose most of their value if employed in alternative uses or by another firm. For example, assets such as bricks and mortars can be employed in several tasks without reducing their own value once the original purpose has been fulfilled. On the other hand, firm-specific assets, such as specialized production equipment, cannot be as easily redeployed because they are tailored to the firm's particular needs. For general purpose assets there is complete knowledge about their present and future value and this reduces the risk of any associated financial transaction. As a consequence, highly redeployable assets should be better financed through debt contracts in order to minimize overall transaction costs. When uncertainty is limited transaction costs arising from bounded rationality and hold-up behaviors are limited. A governance mechanism that is more similar to the market helps minimizing the cost of external capital. On the other hand, for firm-specific assets such as R&D, advertising,

patents or marketing expenses, there is very limited knowledge available with respect to their present and future value. Such increased uncertainty leads to higher transaction costs and makes debt an unattractive form of governance. Indeed, when dealing with non-redeployable investments, it would be extremely difficult for the firm to assess and negotiate ex-ante the preemptive claims from bondholders. Moreover, these investors may require additional compensation for the risks associated with the transaction in the form of higher cost of capital as these assets represent poor collaterals. On the opposite, when using equity financing, the responsibility for control and enforcement shifts from external capital markets to the board of directors, whose duty is to protect the interests of residual claimants (Simerly and Li, 2000). As an insider, the board is assumed to have more complete knowledge about the future prospects of firm-specific assets. Moreover, since their contract runs for the entire life of the firm, shareholders have a long-term orientation and are less concerned about temporary difficulties or lack of available cash flows to reimburse capital. As a result, when firm-specific assets are involved, equity provides a more flexible governance mechanism for financial transactions without putting at risk the firm's long-term growth (Williamson, 1988; Kochhar, 1996; O'Brien, 2003; Vicente-Lorente, 2001).

Empirical evidence provides some support for these predictions. For example, Balakrishan and Fox (1993) examine the influence on capital structure of firm-specific attributes as opposed to industry characteristic. Their results show that measures related to intangible capital (such as R&D and advertising expenses) contribute significantly to variation in leverage. Because investments in intangible assets are likely to depend upon the firm's strategic behavior, such result confirms that strategy and other firm-specific drivers help explaining capital structure decisions. Another interesting finding from this study is that investments in specific assets (advertising expenses) are associated with higher leverage when they signal to capital markets the ability of a firm to convert intangible resources into economic rents or when they signal the commitment towards an aggressive behavior in product market. Furthermore, by employing a variance component model the authors find that firm heterogeneity (i.e. firm fixed effect) accounts for over 52% of the overall variance in capital structure, while industry and time effects are of relatively little importance.

Resource-based view

The resource based view of the firm states that our understanding of strategy and competitive advantage is improved when we take into account the distinctive and idiosyncrastic characteristics of firms' resource endowments. Firms earn extraordinary profits when they posses strategic resources which are rare, specific, hard to imitate and heterogeneously distributed (Barney, 1991). However, supporters of this view often neglect to take into consideration the various *ex-ante* and *ex-post* restrictions imposed by strategic assets. More specifically, scholars approaching capital structure issues from an RBV perspective propose the existence of financial market frictions associated with different types of firm's resources. For example, Vicente-Lorente (2001) explores the financial implication of a "resource-driven strategy" and develops a general framework relating the imperfections of markets for strategic resources to the behavior of firms in capital markets. The study confirms that highly specific and opaque investments, such as specialized human capital or internally developed R&D, are associated with lower debt, while less opaque investments, such as external R&D (R&D acquired from external partners), do not influence leverage.

While this approach reinforces the predictions of TCE about the differences between debt and equity financing, works adopting an RBV perspective further suggest that capital structure decisions should be considered as one of the functional capabilities necessary to realize the full value embedded in strategic resources (Kochhar, 1996). Indeed, firms must pursue different strategies in order to serve different business segments and this strategic orientation determines the firm's investments in intangible and idiosincrastic resources, such as advertising, R&D etc. (Balakrishnan and Fox, 1993; O'Brien 2003; Vicente-Lorente, 2001). As a result, since investments and financing decisions typically interact (Jensen, 1976; Williamson; 1988) it is reasonable to think that different capital structures best serve the needs of different competitive strategies (Kochhar, 1996, O'Brien 2003). Indeed, while there is a general consensus on the characteristic that an asset should have to be considered strategic, there is less agreement on the real sources of competitive advantage and scholars need to consider the role of capabilities present in functional areas in extracting the value contained in idiosyncratic assets (Kochhar, 1996). From this perspective strategic resources stocks can be considered a necessary but not sufficient condition to realize the full value of a firm. Firms must also devise appropriate financing policies to sustain their investments and strategic goals in the long-term. As a result, in case of two firms possessing identical resources but different financial management capabilities, the RBV approach predicts

different performance, as if a firm undertakes poor capital structure decisions it will suffer a loss in the value extracted from its resources and thus a competitive disadvantage.

Capital structure and competitive strategy

The upshot from the theoretical frameworks discussed above is that there is a reciprocal interdependence between capital structure and strategic decisions. On the one hand, strategic considerations are fundamental in order to enhance our understanding of how resource requirements of different strategies impact a firm's choices in terms of debt and equity financing. On the other hand, it is also important to understand how firm financing policies, once adopted, influence the ability of a firm to pursue a given strategy. For these reasons, recent research spanning the boundaries of strategy and finance has focused on firm heterogeneity as a relevant dimension in the study of capital structure and has focused on the link between capital structure and a wide range of competitive strategies. These lines of research not only enhance our understanding of capital structure decisions, but also help explaining how capital structure influences firm strategic behavior. In addition, they have strong managerial implications since they predict a decline in performance for firms failing to align financial and competitive strategy (Kochhar, 1996; O'Brien, 2003; Simerly and Li, 2000).

Scholars linking insights from capital structure and strategy research have traditionally focused on two main issues. First, great attention has been devoted to the importance of industry characteristics and other environmental factors with respect to capital structure determination. For instance, Simerly and Li (2000) study the importance of environmental dynamism as a driver of capital structure decisions, and suggest that excessive debt levels may constrain a firm's ability to undertake strategic actions in dynamic contexts and in areas such as research and development. Second, another important aspect that has been investigated is the impact of different strategic orientations on corporate financing decisions. These works build on the idea that different strategies require unique bundle of resources, whose characteristics in turn determine the optimal financing strategy. Kochhar and Hitt (1998) document a reciprocal and dynamic relationship between capital structure and corporate diversification strategies. Ngah-Kiing Lim et al. (2009) focus on the impact of related and unrelated diversification strategies on the level of debt carried considering the

moderating effect of environmental dynamism. Andersen (2005) demonstrates how effective risk-management strategies can reduce business risk and are suitable to support higher levels of debt. Moreover, he shows that some degree of financial slack (i.e. low financial leverage) can improve the positive influence of risk management strategies on performance.

Finally, extensive theoretical and empirical work has also focused on the link between innovation strategies and capital structure. O'Brien (2003) studies the role of financial slack during the implementation of an innovation strategy and finds that firms competing on the basis of innovation adopt lower levels of debt. David et al. (2008) further explore this point and analyze the implication of debt heterogeneity for R&D investment and firm performance. Overall, this body of research suggests that a conservative financing strategy helps firms to foster innovation in several ways: by avoiding jeopardizing R&D investments, by optimizing pipeline management and new product development, and by undertaking M&As and other knowledge expansion strategies in a timely fashion. Accordingly, innovative firms failing to acknowledge the importance of maintaining financial slack experience a decline in financial performance (O'Brien, 2003).

Stakeholder theory of capital structure

While the above studies linked strategic and finance arguments to study the dynamic relation between financing policies and strategic behavior, they have done so by looking at the consequences of capital structure exclusively within firm's boundaries and at the expectations of traditional financial investors. An important literature strand develops a more general framework, where firm boundaries include implicit contracts with non-financial stakeholders as well as explicit contracts with traditional investors. Non-financial stakeholders can be defined as "parties that have either a direct or indirect interest in the firm's long-term viability" (Parsons and Titman, 2007). These works draw from stakeholder theory and analyze the impact of firm financing strategy on its dealings in the input/product markets. Relevant papers discuss the impact of capital structure on the relationship between the firm and its customers, suppliers, employees and competitors (Titman, 1984; Maksimovic and Titman, 1991; Banerjee et a., 2008; Chevalier and Scharfstein, 1996; Sharpe, 1994; Hanka, 1998) and argue for a stakeholder theory of capital structure (Grinblatt

and Titman, 1998)[8].

Seminal works in this area include Titman (1984) and Maksimovic and Titman (1991) who explore the implications of capital structure and expected liquidation costs with respect to the characteristic of a firm's products and its customers. Titman (1984) is the first to suggest that firms with unique products that require firm-specific investments from customers should be less levered, since such stakeholders may be concerned about the costs they would bear in case of bankruptcy. Customers buying unique products (e.g. durable goods) usually require subsequent after-sales interactions with the firm for example for the provision of spare parts, maintenance services, and so forth. If the firm declared bankruptcy or was liquidated following financial difficulties, these services would not be provided with subsequent costs imposed on customers who had to resort to alternative service providers at extra costs. As the risk of liquidation is directly influenced by the amount of debt financing, then it follows that customers should care about a firm's capital structure decisions and how they impact the firm's long-term survival. If customers rationally assess the firm's probability of liquidation, they will anticipate these costs and require compensation by reducing the price they are willing to pay for the products of a highly levered firm, or, alternatively, they could even turn to alternative suppliers. Accordingly, firms should reduce leverage ex-ante in order to induce R-S investments and to extract better terms from their customers.

Several studies further propose that high levels of leverage can give rise to costs even when bankruptcy risks are not immediate, and more specifically, by influencing a firm's incentives to meet implicit claims sold to external stakeholders. While after-sales services usually represent explicit claims specified in a contract, implicit claims are too state-contingent to be reduced to a written form. As a result, it is possible for a firm to default on those claims without necessarily going bankrupt. Leverage influences the value of such implicit claims for at least two reasons. First, debt levels determine the future ability of a firm to raise external funds and, thus, the opportunity cost of meeting implicit claims when cash flows are reduced (Cornell and Shapiro, 1987). Second, more debt reduces the share of future cash flows diverted to shareholders, which in turn could incentivize a firm to take actions that increase shorter-term gains at the expense of longer-term profits (Maksimovic and Titman, 1991). For example, scholars have demonstrated that highly levered firms tend to provide

[8] For a complete review of this literature see Parsons and Titman (2007).

their customers lower quality inputs, or to skimp on follow-up services for existing products (Cornell and Shapiro, 1987; Maksimovic and Titman, 1991; Maksimovic, 1995)[9].

The above arguments suggest that a firm capital structure decision represents a relevant concern for external stakeholders and that firms should be financed conservatively whenever inducing transactions with such external partners is important. Empirical research provides support for these predictions. In particular, various scholars have extended this reasoning to other kinds of external stakeholders relationship involving R-S investments (not only customers, but also suppliers and employees). These works suggest that proxies related to external stakeholders concerns about the value of their implicit and explicit claims should be important determinant of capital structure decisions. For instance, Titman and Wessels (1988) find that firms producing specialized product, that is firms characterized by higher intensity of investments in R&D, anticipate customers concerns and adopt lower leverage. Kale and Shahrur (2007) focus on customer-supplier relationships and point out that firms can use capital structure as a tool to induce relation-specific (R-S) investments from these stakeholders. Consistently with this prediction, their results document a negative impact of R&D expenditures from the firm's main customers and suppliers on the level of debt carried. Similarly, Banerjee et al. (2008) further show that firms buying most of their inputs from dependent suppliers or selling most of their outputs to dependent customers [10] tend to use less debt, arguably to induce investments from these partners. Franck et al. (2010) focus on young start-ups and their distinctive characteristic with respect to their relationships with external stakeholders. Unlike mature firms, start-ups are young innovative firms that have to establish these relationships from the scratch and that suffer from a lack of operating history in the marketplace. Empirical evidence from their survey demonstrates that young firms imposing higher costs on their partners in case of liquidation significantly reduce their leverage. In addition, their results suggest that the presence of partners with more bargaining power, who are arguably better able to transfer eventual distress costs to the focal firm, further strengthens this effect.

[9] The basic logic is that the short-term gains from such strategies would immediately benefit a firm's shareholders. On the other hand, customers may later detect opportunistic behavior and react by punishing the firm, in which case debt holders would be especially damaged since they bear most of the downside risks of the firm.

[10] Authors define dependent customers as customers that accounts for at least 10% of firm total revenues. Similarly, purchases from dependent supplier must represent at least 10% of firm's total purchased inputs.

While these works show that external relations shape a firm's capital structure, another stream of literature investigates the inverse causal effect. More specifically, these studies analyze the implications of capital structure on the relation between the firm and its competitors. For instance, Opler and Titman (1994) find that highly leveraged firms lose market shares to their less leveraged competitors during industry downturns. They interpret such result as an evidence of financial distress costs arising from the relationships between the firm and its customers. Bolton and Scharfstein (1990) argue that conservatively financed competitors may have incentives to compete more aggressively in order to drive financially distressed firms out of business. Increased competition reduces rivals cash flows and profitability, which in turn may disrupt the firm relationships with its investors (recall agency-based model of capital structure) and cause market exit. Chevalier (1995) analyzes the impact of leveraged buyouts (LBOs) in grocery store chains but finds mixed evidence on the effect of increased leverage on prices. LBOs significantly influence subsequent price changes, but the direction of the changes depends on the financial condition of rival firms. When a firm faces conservatively financed competitors, LBOs lead to lower prices, consistently with the view that financial distress induces aggressive competition from rivals. When bankruptcy is a concrete possibility also for competitors, LBOs lead to higher prices and tend to soften competitive pressures, consistently with the view that financial distress induces firms to behave less aggressively in order to improve short-term performance. Finally, Chevalier and Scharfstein (1996) present further evidence that financially distressed (high levered) firms have less incentive to build market shares and tend to increase prices during industry downturns. Managers that take on excessive debt may have a short-term orientation since firm liquidation is a concrete scenario, and thus they prefer to boost immediate profits at the expenses of long-run performance.

2.3. Strategic alliances and capital structure

The above sections provided a general overview of prominent research on both strategic alliances and capital structure. This review clearly reveals that the two fields have, buy and large, developed independently and with little cross-fertilization even in topics that received much attention from both of them. For this reason, in this section I make the first effort towards integrating the two literature streams by focusing on those areas of research that I

believe represent common ground for both fields, yet that have been analyzed from different points of view by finance and strategy scholars.

First, I believe that although strategy scholars certainly acknowledge the importance of financial aspects involved in strategic alliances, they have paid only limited attention to the topic. Generally speaking, alliance research has approached financial issues by adopting a resource-based perspective and looked at alliances as a valuable means to access financial resources critical for firm development. For example, many studies on alliance formation usually control for firm capital structure or other proxies for the availability of financial resources, based on the underlying assumption that financially constrained firms should form alliances more because they lack the necessary financial resources to prosper independently (Stuart, 2000; Patzelt et al., 2008). In a related vein, Lerner et al. (1998, 2003) show that biotech firms tend to turn to alliances with pharmaceutical companies as an alternative mechanism to raise new funds when equity markets are less liquid. Moreover, they also show that the relative importance of firms' financial and technical contributions determines the optimal allocation of control rights over the joint project and its success rate. Similarly, Dunne et al, (2009) suggest that the extent of financial resources possessed by biotech firms impact the level of control they are able to retain over joint projects with big pharmaceutical companies. Hitt et al. (2000) analyze the drivers of partner selection in emerging and developed economies and suggest that the availability of proper financial resources is a critical dimension according to which firm select alliance partners. Finally, Lavie (2007) suggests that building extensive alliance portfolios helps firms tapping into other partners' financial resources and enhancing their financial performance.

While these studies certainly provide valuable insights on the importance of financial resources in many aspects of alliances, they overlook to analyze the risk implications of a firm's financial condition during the overall alliance making process. Das and Teng (1998a) propose that resource and risk represent the two main strategic dimensions to consider in the study of alliances. The resource dimension represents what a firm contributes or gain to/from an alliance, while the risk dimension indicates what the firm fears the most. Accordingly, the goal of every firm should be to obtain the maximum returns from the resources committed to the alliance, while minimizing the related risks. By integrating both dimensions scholars can achieve a better understanding of several aspects of the alliance making decision process, such as partner opportunistic behavior, trust, diversity and structural arrangements (Das and Teng, 1998a). Consistently with this approach, I contend that the attention of extant alliance

literature to firm financing policies (and thus capital structure) has been limited, because these studies have focused exclusively on their implications in terms of resources, while the risks involved in the alliance have been completely neglected. In particular, capital structure decisions determine not only a firm's need for additional financial resources and thus its incentives to enter into a strategic alliance, but also its overall risk profile and ability to undertake and maintain specific kinds of strategic investments. The level of financial leverage directly influences a firm's risk of bankruptcy and thus its commitment towards investing properly in order to honor external stakeholders implicit as well explicit claims (Titman, 1984; Maksimovic and Titman, 1991; Banerjee et al. 2008; Kale and Sharhur, 2007). Capital structure decisions also impact the ability of a firm to undertake critical investments, such as those in innovation, necessary to compete more boldly in highly dynamic environments (O'Brien, 2003; Vicente-Lorente, 2001; Simerly and Li, 2000). Both a firm's risk profile and its ability to undertake strategic investments represent key considerations during an alliance, and thus alliance scholars should also devote more attention to how a firm's capital structure influence these factors.

On the other hand, the importance of strategic alliances has also been overlooked by most of capital structure research. Indeed, although several studies suggest that a firm's capital structure has critical repercussions on its ability to deal with external stakeholders (such as customers, suppliers, employees, labor unions, etc.), the ramifications of this argument have not been fully developed with respect to the relationships established with alliance partners. To the best of my knowledge, the only paper that addresses this topic is Kale and Shahrur (2007), who consider the existence of alliances between the firm and its key customers and suppliers and document a negative impact on the level of leverage. However, these authors focus exclusively on outsourcing contracts and did not consider other important typologies of alliance relationships, such as those with partners in innovation or industry competitors. Moreover, their analysis does not consider that alliances differ substantially across various dimensions, which in turn could be relevant in terms of capital structure determination. For instance, alliance partners may differ in their bargaining power and thus in their ability to transfer to the focal firm the anticipated costs of financial distress (Franck et al., 2010). Similarly, the nature of the activities involved in the collaboration is also likely to influence the extent to which alliance partners are exposed to the risks implied by the focal firm's capital structure. Finally, the importance of a firm's capital structure in inducing investments from external partners could be contingent on the presence of other transaction-level

mechanisms that could be used by alliance partners to safeguard their investments in the relationship (such as equity-based governance structures) (Pisano et al., 1989).

Overall, the above observations suggest that the role of capital structure decisions during the strategic alliance making process is far from been completely understood and that our knowledge on both alliances and capital structure could be greatly enhanced by a consistent effort to explicitly integrate the two fields. In particular, two main gaps can be identified in extant literature:

(i) first, we have only limited knowledge on the risks implied by a firm's capital structure for its alliance partner, and whether these risks are significant enough to impact its choice between debt and equity financing;

(ii) second, once a firm has adopted a given capital structure, little is know about whether and how the implied risks impact the strategic alliance making process in terms of partner selection, governance choice, or contribution of the alliance strategy to firm performance.

This research explicitly aims at filling these two gaps by integrating the insights provided by alliance and capital structure research. In particular, in Chapter 3 I address the first gap and contribute to the lack of knowledge in finance research by providing a thorough analysis of the impact that strategic alliances exert on a firm's capital structure decision. In Chapter 4 and Chapter 5 I deal with the second gap and contribute to alliance research by investigating the implications of capital structure policies on firms' alliance activity at the level of the individual dyad and of the overall alliance portfolio, respectively.

CHAPTER 3

THE IMPACT OF STRATEGIC ALLIANCES ON FIRM'S CAPITAL STRUCTURE

3.1. Introduction

Capital structure decisions entail important consequences for the relations a firm establishes with its external stakeholders. In particular, extant research suggests that these stakeholders care about a firm's capital structure especially when they make R-S investments (Parsons and Titman, 2007). If financial distress resulted in the firm's liquidation, these relationships would terminate and the value of the assets involved would decrease substantially. As liquidation risks increase with the amount of debt in a firm capital structure, these stakeholders are either reluctant to deal with highly leveraged firms, or they require risk-adjusted prices in order to do so (Titman, 1984; Cornell and Shapiro, 1987). Accordingly, as extensively discussed in Chapter 2, empirical evidence finds that firms tend to reduce leverage whenever inducing R-S investments from external stakeholders is important (Banerjee et al., 2008; Kale and Shahrur, 2007, Parsons and Titman, 2007).

While this body of literature provides valuable insights by showing the potentially profound consequences that capital structure holds for a firm's external relationships with customers, suppliers, and employees, it neglects to consider the ramifications of above arguments with respect to another very important group of stakeholders, namely alliance partners. Indeed, although many of the arguments developed by finance research could clearly apply also to alliance partners, there exist substantial differences that make alliances unique with respect to the other kinds of relationships. First, the aforementioned studies concentrate on relationships that essentially take the form of an outsourcing contract between customers and

suppliers. However, firms may form alliances not only with their customers and suppliers, but also with other stakeholders such as competitors or partners in innovation. Thus far, the literature has been silent on the impact that these other classes of external stakeholders may have on firm financing policies. Second, the fact that a customer decided to "buy" a particular product from a supplier indicates that asset specificity was not so serious as to prevent the outsourcing of that product (Banerjee *et al*., 2008). In contrast, firms often turn to more complex governance forms (such as strategic alliances) when the hazards related to asset-specificity are more salient (Lo Nigro *et al*., 2012). Hence, alliances represent a novel context to study the implications of R-S investments for capital structure.

The need to pool resources together and undertake relation-specific (R-S) investments exposes partners in an alliance to various hazards (Williamson, 1985). First, if the relationship terminates unexpectedly a firm may find it difficult to redeploy assets devoted to the collaboration and hence termination may entail significant costs. Second, asset specificity also exposes the firm to the risk of opportunism, as partners may try to extract wealth under the threat of unilaterally withdrawing from the alliance (Klein et al., 1978). Given the costs, firms will resist making R-S investments unless the long-run stability of the alliance can be safeguarded. In this respect, alliance research has shown that appropriate governance structures can help mitigate exchange hazards while preserving partner incentives to devote resources to the alliance, thereby inducing R-S investments in inter-firm relationships (Williamson, 1985, 1991a; Dyer and Singh, 1998, Hansen, Hoskisson, and Barney, 2008). These studies imply that a partner's incentive to invest depends on the governance form, which in turn is affected by characteristics of the transactions such as the degree of assets co-specialization, task uncertainty, technological uncertainty, technological distance, prior cooperation, partners' resource contributions and bargaining power (Pisano, 1989; Santoro and McGill, 2005; Bosse and Alvarez, 2010; Van de Vrande et al., 2009). However, as this view mainly focuses on the dyad as the unit of analysis, it overlooks the fact that incentives to invest in alliances may also depend on critical firm-level policies, such as capital structure.

The lack of clear knowledge about the relationship between a firm's capital structure and its strategic alliance activity suggests that this remains a relevant, yet under-researched topic both in finance and strategy literature. In order to fill these gaps I start off my analysis by extending the argument regarding the risks of dealing with highly leveraged firms to the context of strategic alliances, and propose that in light of these risks another stakeholders

group, namely alliance partners, should care about a firm capital structure. Accordingly, in this chapter I develop and empirically test the basic theoretical arguments exploring the importance of strategic alliance in capital structure determination. Moreover, as extant alliance research suggests that transaction level characteristics influence incentives to invest in inter-firm relationships, I also investigate whether the impact of alliance relationships on capital structure choices is most pronounced for particular typologies of alliances. As a result, in the present chapter I seek answer to the following research questions:

(i) To what extent do strategic alliances affect a firm's capital structure decision?

(ii) *Does the impact of strategic alliances depend on transaction-level characteristics?*

I contend that the capital structure of potential alliance partners will be a critical factor that firms consider forming alliances. If the resources devoted to an alliance often entail R-S investments, then partner liquidation can impose substantial costs on a firm. In support of this point, Boone and Ivanov (2012) found that firms experience negative abnormal stock returns when their alliance partners file for bankruptcy. Similarly, these firms also face significant drops in profit margins and investment levels. If managers rationally anticipate the risks of partnering with highly leveraged firms, or even simply learn from previous negative experiences (Ulset, 2008), then firms will have to maintain low leverage in order to attract desirable partners. Accordingly, I argue that firms that make alliances a strategic priority will generally adopt less debt in order to reduce financial risks and encourage R-S investments from their partners. Furthermore, I also argue that the importance of maintaining low leverage is most pronounced in the presence of other alliance attributes – namely, the typology of partners and activities involved – that magnify the costs of early termination.

I test the above hypotheses by conducting two empirical analyses. In the first analysis I consider a sample of 166 publicly traded biotech firms over the period 2000- 2010. In the biopharmaceutical industry, factors such as patent expiration, increasing costs of discovery, and shorter product lifecycle have pushed firms towards an increasing reliance on external expertise. The vertically integrated approach to drug development has given way to a new collaborative model of innovation characterized by the allocation of discovery, development, and commercialization activities to specialized firms (Gupta et al., 2007). In this context, biotechnology innovations have been pursued mostly through strategic alliances between biotech firms that possess new technological expertise, and pharmaceutical incumbents providing financial resources and experience in late-stage development, marketing and

distribution (Witthaker and Bower, 1994). These alliances require firms to pool together complementary resources whose value is tailored to partners' specificity and make the biotech industry a relevant research context to test our theory. Results from this first analysis show that biotech firms that place greater strategic emphasis on the use of alliances tend to reduce leverage more than firms that do not prioritize strategic alliances. Furthermore, this tendency is most pronounced when firms form collaborations in uncertain activities such as R&D, where pay offs are distant in time and it is important to mitigate liquidation concerns in the long term. Finally, I also find that leverage tends to be reduced when alliance partnerships are established downstream firm, such as biopharmaceutical and chemical companies, who usually undertake the bulk of the investments and have presumably greater bargaining power.

In the second empirical study I extend the previous analysis to a larger sample comprising all non-financial firms included in Compustat, but with some important differences. On the one hand, by extending the analysis to a broad range of industries I am able to test the external validity of my previous results and whether alliances represent an important determinant of capital structure also for other typologies of firms other than biotech companies. Moreover, I also test whether the above findings are affected by endogeneity concerns, which naturally arise when studying the relationship between capital structure and strategy-related variables (Parson and Titman, 2007). On the other hand, while extending the sample certainly improves the statistical analysis, it also makes it difficult to perfectly replicate the fine-grained analysis conducted for biotechnology firms. In particular, since some of my arguments regarding the impact of specific typologies of alliances (R&D-based/ non-R&D-based, upstream or downstream alliances) were developed by considering the specific characteristics of collaborations typically formed by biotech firms they may not necessarily hold in other industry contexts. Accordingly, in this second analysis I only test (and empirically find) that firms forming alliances indeed adopt lower leverage.

The present chapter is structured as follows. In section 3.2 I develop the hypotheses linking the characteristics of a firm alliance strategy to its capital structure choice. Next, in section 3.3 I describe the two empirical analyses adopted to test the proposed theoretical arguments. Finally, section 3.4 includes a discussion of the main findings, contributions and avenues for future research.

3.2. Hypotheses development

I contend that the contingent value of resources devoted to an alliance makes a firm's financial health relevant to its partners. In case of firm liquidation, the alliance would be interrupted and most of the value of these investments would be lost because of their limited re-deployability (Boone and Ivanov, 2012). Thus, if the firm is financially weak, partners may be reluctant to form an alliance or they may require contractual safeguards to protect their investments. Alternatively, they could require compensation in the form of risk-adjusted prices and extract more wealth from the firm. In contrast, if a firm is conservatively financed the implied risks of unplanned termination are lower and less-costly safeguards can be employed in order to facilitate R-S investments. Thus, leverage can impact alliance partners in two ways. First, it determines *ex post* costs if a partner's financial distress causes unplanned termination of the alliance. Second, it increases *ex ante* transaction costs by requiring firms to adopt additional safeguards to deal with the risks posed by leverage. Therefore, firms seeking to form alliances should adopt lower leverage in order to reduce transaction costs and induce R-S investments from external partners.

I further argue that the impact of leverage on alliances will depend on their strategic importance to the firm. In the biotechnology industry, most agreements are formed to foster the development of novel drugs, a process that can require a long time to be completed. R-S investments from both partners are not limited to the year of alliance's formation and are generally contingent upon the achievement of certain developmental milestones. Consequently, the financing policy of a biotech firm in a given year may be influenced by older alliances and by its long-term propensity towards collaboration. However, despite the benefits of low leverage for firms seeking strategic alliances, adopting a particular capital structure is not without costs as debt can have numerous benefits for firms (Cambini and Rondi, 2011; Castaneda, 2007). Furthermore, target-adjustments models of capital structure show that issuing or retiring financial securities is costly and that firms will adjust their capital structures only when the associated benefits exceed these adjustments costs (Faulkender *et al*., 2012). Thus, a firm seeking to establish alliances will reduce leverage only when the benefit in terms of inducing investments from its partners is high enough to offset the related costs.

Firms involved in multiple alliances are likely to consider R-S investments from their partners a key element of their competitive strategy, as opposed to firms that do not make

such an extensive use of inter-firm linkages. As a result, they may enjoy greater benefits from keeping their leverage low. Accordingly, I argue that the impact of strategic alliances on capital structure will be especially strong for firms that place a greater strategic emphasis on alliances. In other words, firms that possess an extensive portfolio of alliances (Lavie, 2007) and that maintain their propensity towards collaboration in the long-term should tend to adopt lower levels of leverage. Conversely, firms that rarely form alliances may find it more efficient to craft *ad hoc* contractual solutions to induce investments from external partners, since altering their capital structure would be too costly. Therefore, I predict the following:

> *H1: Firms that place a greater strategic emphasis on alliances will have lower leverage.*

While a desire to engage in strategic alliances will generally give firms incentives to maintain lower leverage, this effect will likely vary in accordance to the type of activities that are involved in the alliance. Specifically, I contend that partners collaborating in R&D are more exposed to the risk (and implied costs) of firm liquidation because of the long-term and uncertain nature of these relationships. R&D alliances in the biotech industry are formed to foster the creation of innovative compounds, a process that is complex, extremely costly, and time-consuming (Kim, 2011; Lo Nigro *et al*., 2012; Gupta *et al*. 2007; DiMasi and Grabowski, 2007). For instance, in 2002 developing a new compound took on average over 12 years with an average capitalized cost of US$900 million, and only one out of nine molecules makes it through the development process and eventually wins regulatory approval (Kola and Landis, 2004).

The nature of the drug development process has two main implications. First, given the huge costs, the level of R-S investments undertaken by partners entering into these relationships is presumably very high. Second, given the length and the high failure rate of the process, they also involve higher levels of uncertainty relative to other late-stage agreements. In this context, capital structure becomes even more relevant because it influences long-term financial health. The longer the span of time considered, the higher the risk of liquidation induced by high levels of leverage because over longer time intervals, there is greater risk that at some point the firm will not be able to generate steady streams of revenue sufficient to cover its debt obligations. Thus, higher levels of firm leverage will especially threaten the continuity of alliances that are supposed to be prolonged in time. As a

result, the negative impact of alliances on leverage should be more pronounced when the firm has a greater propensity towards engaging in R&D collaborations. Accordingly, I predict the following:

> *H2: The negative impact of alliances on leverage will be stronger when collaborations involve R&D activities.*

Finally, I investigate whether the impact of alliances on capital structure is contingent on the characteristics of the partners involved. Partners who are expected to undertake the bulk of investments in the alliance should be particularly concerned about the firm's capital structure decisions, because they would bear most of the losses associated with an interruption due to partner liquidation. In the biopharmaceutical industry this is likely to occur when a biotech firm forms an alliance with incumbents that operate in later stage activities of the value chain. In vertical alliances with downstream partners (e.g. established pharmaceutical, biopharmaceutical, agri-food, and chemical firms) the biotech firm usually provides technical knowledge while most of the resources and competencies required to complete the development of innovations are likely to be provided by the partner. The alliance literature suggests that in such circumstances, biotech firms negotiate at a bargaining disadvantage and are at risk of being under compensated for disclosing their valuable knowledge (Deeds and Hill; 1996; Bosse and Alvarez, 2010).

I argue that biotech firms will take into account potential liquidation costs when dealing with downstream firms. As the downstream firms usually incur most of the investment costs involved in the alliance, they would suffer severe losses in case of partner liquidation. Moreover, since these partners have presumably greater bargaining power, it would be easy for them to transfer these costs to the biotech firm by requiring risk-adjusted contractual terms. Hence, biotech firms wishing to negotiate more favorable terms with downstream partners should maintain lower leverage. I also expect that alliances will be less consequential for financing policies when biotech firms deal with upstream firms. Indeed, neither of these partners is likely to be the primary investor in the alliance, nor would they have the bargaining power to transfer these costs to the other firm in case of high liquidation risk. Hence, I predict that the impact of alliances on capital structure will be most pronounced when a biotech firm collaborates with downstream partners. These considerations lead to the following hypothesis:

H3: The negative impact of alliances on leverage will be stronger when collaborations involve downstream partners.

3.3. Empirical analysis

In order to test the above hypotheses I conduct two different empirical analyses. In the first study I narrow my focus to the capital structure choice of firms operating in the biotech industry, as most of my previous arguments were developed considering the characteristics of alliances in this sector. The focus on a single industry helps providing a fine-grained analysis of the impact of different typologies of alliances, which would not be possible in a multi-industry study. Since different industries operate under very different business models and environmental conditions, it would be difficult to consistently distinguish between different typologies of alliance partners or activities involved, and to organize them across meaningful categories. For example, while it is reasonable to think that pharmaceutical companies have presumably greater bargaining power in alliances with biotech firms, this is not necessarily true when they deal with partners in other sectors, such as chemical companies or other pharmaceutical firms. Similarly, categorizing alliances according to the typologies of activities involved may also be misleading, because the underlying goal of the collaboration could be very different from developing a new drug candidate. Nonetheless, findings from a single industry may not necessarily hold in other industrial contexts and could raise concerns of external validity. Accordingly, I conduct a second empirical analysis in order to test the robustness of my previous results. In particular, I consider a larger sample of firms operating in different industries (not only biotech companies) and test exclusively the general argument that firm forming alliances should adopt lower leverage.

STUDY 1: An empirical investigation of the biotech industry

Data and Sample Selection

The initial sample included all publicly traded biotechnology firms listed in the Orbis database, a global extensive database containing accounting, market and business information covering over 60 million companies. This database was used as the source for

the accounting data needed to construct the financial variables used in this study. I then restricted the focus to companies that could be considered as independent firms. In order to test the latter condition, I used the Orbis BvD Independence Indicator and selected only those firms that scored a value of A (*i.e.*, companies with known recorded shareholders, none of which having more than 25% of direct or total ownership). I also excluded firms having a group ultimate owner. These conditions were required in order to prevent the sample from including both parent firms and their subsidiaries, a condition that could skew the proxies employed since I may consider the same data both at the parent firm level and at the subsidiary firm level. Following these criteria, I collected a sample of 223 biotech firms and an unbalanced panel of 1645 firm-year observations spanning from 2000 to 2010. This data was combined with data on strategic alliances derived from the Securities Data Company (SDC) Platinum database. For each firm in the final sample, I considered all the alliances formed from 1997 to 2010 and for each alliance I retrieved data on transaction-level and partner-level characteristics, such as partners' names, year the alliance was formed and the typology of activities involved in the collaboration. This second dataset includes information on 353 strategic alliances. Finally, during the analysis I excluded firms with empty records in the Orbis database and firm-year observations with occasionally missing accounting data. After merging the two datasets, the final sample includes 172 firms and 803 firm-year observations.

Variables

Following extant studies that analyzed the determinants of capital structure firm's financial leverage is considered as the main dependent variable of the analysis. I compute *Leverage* by dividing the total book value of debt (long term debt plus bank loans listed under current liabilities) by the total market value of the firm (total book value of debt plus the market value of equity) (O'Brien, 2003). Studies in the capital structure literature also consider a book-based formulation of leverage computed as the ratio of total debt to the total book value of assets. Although I employ the market-based formulation of leverage, results remain qualitatively unchanged when the alternative book-based formulation is employed.

In order to test hypothesis 1, I build a proxy for the strategic emphasis placed by the firm on the use of alliances by considering both the number of alliances in a firm's alliance portfolio and its propensity to establish collaborations in the long-term. I build the variable *SAs4,*

computed as the number of alliances formed during the previous four years, as a proxy for the strategic emphasis placed on alliances. I consider the number of alliances formed during the previous four years because the average expected duration of R&D alliances for biotech firms is of about four years (Robinson *et al*., 2007).

In order to test hypothesis 2 I distinguish between R&D-based alliances and other alliances. The first category includes both "pure" R&D collaborations, where partners collaborate exclusively in R&D activities, and "mixed" agreements where the collaboration is not confined to R&D but includes also other value chain activities. The second category includes alliances involving activities such as licensing, marketing, production, retail and distribution, but where R&D is not included in the collaboration. This classification is consistent with other studies in the alliance literature (e.g. Oxley, 1997). Accordingly, I construct the variable *RD4*, computed as the number of R&D-based alliances formed by the firm during the previous four years. Similarly, I computed *No-RD4* as the number collaborations falling into the second category.

To test hypothesis 3, I considered the characteristics of the partners involved in the alliance. Biotechnology firms generally sit at the 'upstream pole' of other broader industries, such as the pharmaceutical and agricultural industries (Stuart *et al*., 2007). Accordingly, I divide partner firms into *downstream* and *upstream* based upon their 4-digits SIC codes. The category *downstream* partners includes established players operating in the pharmaceutical, biopharmaceutical, chemical, agricultural, food and beverage and medical equipment industries. Usually, these partners have already brought several products to the market, and biotech firms forming agreements with these players generally seek to obtain financial resources and experience in later-stage activities of the value chain. As a result, in alliances between biotech firms and downstream players the latter are likely to provide the bulk of investments required. In contrast, I classify as *upstream* partners "pure" biotech firms, hospitals, laboratories, universities, and other kinds of non-profit research organizations. These partners usually do not have experience in later phases of the value chain, but they provide technical knowledge and promising new compounds that need further development. Since my focus in this analysis is on established biotech firms, I expect them to provide higher levels of investments when dealing with upstream partners. To reflect this distinction, I compute the variable *DOWNSTREAM4* as the number of alliances formed with downstream partners during the last four year. Similarly, I computed the variables *UPSTREAM4*.

Finally, although I control for inter-industry variance by focusing on a single industry, I also include a number of control variables that previous researches linked to financial leverage (O'Brien, 2003; Simerly and Li, 2000; Fama and French, 2002; Titman and Wessels, 1988). I control for the effect of *Size* by including the natural logarithm of total book assets. Bigger firms possess established and more diversified businesses and thus they are expected to have easier access to equity markets and may carry lower levels of debt. Return on assets (*Profitability*) is employed as a measure for firm's profitability. According to the trade-off model, firms with higher profits are able to take advantage of the higher interest tax shields associated with debt and should adopt higher levels of leverage. Conversely, the pecking order model suggests that profitability is a proxy for the availability of internal funds and predicts an opposite effect on leverage. The variable *Growth* is a proxy for firm expected investment opportunities and is computed as the annual growth rate in total book assets. Firms with higher growth opportunities possess more intangible assets and as a result, debt financing is more costly for them. The variable *Tangibles* is used to control for the level of collaterals that may enhance a firm's ability to borrow. It is computed as the ratio of all tangible assets (e.g. buildings, machinery, equipment, etc) to total book assets. Finally, the variable *R&D Intensity* is the ratio of R&D expenditures to firm's total assets and is a proxy for the uniqueness of the firm's products and the level of intangible assets. Both factors limit the ability of a firm to borrow and should be associated with lower levels of leverage.

Hypotheses Tests

Since the identified sample is an unbalanced panel of firm-year observations, my dataset has both cross-sectional and time series dimensions. The application of regression models to panel data is a more complex task than for simple cross-section datasets. Indeed, the unobserved heterogeneity effect, due to unobserved characteristics of firms, will cause standard OLS to yield inefficient estimates and invalid standard errors. Following other empirical studies in capital structure literature (Degryse *et al*., 2010; Vicente-Lorente, 2001), I address this issue by adopting a fixed-effects model. This approach was deemed superior to other possible solutions such as random-effect models because such models are appropriate when the sample can be viewed as a random draw from a given population. Clearly, this is not the case in the present study since I analyze *all* independent and publicly traded biotech firms in the Orbis Database. Moreover, random-effects models are likely to be biased if the

model fails to include all variables that influence the dependent variable. Again, this assumption is not supported in this analysis because, although I include a set of control variables identified by prior studies, I do not include all potential determinants of capital structure. When the underlying assumptions of random effects model cannot be justified, fixed-effects estimators are preferable (O'Brien, 2003). Thus, the following standard fixed-effects model was estimated:

$$y_{it} = \alpha_i + \sum_K \beta_k x_{kit-1} + \mu_{it} \qquad ((1)$$

whereby y_{it} is the level of leverage of firm *i* at time *t* and $\sum_k \beta_k x_{kit-1}$ represents the impact of the main independent variables and controls. Consistently with previous studies in capital structure literature, control variables are lagged one year in order to take into account slow adjustments towards target capital structures (O'Brien, 2003). I tested the appropriateness of the fixed-effects model with an F-test, which rejected the null hypothesis that the intercept term is constant across firms. All models also include year dummies to control for the effect of factors related to time.

Table 1 reports the absolute and relative frequencies of the different types of alliances observed in our sample. R&D-based and late-stage alliances are both quite common among biotech firms, representing 43.6% and 40.5% of total alliances, respectively. Somewhat less diffuse are agreements involving both R&D and later-stage activities (15.9%). This data confirm that sharing costs and risks associated with early research programs and acquiring complementary assets in later-phases of the value chain are both important reasons for biotech firms to form alliances. Moreover, biotech firms tend to collaborate predominantly with downstream partners, as approximately 83% of alliances are with downstream partners.

Table 2 reports descriptive statistics for the main variables considered. The variables related to alliances are not highly correlated with the control variables, but they are strongly correlated with each other. However, these high correlations derive from the way the variables were computed and do not represent a serious concern for the estimated models since most of them are tested separately. For instance, *SAs4* is more strongly correlated with *RD4* and *DOWNSTREAM4* than it is with *No-RD4* and *UPSTREAM4*. This is probably related to the fact that R&D-based alliances and alliances with downstream partners are more common in my sample.

Table 1. Alliances Activities and Partner Characteristics.

	Number	Percentage
R&D	154	43,6%
No_R&D	143	40,5%
Mixed	56	15,9%
Total:	353	
Upstream	60	17,0%
Downstream	293	83,0%
Total:	353	

Table 2. Descriptive Statistics.

		Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	Size	10	2,39	1									
(2)	Profitability	-0,79	1,20	0,63	1,00								
(3)	R&D Intensity	0,28	0,49	-0,27	-0,53	1,00							
(4)	Tangibles	0,13	0,18	-0,05	0,00	-0,05	1,00						
(5)	Growth	0,33	1,01	0,07	0,16	-0,18	-0,10	1,00					
(6)	SAs4	0,66	1,39	0,28	0,06	0,03	-0,09	-0,08	1,00				
(7)	RD4	0,41	0,99	0,28	0,10	-0,02	-0,07	-0,06	0,90	1,00			
(8)	No-RD4	0,25	0,66	0,17	-0,02	0,10	-0,09	-0,07	0,75	0,38	1,00		
(9)	UPSTREAM4	0,11	0,38	0,11	0,03	0,07	-0,06	-0,04	0,51	0,50	0,33	1,00	
(10)	DOWNSTREAM4	0,51	1,13	0,29	0,06	0,01	-0,09	-0,08	0,95	0,86	0,71	0,26	1,00

N=803

Results

The results of the fixed-effects models are reported in Table 3. In Model 1 I test hypothesis 1, which predicts that biotech firms that place more strategic importance on the use of alliances should adopt less leverage. Consistently with this prediction, the coefficient on the variable SAs4 is negative and significant ($p<0.05$). Hypothesis 2 extends this argument by predicting that the impact of alliances on capital structure will be stronger especially when alliances involve highly uncertain and long-term activities such as R&D. In Model 2 I test this by analyzing the impact of R&D based alliances separately. I find that while the variable *No-RD4* has no significant effect on leverage, the coefficient on the variable *RD4* is negative and highly significant ($p<0.05$), thus corroborating the idea that firms tend to reduce leverage especially when alliances involve risky activities and partners care about the firm long-term viability. On the opposite, collaborations involving later-stage activities seem not to have a relevant influence on capital structure.

Finally, the importance of the type of partners involved in the alliance is tested in Model 3. I find a negative and significant ($p<0.05$) coefficient on *DOWNSTREAM4,* while the variable UPSTREAM4 shows no significant impact. These results are consistent with hypothesis 3, which predicts that biotech firms tend to adopt lower levels of leverage particularly when its alliance partners undertake the bulk of investments involved in the alliance, thus making alliance premature termination especially costly to these partners.

In terms of the control variables, the coefficient on the variable *Size* is negative and significant in all models. This result is in line with the prediction of the pecking order model and it suggests that larger firms have easier access to external equity markets and tend to adopt less debt (Myers and Majluf, 1984). The coefficient on the variable *Growth* has the expected negative sign and is significant in all model specifications. The other control variables were insignificant, which I attribute to the relatively small size of the considered sample, in comparison to most research that has employed samples constructed from a much broader array of industries.

Finally, in order to provide a further test of hypothesis 3, I focus on the impact of the sub-sample of R&D-based alliances and distinguish among the types of partners involved exclusively in those alliances. The result that firms tend to reduce leverage most when they deal with downstream partners could be related to correlations between the types of activities

engaged in and the types of partners involved in an alliance. That is, if downstream partners were more likely to establish R&D-based alliances with biotech firms, then the results from Model 3 could be driven by the typology of activities involved in the alliance and not by the typology of partners, which is my proxy for counter-parts level of investments in the alliance. Thus, in Models 4 I analyze only R&D-based alliances and distinguish between the number of R&D-based alliances formed with downstream partners (111 alliances) and the number of R&D-based alliances with upstream partners (43 alliances). Consistently with previous models, results suggest that the negative impact of R&D-based alliances on leverage comes especially from those relationships involving downstream partners.

Table 3. Statistical Models.

	Model 1	Model 2	Model 3	Model 4
Size	-0.0203*	-0.0206*	-0.0202*	-0.0207*
	(0.0101)	(0.00992)	(0.0102)	(0.0101)
Profitability	0.0206	0.0211	0.0207	0.0217
	(0.0134)	(0.0134)	(0.0135)	(0.0137)
R&D Intensity	0.00164	0.00110	0.00157	0.000251
	(0.0101)	(0.00989)	(0.0101)	(0.0102)
Tangibles	-0.0246	-0.0237	-0.0259	-0.0231
	(0.0544)	(0.0545)	(0.0547)	(0.0549)
Growth	-0.0109*	-0.0110*	-0.0110*	-0.0111*
	(0.00498)	(0.00501)	(0.00499)	(0.00503)
SAs4	-0.0137*			
	(0.00577)			
RD4		-0.0162*		
		(0.00707)		
No-RD4		-0.00782		
		(0.0131)		
UPSTREAM4			-0.0238	-0.0275
			(0.0180)	(0.0220)
DOWNSTREAM4			-0.0119*	-0.0145*
			(0.00604)	(0.00723)
cons	0.295**	0.301**	0.294**	0.305**
	(0.107)	(0.103)	(0.107)	(0.107)
N	803	803	803	803
R^2	0.072	0.073	0.072	0.073
adj. R^2	0.055	0.055	0.055	0.055
F	1.506	1.436	1.389	1.439

Standard errors in parentheses $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Note: All variables were winsorized at the 1% or 5% level in order to mitigate the influence of outliers. Coefficients' standard errors are robust to the presence of heteroskedasticity.

STUDY 2: An empirical investigation of the Compustat population of firms

Data and sample

In order to test the external validity of the main finding regarding the impact of alliances on capital structure I needed a suitable sample of firms operating in a reasonable number of industries. Accordingly, for my second analysis I use the entire Compustat population of firms during the period 1988-2006 as sample, and build a panel data set where the unit of analysis is the *firm-year*. Firms operating in financial sectors (SIC codes 6000-6999) were excluded as in other studies of capital structure (O'Brien, 2003; Vicente-Lorente. 2001; Simerly and Li 2000). Financial and accounting data necessary to compute financial leverage and its standard determinants were collected from Compustat. Data on alliances were gathered from the Securities Data Corporation (SDC) database on mergers, acquisitions, and alliances. For each firm with available financial records in Compustat information was retrieved on the number of alliances formed in a given year. After merging the two datasets and dropping observations with occasionally missing values I were left with a sample of 9034 firms and a total of 70095 firm-year observations.

Variables

Since in this empirical analysis the focus is still on the determinants of capital structure, I consider variables similar to those that were used in the previous analysis, but with some minor differences due the multi-industry nature of the sample. As before, the main dependent variable is leverage, computed as total debt divided by total market value of the firm, and the total market value of the firm is the sum of total book debt plus total market value of outstanding shares[11]. However, in order to test my first hypothesis – which predicts that firm forming alliances will also adopt lower leverage – this time I employ a slightly different independent variable. Specifically, I consider the variable *SAs* defined as the number of alliances formed by a given firm in a given year. This variable differs from the main independent variables used in Study 1 in that it does not take into account older alliances formed in previous years. This choice was motivated by the fact that, unlike for alliances involving biotech firms, it was difficult to establish the average duration of

[11] Results are qualitatively unchanged if I use the book value of total assets in the denominator.

collaborations in different industries. Thus, I was not able to define the correct time-window for the computation of active alliances in a given year. For this reason, I decided to consider only alliances formed in a single year to make sure the main independent variable was not affected by the specific time window adopted.

Control variables include standard determinants identified by previous capital structure research and also used in the previous analysis (O'Brien, 2003; Vicente-Lorente, 2001; Banerjee et al., 2008; Kale and Shahrur, 2007). To control for firm profitability I include the variable *Profitability,* defined as operating income divided by total assets. I include firms' *Tobin's Q* in order to control for differences in firms' growth opportunities. This variable is computed as: (market value of equity + total assets - common equity) / (total assets). I also control for the intensity of investments in R&D, defined as the ratio of R&D expenses to total assets (*R&D Intensity*). The variable *Size* control for the effects of firm size and it is computed as the natural logarithm of a firm's total assets. I also include the variable *Tangibles* to control for the level of assets that can be used as collateral. This variable is computed as the ratio of property, plant, and equipment to the total book value of assets. Similarly, I also controlled for the firm capital intensity (*Capital Intensity*), computed as the ratio of the firm's total book assets over total sales. In order to account for the effect of dividend policies I included the binary variable *Dividend*, which takes the value of 1 when a firm distributes dividends, and zero otherwise. Finally, to minimize the effect of outliers, all variables that were not binary or logged were winsorized at the 1% level.

Table 4 reports main summary statistics and correlation matrix for the variables considered. Compared to my previous sample of biotech firms, firms in the multi-industry sample have on average higher leverage (0,23), lower R&D intensity (0,08), greater tangible assets (0,47) and higher profitability (-0,02) thus suggesting that the analysis is now capturing also more traditional non-high-tech sectors. Also, this time firms appear to be smaller in size (average logarithm of firm's assets is 4,5). This last difference probably reflects the choice to focus only on established biotech players in the first analysis, while here I am not imposing such restriction. Furthermore, correlations are generally low, thus suggesting that multi-collinearity is not a concern for the analysis.

Table 4. Descriptive statistics and correlation matrix for the overall Compustat population of firms.

	Mean	SD	Leverage	SAs	R&D Int.	Tobin's Q	Tangibles	Profitability	Size	Cap. Int.	Div.
Leverage	0,214	0,239	1								
SAs	0,221	0,641	-0,096	1,000							
R&D Intensity	0,081	0,129	-0,262	0,098	1,000						
Tobin's Q	2,335	2,245	-0,323	0,111	0,380	1,000					
Tangibles	0,475	0,335	0,236	-0,031	-0,115	-0,175	1,000				
Profitability	-0,024	0,284	0,054	0,003	-0,620	-0,324	0,047	1,000			
Size	4,542	2,290	0,122	0,261	-0,280	-0,208	0,161	0,391	1,000		
Capital Intensity	2,673	7,842	-0,112	0,025	0,238	0,201	-0,152	-0,325	-0,122	1,000	
Dividend	0,289	0,453	0,052	0,042	-0,251	-0,181	0,246	0,304	0,506	-0,137	1

N=70095

Hypotheses test and results

Besides external validity, probably the major concern about the analysis conducted in Study 1 is the potential existence of reverse causality between capital structure and alliance-related variables (Parson and Titman, 2007). Indeed, while the existence of relationships with external alliance partners could affect capital structure decisions, it could also be the opposite, that is, a firm's capital structure may impact its need or ability to enter strategic alliances. For instance, firms with lower leverage may form alliances more because they possess the financial resources needed in order to invest effectively and acquire external capabilities (Patzelt et al., 2008). If this were the case, then a negative relation between leverage and alliance-related variables would emerge but not for the reasons proposed. Accordingly, as capital structure and alliance activity are jointly determined, the main independent variable could be endogenous leading to biased coefficient estimates. In this second analysis I address this concern by taking advantage of inter-industry variation in the rate of alliance formation and by identifying a proper instrumental variable for my main alliance-related variable in order to ensure that the previous results are not driven by reverse causality. Accordingly, I employ fixed effects instrumental variables regression in order to estimate the following equation:

(5) $Leverage_{it} = a_0 + a_i + \gamma_1 RD\ Intensity_{it} + \gamma_2 Tobin's\_Q_{it} + \gamma_3 Tangibles_{it} + \gamma_4 Profitability_{it} + \gamma_5 Size_{it} + \gamma_6 Capital\ Intensity_{it} + \gamma_7 Dividend_{it} + \gamma_8 SAs_{it} + \mu_{it}$

In this specification, the variable *SAs* is treated as endogenous and is instrumented in the first stage by the overall number of alliances formed by firms in that industry each year (AVGINDALL). The underlying assumption is that, since the instrument is at the industry level, then it should be exogenous with respect to firm leverage. Explorative regressions as well as simple bivariate correlations suggests that this is indeed the case and that industry-level alliancing activity and firm-level leverage are not significantly related. Table 5 reports results from the estimated model. Consistently with the results obtained from Study 1, the variable *SAs* reports a negative and significant coefficient ($p<0.001$). This result provides further support for my main argument that firms making alliances a strategic priority should

also reduce leverage in order to induce R-S investments from alliance partners. Thus, this prediction seems to be valid not only for biotech firms but also for firms operating in other industries and it is not driven by reverse causality, at least in this second analysis.

Table 5. Fixed effects instrumental variable regression on firm leverage

Dependent Variable	Leverage
Independent Variable:	
SAs	-0.0318***
	(0.00842)
R&D Intensity	-0.138***
	(0.00971)
Tobin's Q	-0.0108***
	(0.000392)
Tangibles	0.0976***
	(0.00385)
Profitability	-0.137***
	(0.00398)
Size	0.0431***
	(0.00134)
Capital Intensity	-0.000631***
	(0.000109)
Dividend	-0.0289***
	(0.00273)
_cons	-0.0454***
	(0.00823)
N	70095
R^2	0.1386
F (9033,61028)	10.07
Prob>F	0.000

Standard errors in parentheses $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.4. Discussion and conclusions

External stakeholders often invest in assets whose value is relationship-specific. If the partner firm is liquidated, these relationships are interrupted and the owners of these resources bear significant costs. As the risk of liquidation increases with a firm's level of debt, firms should try to reduce leverage if they want to induce R-S investments. In this chapter, this idea is extended to the context of strategic alliances, where pooling resources together with other firms is crucial.

Strategic alliances can play a valuable role in helping firms acquire new knowledge, adapt to a changing environment, and build a competitive advantage. I have argued that partnering firms have good reasons to care about each other's financial health, especially when R-S investments are significant. Results from the above empirical analyses indicate that managers generally recognize the pitfalls of forming alliances with highly leveraged partners, and hence maintain lower leverage when the firm places a greater strategic emphasis on inter-firm collaborations. The findings of this first chapter suggest that in order to preserve their partner's incentive to invest, firms need to carefully adjust their capital structure. Due to the implied risk of liquidation, highly leveraged firms threaten the continuity of an alliance, potentially despite their best intentions. Since the unexpected termination of the alliance would be costly, these stakeholders are reluctant to invest if their counter-part is financially weak. I also argue that this effect should be contingent upon other alliance level factors that magnify hazards related to R-S investments. In this regard, I propose that the nature of the activities and also the types of partners involved in the alliance represent relevant considerations. Alliances involving riskier activities with distant pay-offs (such as R&D collaborations) magnify the risks associated with leverage, as they require the firm to stay solvent for the long-term. Similarly, partners with greater bargaining power that undertake the bulk of capital investments may require *ex ante* compensation for the risks introduced by leverage, thereby shifting most of the associated costs to the focal firm. Both circumstances increase the need to safeguard the stability of the alliance and push alliance aspirants to reduce their leverage.

In order to support these arguments, I conduct two empirical analyses where I study alliances as one of the determinants of firms' capital structure decisions. In the first analysis, I analyze

a sample of established biotech firms and provide several pieces of evidence consistent with these ideas. The findings show that biotech firms that have a greater propensity for forming alliances generally adopt lower leverage. In addition, biotech firms tend to reduce leverage more when they form R&D-based alliances, while other collaborations seem not to play an important role. Finally, I find that leverage is reduced in the presence of partners who are likely to undertake the bulk of the investments in the collaboration, such as pharmaceutical companies. In order to test the external validity of these findings I also conduct a second empirical analysis and extend the focus to the overall Compustat population of firms. Results from this multi-industry sample confirm that a negative relationship exists between financial leverage and the number of alliances formed by a given firm, even after controlling for potential endogeneity due to the fact that capital structure and alliance activities may be jointly determined. Overall, these findings are consistent with the main argument of this thesis that firms should reduce leverage in order to boost investment from alliance partners and that this impact ultimately depends on alliance characteristics.

The findings of this chapter have important implications for the extant research. First, the results add to finance research by clarifying the role played by alliances in the capital structure decision. Extant literature provides evidence that firms tend to reduce leverage whenever inducing R-S investments from external stakeholders is important. These studies focus on the role of customers, suppliers and employees in shaping a firm's capital structure. I contribute to this stream of research by showing that another stakeholders group cares about the firm's financing policy, namely alliance partners. I show that firms take into account costs imposed on alliance partners when setting their leverage and that these costs depend on alliance characteristics and the characteristics of the alliance partners. These results are noteworthy as they suggest that in a world where inter-firm collaborations are increasingly popular, alliances and their characteristics should be considered when establishing corporate financing policies.

This study also contributes to alliance literature. Extant research in this area suggests that firms adopt contractual solutions to mitigate hazards and to induce investments involved in alliances. Accordingly, the main take-away from this body of works is that attributes of the transaction besides firm-level policies influence the hazards implied by R-S assets (Billitteri *et al.*, 2013). My analysis advances this perspective by showing that capital structure decisions are critical in preserving partner incentive to invest in alliances. This finding is interesting as it shows that incentives to undertake R-S investments at the *alliance level* can

be important in determining corporate financing policies at the *firm level*. Consistent with this idea, I show that firms maintain conservative financing when they place greater strategic emphasis on the use of alliance. This result is important as it suggests that capital structure may also have an impact on the firm's perceived attractiveness as an alliance partner and, ultimately, on its alliancing activity. For instance, higher firm leverage could imply greater uncertainty/instability at the alliance level and impact the choice of the governance form or other structural preferences of partnering firms. Similarly, the risks implied by firm financial conditions could also constrain its ability to attract valuable partners and thus have important repercussions in terms of partner selection.

Finally, I note some limitations of the analysis conducted in this chapter. First, I tested the robustness of the main finding about the link between alliances and leverage by checking for external validity and the impact of endogeneity in a multi industry sample. Unfortunately, I was not able to do the same for the other predictions on the impact of particular typology of alliances because consistent and meaningful categorizations of alliances should be defined ad-hoc by considering each industry's specificities. In addition, proper instruments for all these variables should be defined accordingly. Future research could address these points by analyzing with more rigorous empirical methods the importance of alliance heterogeneity in specific industries. Second, while my analysis showed that firms forming alliances tend to reduce leverage arguably to induce investments from their external partners this result should be further integrated with insights from models of capital structure determination. Indeed, the target adjustments models of capital structure suggest that firm possess target debt ratios that depend on the anticipated benefits and costs of debt financing. However, due to the existence of transaction costs and other market frictions firms do not always operate at target levels of leverage, but instead they gradually adjust toward it with a given speed of adjustment (Shyam-Sunder and Myers, 1999). As a result, the analysis conducted in this chapter does not discriminate for alternative financial explanation for why firm that have alliances are also low levered. In particular, it is still not clear whether firms with alliances indeed possess lower target debt ratios or the need to induce investments from alliance partners just bump them away from their presumably higher target levels of debt. Future research could address this limitations by investigating whether strategic alliances influence target capital structure or rather the "speed" with which firms are able to tend to their targets.

CHAPTER 4

THE IMPACT OF CAPITAL STRUCTURE DECISIONS ON FIRM'S ALLIANCE STRATEGY

4.1. Introduction

The findings of the previous chapter provide support for the main argument that a firm's capital structure represents a relevant concern for alliance partners, and that a firm should reduce leverage whenever inducing R-S investments from these stakeholders is important. Accordingly, I analyzed the formation of strategic alliances as one of the determinants of capital structure and found that managers take into account alliance partners concerns when defining firm's financing policies. However, also the opposite may be true, that is, many aspects of a firm's alliance activity could well reflect its capital structure policies. Finance research suggests that firms' capital structure tend to be stable over time, as managers appear to use net securities issuance to maintain their leverage in relatively confined regions (Lemmon et al., 2008). Moreover, since issuing or retiring financial securities is costly, firms tend to gradually adjust their capital structure only when the associated benefits exceeds the implied costs. In my research context this suggests that, although managers could anticipate alliance partners concerns and reduce leverage ex-ante, there may be circumstances under which the firm is not able to operate at optimal levels of leverage. Thus, part of the risks of instability implied by a firm capital structure may persist and constrain its subsequent alliance activity. Accordingly, considering the capital structure policies of partnering firms and their risk implications could also be important in order to better understand several issues involved in the alliance making process. In this chapter I further explore the ramifications of this intuition by seeking answer to the following general research question:

(i) *To what extent does a firm's capital structure influence its ability to deal in the market for inter-firm collaboration?*

In order to analyze how capital structure policies influence a firm's alliancing activity I extend the theoretical arguments developed in the previous section and discuss in details further risks implied by capital structure decisions during the process of alliances formation. Then, I derive the implications of the proposed theoretical framework for two key alliance decisions, namely partner selection and the choice of the governance form, and test these predictions empirically.

Factors that impact partner selection have been a central concern in the literature on strategic alliances. One stream of literature focuses on the types of resources possessed by a partner in relation to the focal firm (e.g. upstream/downstream, supplementary/complementary, technical/marketing) as a determinant of alliancing activity (Lavie 2007; Rothaermael and Deeds, 2004; Rothaermael and Boeker, 2008; Wang and Zajac, 2007; Lin, Yang and Arya, 2009). Another stream emphasizes the importance of relational capital, cultural fit and the compatibility of routines between the partnering firms (Kale, Singh and Perlmutter, 2000; Lavie Haunschild and Khanna, 2012; Das and Teng 1997; Dyer and Singh 1998, Zaheer, McEvily and Perrone, 1998). A third stream argues that firms select partners based on their status because high status partners act as an endorsement to external constituents (Stuart, Hoang, Hybel 1999; Hoehn-Weiss and Karim, forthcoming) and provide access to valuable networks (Ahuja, 2000; Diestre and Rajagopalan, 2012). While these studies certainly provide valuable insights on many of the relevant aspects firm consider when looking for an alliance partner, they do not take into consideration prospective partners' capital structure and the implied risk of instability in the alliance. In this chapter, I try to explicitly fill this gap by arguing that another important factor that influences alliance partner selection is their financial health. In particular, it is proposed that in the inter firm market for collaboration[12], firms select partners after taking into account not only their resources, but also their leverage and the associated potential for bankruptcy and financial distress.

The hypotheses developed are based on two central arguments. First, I begin by recalling that an important concern in alliances is the risk of unplanned termination (Sadowski and Duysters 2008, Reuer and Arino 2002, Reuer and Zollo 2005). If one partner encounters financial difficulties and is facing growing bankruptcy concerns, out of either desperation or necessity it may unilaterally withdraw from the relationship before the objectives have been

[12] Similar to the market for marriage (Becker 1974), this market can be viewed as one where firms scan the environment for potential partners with whom they can collaborate and develop new capabilities.

achieved. Indeed, the costs associated with such unanticipated termination can be substantial, because the efforts devoted to the alliance and the resources developed within it (such as joint technologies or marketing knowhow) are often sunk and cannot be fully recovered if the relationship is terminated. Accordingly, when a firm is financially distressed it can impose substantial costs on its alliance partners (Boone and Ivanov, 2012)[13]. The second argument I develop is that leverage is an important determinant of partner attractiveness in various transactions, including in alliances. As already explained in Chapter 2 and Chapter 3 stakeholders theories propose that as leverage increases, customers, suppliers and employees impose various costs on the firm (e.g. paying lower prices or demanding higher compensation) due to the increased probability of bankruptcy and financial distress (Cornell and Shapiro, 1987). Thus, because of these costs higher leverage makes a firm a less attractive transaction partner (Titman, 1984) and creates disincentives for stakeholders to make relationship specific investments. In this chapter I extend this reasoning to the context of alliances and argue that leverage and capital structure matter in partner selection because alliances are particularly prone to unplanned termination, which could lead to substantial loss in value of relationship specific assets.

Based on the central argument that leverage and financial health impact alliance partnering choices, I develop several hypotheses and provide empirical support using a large multi-industry sample of inter-firm alliances formed during the period 1988-2006. First, I show that firms tend to form alliances with partners characterized by relatively similar levels of leverage. This 'double sided matching' of leverage occurs in the market for collaboration because low leverage firms prefer other low leverage firms as partners, while high leverage firms are constrained to partner with other high leverage firms due to the implied risk of bankruptcy and alliance instability. Second, I also hypothesize and find that partner Tobin's Q is negatively associated with firm leverage, which further suggests that because of the risks they bring about in the alliance, highly levered firms are also constrained to partner with lower quality firms.

Nonetheless, partner selection is not the only aspect that is likely to be affected by a firm's capital structure. Indeed, it reasonable to think that some firms will still form alliances with high levered partners despite the implied instability, because the latters possess unique

[13] As an example, in 2005 the shares of brake manufacturer Pacifica fell by nearly 10 percent when its customer and joint venture partner, Delphi, filed for bankruptcy. A key part of Pacifica's operations was a plant that it operated jointly with Delphi to supply brakes to GM.

resources that cannot be found elsewhere. Accordingly, I also explore whether firms can adopt ex post contractual solutions to mitigate the risks implied by their partners leverage once a dyad has been formed. In this respect, I interestingly find that the propensity to use equity-based agreements in alliances increases both as a firm's leverage increases and as the *difference* in leverage across the alliance partners increases. Prior literature argues that equity is effective in aligning incentives, and in containing appropriability hazards in the alliance relationship (Pisano, 1989). The results of this chapter add to these studies by suggesting that equity is also important because it provides an enforceable mechanism and a safeguard through which specific investments can be salvaged by an unlevered partner in the event of premature termination by a relatively levered firm[14]. Overall, these findings have important implications for extant alliance research as they suggest that firm-level financing decisions, such as capital structure, can have profound consequences on many aspects of the alliance making process, and that both practitioners as well as strategy scholars should be aware of them.

The present chapter is structured as follows. In section 4.2 I develop my research hypotheses. I start with a discussion of the various risks implied by high partner leverage in an alliance. Then, I derive the implications of the proposed theoretical arguments for the process of partner selection and for the choice of alliance governance. In section 4.3 I describe the sample and methods used to test the hypotheses. Section 4.4 discusses the results of the empirical analysis. Finally, conclusions are drawn in section 4.5.

[14] Firms sometimes sell their stakes in a JV to their partner and use the proceeds to pay down debt. For example, in 1997 Eli Lilly sold its 40% stake in its JV with Dow Chemical, named Dow Elanco, and used the proceeds of USD 900 million to pay down debt from a recent acquisition. Similarly, General Mills sold its stake in its European JV with Pepsico for USD 750 million as part of its debt reduction efforts.

4.2. Hypotheses development

Capital structure and risks involved in strategic alliances

Research has shown that a firm's liquidation decision can be costly for external stakeholders such as employees, customers buying long-lived assets, dependent suppliers (Titman, 1984; Kale and Sharur, 2007, Banerjee et al., 2008), or any other stakeholders exchanging unique products and services with the firm in general. These relationships typically involve investments that are relation-specific (R-S) in the sense that they are tailored to contractual parties' specific needs. In the event of a firm's liquidation the relation would terminate and these investments would lose most of their value, with subsequent costs imposed on these stakeholders. Because liquidation is more likely if a company has high leverage, external stakeholders are reluctant to deal with highly levered firms or, alternatively, they require compensation to do so in the form of risk-adjusted prices ex-ante.

Investments involved in alliances expose partners to similar costs and risks. Firms turn to alliances when the interactions involved with a particular transacting partner are repeated and intense over time, such as for example in innovation. Such interactions call for close coordination mechanisms, both formal and informal, that enable information flow, which are typically facilitated in an alliance structure. The consequence of these intense interactions and coordination mechanisms is that they inevitably build relationship specific assets over time, such as shared knowledge or technologies. In the event of one partner terminating the venture in the face of bankruptcy risks, the value of such resources and shared knowledge is irremediably lost. As a result, despite its best intentions, a highly levered partner puts at threat the continuity of an alliance and the value of the investments undertaken by both sides.

High levels of leverage can also give rise to costs even when bankruptcy risks are remote, by influencing a firm's incentives to meet implicit claims sold to stakeholders. Implicit claims are too state-contingent to be reduced to a written form. As a result, it is possible for a firm to default onto those claims without going bankrupt. Leverage influences the value of implicit claims for at least two reasons. First, debt levels determine the future ability of a firm to raise external funds, which in turn determines the opportunity cost of meeting implicit claims when cash flows are reduced (Cornell and Shapiro, 1987). Second, more debt

reduces the share of future cash flows diverted to shareholders, and it could incentivize a firm to take actions that increase shorter-term gains at the expense of longer-term profits (Maksimovic and Titman, 1991)[15]. Consequently, scholars have demonstrated that highly levered firms tend to provide their customers lower quality inputs, to harvest an existing reputation of being a high quality producer, or to skimp on follow-up services for existing products (Cornell and Shapiro, 1987; Maksimovic and Titman, 1991; Maksimovic, 1995)[16].

One important implicit claim in an alliance is the commitment of both partners to provide consistent efforts over the course of the collaboration. Indeed, due to contract incompleteness and bounded rationality it is difficult to exactly specify ex-ante how partners should contribute to an alliance under all future states of nature. For this reason, given their reduced incentives to meet external stakeholders implicit claims, levered firms could pursue short-term goals at the expense of their partners by reducing resource contributions (such as financial, tangible or managerial resources) to the alliance, while trying to gain as much as possible from the partner. Under these circumstances, the partner is either faced with the prospect of terminating the alliance and losing its relationship specific assets, or continuing the alliance despite the half-hearted efforts of the levered partner in an attempt to preserve the value of these assets. Regardless of its choice, this situation certainly imposes costs on the counter-part.

In addition to reduced effort, a lower levered firm is exposed to another form of *ex post* opportunism when partnering with a levered counterpart. A levered firm experiencing financial distress could try to extract concessions from a more financially healthy partner by threatening termination of the alliance and requesting either financial support or renegotiation for more favorable terms. In such a case, the lower levered firm is once again faced with the choice between terminating the alliance and losing the value of its relation-specific investments or perpetuating the alliance despite such *ex post* opportunistic behavior

[15] These costs are similar to the agency costs arising from the relationship between bondholders and shareholders discussed in Chapter 2. The difference is that this time the cost of inefficient investments would be borne not only by bondholders but also by external stakeholders.

[16] The basic logic is that the short-term gains from such strategies would immediately benefit a firm's shareholders. On the other hand, customers may later detect opportunistic behavior and react by punishing the firm, in which case debtholders would be especially damaged since they bear most of the downside risks of the firm.

(Reuer and Arino, 2002, Arino et al., 2008) by subsidizing the levered partner in some manner[17].

In summary, alliances inevitably involve the presence of relationship specific assets, which raises the costs of premature termination. Partnering with highly leveraged firms not only increases the risk of such premature termination, but also exposes the unlevered firm to various forms of *ex post* opportunism such as a lack of effort or bargaining for financial support and more favorable terms.

In the next section, I further extend the above arguments and develop specific predictions on how the risks implied by partners' leverage impact a firm's alliancing activity in terms of partner selection and governance choice.

Impact of capital structure on partner selection

The first set of hypotheses developed in this chapter build on the underlying assumption that rational firms should anticipate the risks discussed in the previous section and take *ex ante* actions by carefully selecting potential partners based on their leverage. Indeed, as risk and resources represent the two most relevant strategic dimensions in an alliance (Das and Teng, 1998a), it is reasonable to think that firms will select potential partners by trading off not only resource considerations but also the implied potential for bankruptcy and financial distress. Accordingly, I suggest that because of the risks of alliance instability implied by leverage, *ceteris paribus*, low leverage firms are generally more attractive partners and should have greater opportunities to find collaborators. At the same time, they are also likely to face additional opportunism when dealing with highly levered counterparts, and hence they would tend to avoid partnering with such firms. Conversely, highly levered firms will generally be constrained to partner with other highly levered firms because these firms are unable to attract low leveraged firms. In equilibrium, this should result in a relatively stable pattern of alliance formation wherein firms tend to find partners characterized by similar levels of financial leverage. Thus, I predict the following:

[17]For example, in 2009 the financially constrained De Beers asked its joint venture partner, Mountain Province Diamond, for a renegotiation of their existing agreement. The new terms were less financially onerous for De Beers and required Mountain Province to reimburse De Beers a significant portion of historic sunk costs in exchange for increased control rights in the venture. Similarly, in October 2001, Telstra rescued its debt-laden joint venture partner Austar by providing additional funding for the venture, causing shares in Austar to soar 69 percent.

H1. Firms will tend to form alliances with partners characterized by similar levels of leverage.

The influence of a firm's leverage on the risk of unplanned termination is also likely impact the quality of the alliance partners that a firm can attract. One of the primary reasons for engaging in alliances is to combine complementary assets and stimulate innovation. Firms possessing high quality resources are the most valuable partners because they should be able to generate the most valuable synergies. Consequently, high quality firms have more bargaining power in the market for collaboration, which they can use in order to partner with the most desirable associates (Rodhes-Kropf and Robinson, 2008). I contend that, due to their superior resources endowments, high quality firms will have the bargaining power to avoid the risks entailed by partnering with highly levered firms. Indeed, during cash flow fluctuations, the lack of incentives to devote consistent efforts by a highly leveraged firm could undermine the realization of synergies. Furthermore despite best intentions to devote effort, synergies would also not be realized if the alliance terminates prematurely because of a partner's financial difficulties. Thus, higher quality firms face a greater opportunity cost by partnering with highly leveraged counter-parts, as compared to firms with poorer resources and opportunities to find alternative partners. As a result, high quality firms will thus tend to select lower levered counterparts. Accordingly, I formulate the following hypothesis on the relationship between the focal firm's leverage and the quality of resources possessed by its partners:

H2. There is a negative relationship between a firm's leverage and the quality of its partners.

Impact of capital structure on alliance governance choice

Thus far, I have argued that highly leveraged firms are unattractive partners due to greater risks of financial distress and unplanned termination, which dissuade low levered and high quality firms from forming alliances with them. However, highly leveraged firms can *ex ante* offer various forms of protection and safeguards in order to attract desirable partners. One particular form of protection that is likely to be effective in this regard is structuring the alliance as an equity joint venture (JV). As Pisano (1989) observes, allocating equity in an alliance requires putting a value on the expected contributions of each firm prior to the

commencement of the partnership. Typically, it entails negotiations and explicitly drawing out agreements regarding such relative contributions. Once drawn out, these agreements can be legally enforced by the partner (Ryall and Sampson, 2009), which may prevent any subsequent reneging or scaling back of effort on the part of a levered firm. Moreover, any shirking by the leveraged firm reduces the value of the JV, which in turn would lower the proceeds it could obtain should it attempt to raise funds by selling its stake in the JV to the partner or to a third party, which are common methods of JV termination (Villalonga and McGahan, 2005; Cuypers and Martin, 2007).

Equity participation and a JV structure also provide other advantages besides ensuring continuity of effort. Typically a JV has a board with members drawn from the constituent partners. Through such a structure, a partner can safeguard its investments by exercising better control and monitoring of the efforts of a highly leveraged firm on a more continuous basis. Moreover, such ongoing control also allows the partner to understand the joint ventures operations more intimately. Accordingly, in the event of an unplanned termination, the partner may be better able to salvage its investments by taking over the venture entirely. The protection provided by equity and a JV structure is, however, also costly for both parties since it involves a greater commitment of resources from the outset (e.g., managerial resources in the form of human capital and employees specifically devoted to the alliance). For a highly leveraged firm, its willingness to devote such resources and human capital acts as a form of credible commitment to sustain the collaboration and devote consistent effort. Conversely, a JV structure should be desirable also from the counter-parts point of view (regardless of its leverage), since to the extent that there is value in collaborating with a leveraged partner, it may be willing to incur such costs upfront. Hence, I predict:

H3. Alliances involving highly levered firms are more likely to be equity-based.

As an extension of H3, I also posit that an alliance is more likely to take the form of a JV as the *difference in leverage* between the two partners grows. Although any alliance partner could potentially seek concessions or skimp on future resource commitments, the problem should be particularly acute when one firm is lowly levered and financially healthy while the other is highly levered. Under these conditions, the unlevered firm is particularly vulnerable to the threat that the levered firm may use its financially weak position as justification for renegotiation and extracting concessions. Consequently lower levered firms have greater incentives to require their highly levered counterparts to commit to the additional protections

afforded by an equity JV. Conversely, the additional costs of a JV structure (described above) are less likely to be regarded as warranted when both firms are low leveraged due to the lower threat of opportunistic renegotiation and extracting concessions, given that both partners are financially healthy. Similarly, a JV is also less likely to occur when both firms are highly levered as the weak financial positions of both partners reduce the risk of opportunism while making the additional costs of a JV difficult to afford. Hence, I argue the following:

> *H4. The greater the difference between partners leverage, the greater the probability that an alliance will take the form of a JV.*

4.3. Research methods

Data and sample

In order to test the above hypotheses I drew data on all alliances announced between the years 1988 and 2006 from the Securities Data Corporation (SDC) database on mergers, acquisitions, and alliances. I restricted the attention to two partners alliances to ease the comparison among partners' characteristics. In addition, I also excluded from my final sample alliances involving financial firms, since leverage has a different interpretation in those industries. For alliances meeting these criteria information was retrieved on the partners' names, SIC codes, state of incorporation, descriptions of activities involved in the alliance, geographical locations, and other governance-related data such as the presence of equity-exchanges.

Accounting and financial data on the partnering firms were gathered from Compustat. After combining all data, I was left with 4220 alliances involving 2074 distinct firms. On average, each of these 2074 focal firms is associated with 4.1 alliances in my final sample. The final sample also includes alliances in a wide variety of sectors. Adopting Fama and French's twelve industry classification, the distributions of the alliance activity across industrial codes is as follows: computer, software and electronic equipment (48.1 percent); healthcare, medical equipment and drugs (8.45 percent); chemical and allied products (1.37 percent); manufacturing (2.84 percent); consumer durables (1.59 percent); telephone and television transmission (2.06 percent); wholesale, retail and related services (11 percent); and finance

(8.65). All remaining industries account for minor percentages. Table 6 describes in more details the distribution of activities involved in the sample of alliances. Table 7 similarly shows the distribution of industrial SIC codes of partnering firms in the sample. Again, the reported figures confirm that most firms operate in the business equipment (59.22 percent), health care (18.56 percent), manufacturing (4.68 percent) and consumer durables industries (5.57 percent).

Table 6. Frequencies and distribution of alliance level SIC codes in the sample

Industry	Description	Freq.	Percent	Cum.
Consumer Non Durables	Food, tobacco, textiles, apparel, leather, toys	27	0.64	0.64
Consumer durables	Cars, TV's, Furniture, Household appliances	67	1.59	2.23
Manufacturing	Machinery, trucks, planes, off furn, paper, com printing	120	2.84	5.07
Energy	Oil, gas, and coal extraction and products	19	0.45	5.52
Chemicals	Chemicals and allied products	58	1.37	6.89
Business Equipment	Computer, software, and electronic equipment	2.030	48.09	54.99
Telephone and television transmission	Telephone and television transmission	87	2.06	57.05
Utilities	Utilities	7	0.17	57.21
Shops	Wholesale, retail, and other services	466	11.04	68.25
Healthcare	Healthcare, medical equipment, and drugs	357	8.46	76.71
Money	Finance	365	8.65	85.36
Others	Mines, construction, hotels, bus services, entertainment, etc.	618	14.64	100.00
	Total	4.221	100.00	

Table 7. Frequencies and distribution of partner level SIC codes in the sample.

Industry	Freq.	Percent	Cum.
Consumer Non Durables	77	0.91	0.91
Consumer durables	470	5.57	6.48
Manufacturing	395	4.68	11.16
Energy	69	0.82	11.98
Chemicals	233	2.76	14.74
Business Equipment	4.999	59.22	73.95
Telephone and television transmission	208	2.46	76.42
Utilities	3	0.04	76.45
Shops	204	2.42	78.87
Healthcare	1.567	18.56	97.43
Others	217	2.57	100.00
Total	8.442	100.00	

Dependent variables

In order to test hypothesis 1, which posits that firms with similar levels of leverage will partner with each other, I adopt two approaches. First, as I discuss in greater detail in the results section, I compared differences in leverage among allied firms with the difference in leverage of random matched pairs of firms picked from the entire Compustat database. Second, and more formally, I tested the hypothesis by constructing a hierarchical linear regression model to regress partner leverage on alliance level variables and focal firm leverage. Since firms formed multiple alliances in my sample, I constructed the data set so that each alliance with its corresponding partner and alliance characteristics was nested within the firm. Thus, for the 2074 firms in the final sample, a focal firm's alliance appears as a nested observation within the partner's observations, and correspondingly the same

alliance appears as a nested observation within the focal firm's observations. Accordingly, to test this relationship, I measured the partners' market leverage (*PLEV*), where market leverage is computed as total debt divided by total market value of the firm, and the total market value of the firm is the sum of the book value of debt plus total market value of outstanding shares[18]. I similarly constructed a measure of the partners' Tobin's Q (*PQ*) to proxy for partner quality and test hypothesis 2, which posits that leveraged firms will attract lower quality partners. The variable *PQ* is computed as: (market value of equity + total assets - common equity) / (total assets).

Finally, my third and fourth hypotheses relate partners' leverage to the choice of the governance form of the alliance. I used a hierarchical model for this analysis as well, and I constructed a dummy variable (*JV*), which takes the value of one when the alliance is a joint venture and zero otherwise[19].

Key Independent Variables

Hypotheses 1-2 suggest that a firm's level of leverage will impact the characteristics of the partners it is able to attract. To test these predictions I consider the focal firm's leverage as my main independent variable (LEV), defined, as before, as total debt over total market value of the firm. To test hypotheses 3, which predicts that alliances with high leverage firms will be structured as JV, I use both the focal firm's and its partner's leverage as main independent variables (LEV and PLEV). Finally, to test hypothesis 4, which pertains to the impact of *differences* in partner leverage on the choice of governance, I also construct the variable *DELTA*, which is the absolute difference in market leverage between the two partners. In order to test these hypotheses I employ different econometric models and consider multiple dependent variables (that is, partner leverage, partner Tobin's q, alliance governance). Accordingly, for the sake of clarity the control variables are discussed in the next section after each empirical model is introduced.

[18] Results are qualitatively unchanged if I use the book value of total assets in the denominator.

[19] Following previous works on alliance governance, I exclude minority equity positions and define equity alliances as joint ventures only (Casciaro, 2003). However, results are virtually unchanged when I also considered these arrangements as equity alliances.

Empirical models

Hypothesis 1 suggests a double sided matching in the market for collaboration, whereby a highly levered firm is more likely to form alliances with other highly levered firms, while a lower levered firm is more likely to ally with other conservatively financed partners. To test this prediction, the following equation is estimated:

$$(1)\ PLEV_{ij} = a_{00} + a_{0i} + \gamma_1 PROA_{ij} + \gamma_2 PQ_{ij} + \gamma_3 PRD_{ij} + \gamma_4 PLASSET_{ij} +$$
$$+ \gamma_5 LEV_{ij} + \gamma_6 ROA_{ij} + \gamma_7 Q_{ij} + \gamma_8 RD_{ij} + \gamma_9 LASSET_{ij} + \mu_{ij}$$

As groups of alliances formed by the same focal firm are likely to possess common characteristics and observations related to the same focal firm are likely to be correlated I employ hierarchical models wherein alliances are nested within firms. Accordingly in (1) the variables denoted by P are partner characteristics and are at the alliance level, which are modeled as nested within the firm. Hence, for alliance *j* formed by focal firm *i* a random intercept term is included in order to capture these dependencies. Similarly, hypothesis 2 examines the impact of leverage on the quality of alliance partners a focal firm is able to attract. To test this hypothesis, I test the following hierarchical model where, as before, alliances are nested within firms:

$$(2)\ PQ_{ij} = a_{00} + a_{0i} + \gamma_1 PRD_{ij} + \gamma_2 PLASSET_{ij} + \gamma_3 PROA_{ij} + +\gamma_4 PLEV_{ij} +$$
$$+ \gamma_4 RD_{ij} + \gamma_5 LASSET_{ij} + \gamma_6 ROA_{ij} + \gamma_7 Q_{ij} + \gamma_8 LEV_{ij} + \mu_{Ij}$$

For both models above, I include several control variables that could impact either a firm's leverage or the quality of the alliance partners it attracts. *ROA* and *PROA* are the focal and partner firms return on assets, respectively, where return on assets is defined as operating income divided by total assets. The partners Tobin's q (*PQ*) is also used as a control in (1) and is constructed as described above. I similarly construct a measure of the focal firms Tobin's q (*Q*) and include it as a control. I also control for the R&D intensity of both the partner firm (*PRD*) and the focal firm (*RD*), defined as the ratio of R&D expenses to total assets. Finally, I control for the size of both the partner firm (*PLASSETS*) and the focal firm (*LASSETS*) with the natural logarithm of each firm's total assets.

Hypotheses 3 and 4 focus on the impact of leverage on the governance form of an alliance. In order to test these hypotheses I employ logit models where, as before, alliances are nested within focal firms. The following equations are estimated:

$$(3)\ Prob(Y_{ij}=1) = \alpha_i + \beta_1 RESEARCH_{ij} + \beta_2 MANUFACT_{ij} + \beta_3 MARKET_{ij} + \\ + \beta_4 SUPPLY_{ij} + \beta_5 LICENS_{ij} + \beta_6 SUPRANATION_{ij} + \beta_7 SAMESTATE_{ij} + \\ + \beta_8 SAMEIND_{ij} + \beta_9 PRIORALL_{ij} + \beta_{10} AVGASSET_{ij} + \beta_{11} RASSET_{ij} + \\ + \beta_{12} RDGAP_{ij} + \beta_{13} AVGROA_{ij} + \beta_{14} LEV_{ij} + \beta_{15} PLEV_{ij}$$

$$(4)\ Prob(Y_{ij}=1) = \alpha_i + \beta_1 RESEARCH_{ij} + \beta_2 MANUFACT_{ij} + \beta_3 MARKET_{ij} + \\ + \beta_4 SUPPLY_{ij} + \beta_5 LICENS_{ij} + \beta_6 SUPRANATION_{ij} + \beta_7 SAMESTATE_{ij} + \\ + \beta_8 SAMEIND_{ij} + \beta_9 PRIORALL_{ij} + \beta_{10} AVGASSET_{ij} + \beta_{11} RASSET_{ij} + \\ + \beta_{12} RDGAP_{ij} + \beta_{13} AVGROA_{ij} + \beta_{14} DELTA_{ij}$$

In these models, α_i is the random intercept term, which takes into account dependencies among alliances pertaining to the same focal firm. To test hypothesis 3, I estimate a nested specification (equation 3) where I include both the focal firms and its partners' level of leverage as main independent variables (*LEV* and *PLEV,* respectively). Hypothesis 3 implies that both coefficients on these variables will be positive, so that whenever one of the two firms is highly levered chances of a joint venture increase. Hypothesis 4 extends the previous argument by suggesting that equity governance will also be preferred when the difference in leverage between partners is high, since under these conditions the lower levered firm would once again seek the protection that equity provides in terms of sustained commitment and protection of the value of alliance assets. To test this hypothesis I include the absolute difference among partners leverage (DELTA) as main independent variable.

In these specifications, I also use other controls typically employed in studies of alliance governance form. Five dummy variables were constructed in order to indicate whether an alliance included research, marketing, manufacturing, supply and licensing activities (*RESEARCH, MANUFACT, MARKET, SUPPLY, LICENS,* respectively). Three dummy variables were employed to denote if partners operated in the same industry, same geographical areas, or if the geographical scope of the alliance was supranational (*SAMEIND*, *SAMESTATE, SUPRANATION*). I also control for the level of partner uncertainty by computing the number of alliances between the two firms during the previous five years (*PRIORALL)*. To control for the effect of firm size and profitability I include the

variables AVGASSET and AVGROA, computed as the average of partners total book assets and return on assets, respectively. Similarly, RASSET represents the partners relative assets, computed as the ratio of the smaller firm's total assets over the larger firm's total assets. In order to control for potential costs arising from capability gaps among partners, I include the variable RDGAP, computed as the absolute difference between firms R&D intensity. A series of dummy variables are also included to account for the SIC code of the alliance, with industrial codes being reclassified according to Fama and French's twelve industries classification. Finally, yearly dummies capture any time effects in the choice of particular governance forms.

In the interest of space and clarity, I do not report correlation matrices for the variables in the models presented above, because my data is structured into several distinct datasets and hence doing so would require multiple tables. Overall, correlations were relatively low, thus suggesting that multicollinearity was not a concern with the data. Nonetheless, some interesting correlations exist among the independent variables. For example, the focal firm's leverage (LEV) is positively correlated (r = 0.199) with partner's leverage (PLEV), while it shows a negative correlation (r = -0.113) with partner quality (PQ). Moreover, both partners' leverage is positively associated with the presence of a JV (r= 0.195 and 0.180 for LEV and PLEV, respectively). These coefficients provide some preliminary support for my arguments as they suggest that the main variables considered in the present analysis are significantly related in a way consistent with the direction proposed by my hypotheses.

4.4. Results

Preliminary analysis

Before discussing the results of my formal hypothesis tests, I present some preliminary analyses in Table 8, which highlight noteworthy patterns in the data that are consistent with the proposed hypotheses. My primary argument is that high leverage makes a firm a less attractive alliance partner. An ideal test of this argument would involve analyzing not only the leverage levels of partners among alliances that were actually formed, but also among pairs of firms which *did not enter* into alliances, potentially because leverage levels or high differences in levels of leverage made the alliance unattractive. If this hypothesis is correct, then firms with high levels of leverage as well as potential alliance pairings with high

differences in leverage will systematically fall out of my sample of allied firms. This introduces a form of truncation, since the distribution of both observed partners' leverage and differences in leverage is truncated from above and is predominantly observed below a certain threshold. As such, for some of my dependent variables (for example partner leverage in equation 1), my estimates are likely to be understated, and thus the results of the hypotheses tests from the related models are likely to be conservatively biased due to the truncation[20]. That is, if alliances among firms characterized by high levels of leverage were more common, then the inclusion of those observations in my sample would strengthen my estimates of the impact of firm leverage on partner leverage.

To address the possibility that observed alliances are biased towards firms with lower leverage, I compare the absolute differences in partners leverage among observed alliance pairs with absolute differences from a sample of matched random pairs of firms drawn from Compustat. For each observed alliance in the sample, I construct a random pair of firms from the same Fama-French industries in that year. This matched sample controls for industry and year effects and is representative of a population of alliances that might have potentially occurred if counterpart leverage did not matter. If leverage did not affect alliance formation, then there should be no significant difference in leverage between observed alliances and random pairings. Panel A of Table 1 reports the difference in leverage between allied pairs of firms and matched random pairings. Consistent with my arguments, in the sample of observed alliances the average difference in partners leverage is 15.9 percent, while the difference in the sample of random pairings is 22.1 percent, and a t-test confirms that the difference between the sample means is highly significant ($p<0.001$). Unreported Wilcoxon and binomial sign tests confirm that results are not driven by outliers. Aside from addressing self-selection bias, this preliminary evidence also tentatively corroborates the argument that when a firm looks for alliance partners, it tends to match with counter-parts possessing similar levels of leverage. Thus it appears lower levered firms systematically partner with each other, while high leverage firms are possibly constrained to partner with other high levered firms.

In Panel B of Table 8 I show a similar pattern *within* the observed sample of alliances. I divide all 11,112 firms in my sample into three groups according to observed percentiles of leverage, and then for each group I compute the mean and median value of the partners

[20] Hausman and Wise (1977) emphasize that OLS applied to a sample truncated from above generally produces estimators biased toward zero.

Tobin's *q* and leverage. For firms with the lower observed leverage (0-33 percentiles) the median level of partners Tobin's q and leverage are 2.44 and 4.1 percent, respectively. Conversely, for firms with the highest observed leverage (66-99 percentiles) the median partners Tobin's q drops to 1.73, while average level of partner leverage rises to 12.5 percent. These statistics are again consistent with my first argument that highly levered firms are less attractive partners and that they tend to form alliances with partners characterized by higher leverage as well as lower quality, thus supporting hypotheses 1-2.

Finally, Panels C and D provide insight into the extent to which a firm's leverage determines the choice of governance form in an alliance. For Panel C, I first compute the median leverage for all firms in the Compustat population, and then compared the number of alliances formed by firms above and below the median. I divide the sample according to the level of leverage of the first partner listed in the alliance, as it appears on SDC[21]. Results show that more highly leveraged firms are substantially less likely to form alliances, even though some research has suggested they may have a greater need to form alliances under some circumstances (Patzelt et al. 2008). Furthermore, 24.6% of alliances involving a highly leveraged firm were structured as a JV, whereas only 9.2% of alliances involving a low leveraged firm were structured as JVs. This difference of 15.4% is also highly statistically significant ($p<0.001$).

Panel D examines how the *difference* in leverage across the two alliance partners relates to the likelihood that an alliance will be structured as a JV. I divide alliances into three groups according to observed percentiles of the absolute differences in leverage. JVs appear to be more likely for alliances characterized by relatively higher differences in leverage, increasing from 8.5% when the difference is relatively small to 18.1% when the difference is relatively large. The results of Panels C and D are consistent with the argument that when a firm has high leverage, an alliance is more likely to involve equity as a form of protection and safeguard for lower levered firms. The overall patterns of Table 8 are also consistent with the general argument that firms pay attention to the financial health of alliance partners, and that they structure their transactions in the market for collaboration accordingly.

[21] Results are qualitatively unchanged when the second partner is considered.

Table 8. Preliminary analysis

Panel A: Comparison of differences in leverage

Variable	Mean Value		t(diff.)	p-value
	Alliances	Non-alliances		
|Δ Leverage|	0.15927	0.22190	-14.6268	<0.001

n = 4030

Panel B: Focal firm leverage and characteristics of partners

Percentiles of leverage	Mean		Median	
	Partner Leverage	Partner Q	Partner Leverage	Partner Q
0-33	0.110	4.36	0.041	2.44
33-66	0.131	3.85	0.058	2.31
66-99	0.195	2.80	0.125	1.73

n = 11,112

Panel C: Joint ventures activity across levels of focal firm's leverage

Focal Firm leverage	Total alliances	JVs	Percent of JVs
Below the median	4167	385	9.24
Above the median	1389	342	24.62
All observations	5556	727	13.08

Panel D: Joint venture activity across levels of |Δ Leverage|

Percentiles of |Δ Leverage|	Perc. of JVs
0-33	8.53
33-66	12.76
66-99	18.10

Before presenting my regression results, I discuss some alternative explanations that may motivate patterns of leverage among allying firms. Perhaps, the underlying issue could be not whether leverage matters, but what factors influence leverage which in turn also impact

partner attractiveness and alliance deals. For instance, prior research suggests leverage is negatively related to innovation as the latter produces mostly intangible assets with low collateral value (Simerly and Li, 2000; Vicente-Lorente, 2001). Hence, one potential alternative explanation could simply be that my results are reflecting highly innovative firms partnering with other highly innovative firms, rather than matching due to leverage. However, high-innovation/high-leverage firms are not unusual. To examine these issues, I divide the sample of firms into 4 cells according to two dimensions: firms with high/low R&D and firms with high/low leverage. High (low) R&D firms are defined as firms that have R&D intensity greater (lower) than the overall Compustat population median. Similarly, I define categories for high/low leverage based on Compustat median values. After defining the 4 categories, next I randomly chose one partner (the first listed partner in SDC) and examined the leverage/R&D distribution of these firms. When considering the first listed partner in the alliance, it appears that 81 percent of my sample of alliances involves high R&D firms. It is noteworthy that amongst these firms, almost 19 percent have above median leverage. Moreover, if innovation explained my results, leverage should make no difference to the alliances of R&D intensive firms, and the chances of an equity JV should be roughly the same irrespective of whether a high R&D firm has low leverage or high leverage. However, while high R&D-low leverage firms form JVs in only 5.3 percent of the cases, this fraction increases to 12.1 percent for high R&D-high leverage firms. This pattern cannot be explained by R&D intensity and it is consistent with the idea that high leverage also introduces further hazards in the alliance[22].

Alternatively, it could also be argued that highly levered firms tend partner with lowly levered ones quite often as a result of resource considerations, thus violating my proposed matching among partners characterized by similar leverage. For instance, in biotech-pharma alliances, while the biotech firm's intangible assets may prevent it from adopting higher leverage, the pharma partner can usually take on significant amounts of debt due to its greater tangible assets and cash flows (Gopalakrishnan et al. 2008). Accordingly, most alliances should occur between firms possessing very different levels of leverage (due to their different underlying assets), while alliances between firms with similar leverage (high-high or low-low) should be less common. Again, the results in Panel A of Table 8 are

[22] Chances of a JV also increase after taking into account alliance partner level of innovativeness. For example, when considering only alliances involving two high R&D firms, chances of a JV increase from 4.5 percent for low leverage firms to 10.5 percent for high leverage firms.

inconsistent with this explanation, as observed differences in partners leverage are systematically smaller (and not greater) than differences computed for random pairs.

Regression results

Table 9 presents the results from the hierarchical regression models that were used to test hypotheses 1 and 2. Note that while Table 8 is based on all 5556 observed alliances for which both partners leverage and Tobin's *q* figures are available, the results in Tables 9 and 10 are based on a reduced sample of 4220 alliances due to a loss in observations because of missing data for other controls and independent variables. In column 1 of Table 9 the dependent variable is partner leverage (PLEV), and in column 2 the dependent variable is partner quality (PQ). The likelihood ratio tests confirm that in both models the inclusion of a random intercept for each focal firm offers significant improvement over a linear regression model with fixed effects ($p<0.001$). Hypothesis 1 predicts that firms will tend to form alliances with partners possessing similar levels of leverage. Consistent with hypothesis 1, column 1 reveals that firm leverage (LEV) is positively related to partner leverage ($p<0.001$). Thus, the higher (lower) a focal firms leverage, the higher (lower) the levels of leverage of its counter-parts.

The second column of Table 9 tests hypothesis 2, which argued that alliances with highly levered firms entail significant risks for good quality firms looking to derive valuable synergies. Thus, good quality firms tend to avoid high leverage partners and, all else being equal, the latter are constrained to partner with firms of relatively lower quality. Consistent with this argument, the coefficient on the variable LEV is negative and significant at the $p<0.05$ level, implying that higher leverage for a firm generally translates into lower quality alliance partners. In terms of controls in model (1), at the focal firm level the variable LASSETS showed a significant and negative impact on partner leverage, suggesting that bigger firms tend to avoid high leverage firms, possibly by virtue of their wider choice of alliance partners. Conversely, the positive and significant coefficient on ROA indicates that high leverage partners in the sample also tend to match with more profitable firms, possibly because of the latter's readily available financial resources. Results in model (2) indicate that at the focal firm level, higher Q firms tend to partner with other high quality partners. Similarly, bigger firms also tend to partner with high Q firms, possibly in order to access the latter's growth opportunities. In addition, R&D intensive firm (which may possess higher

growth opportunities) appear to look for partners characterized by lower levels of Q in order to access their tangible assets in place. Similarly, after controlling for the effect of Q, more profitable firms also tend to partner with lower quality firms, potentially for access to assets in place.

Table 9. Hierarchical Models for Partner's Leverage and Partner's Quality

	(1)	(2)
Dependent Variable:	PLEV	PQ
Partner variables		
PLEV	_	-6.443***
		(0.282)
PQ*	-0.00875***	_
	(0.000395)	
PRD*	-0.384***	3.052***
	(0.0175)	(0.475)
PLASSETS	0.0239***	-0.147***
	(0.000697)	(0.0197)
PROA*	-0.240***	0.338
	(0.00793)	(0.222)
Focal firm variables		
LEV	0.158***	-0.684*
	(0.0130)	(0.314)
Q*	-0.000189	0.233***
	(0.000457)	(0.0112)
RD*	0.00899	-2.179***
	(0.0201)	(0.351)
LASSETS	-0.00547***	0.129***
	(0.00107)	(0.0230)
ROA*	0.0458***	-1.194***
	(0.00930)	(0.229)
Intercept	0.0469***	3.773***
	(0.00961)	(0.225)
N	8440	8440
Groups	2074	2074
Avg. n. of obs per group	4.1	4.1

Standard errors in parentheses $^{+}$ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Table 10 reports results from the hierarchical logit models used to test the impact of leverage on the choice of governance form. In hypothesis 3 I argued that alliance partners are more likely to opt for the added protections afforded by a JV when the partners are highly levered. The positive and significant ($p<0.001$) coefficients on the variables LEV and PLEV in model 1 of Table 10 support this hypothesis. Hypothesis 4 further argues that the costs of allying with a high leverage firm can be especially high for low leverage counter-parts, and thus alliances characterized by greater difference among partners' leverage are more likely to take the form of a JV. In model 2 I test this prediction by including the absolute difference between partners' leverage (DELTA). As expected, the coefficient on this variable is positive and significant ($p<0.001$), supporting hypothesis 4. As a robustness check, I also estimate this model with a standard (i.e. non-hierarchical) logit model computed for the sample of 4220 alliances and results are qualitatively unchanged. In terms of the controls, most of the coefficients on the dummies accounting for the activities involved in the collaboration (RESEARCH, AMNUFACT, SUPPLY, LICENS) and the coefficients on the variable SUPRANATION and SAMEIND mirror previous studies on alliance governance (Casciaro, 2003; Pisano et al., 1988; Oxley, 1997; Oxley and Sampson, 2004). However, the variable MARKET was found to have a negative impact in my study, while extant literature finds no significant effect. Similarly, the variables SAMESTATE had no significant effect in my analysis, while extant literature documents a significant negative relationship (Oxley and Sampson, 2004). The coefficient on the variable PRIORALL is consistent with studies showing that partner with repeated ties tend to adopt more complex contractual forms of governance (Van de Vrande et al., 2009; Oxley and Sampson, 2004; Casciaro, 2003). The negative impact of RDGAP mirrors Kogut and Chang (1991) and suggests firms with similar levels of sophisticated technological capabilities adopt equity JVs, potentially to share surplus related to the knowledge generated. Both AVGASSET and RASSET appear to have a significant positive influence, while previous studies report conflicting findings (Oxley, 1997).

Table 10. Hierarchical Logit Models for Governance Choice (JV)

	(1)	(2)
RESEARCH	-0.155	-0.224^{+}
	(0.120)	(0.119)
MANUFACTUR	1.472***	1.520***
	(0.115)	(0.115)
MARKET	-0.283*	-0.341**
	(0.118)	(0.118)
SUPPLY	-1.962***	-1.842***
	(0.396)	(0.395)
LICENSING	-2.266***	-2.335***
	(0.204)	(0.203)
SUPRANATION	-1.366***	-1.394***
	(0.227)	(0.228)
SAMESTATE	0.131	0.137
	(0.127)	(0.126)
SAMEIND	-0.235^{+}	-0.195
	(0.133)	(0.131)
PRIORALL	0.484***	0.512***
	(0.138)	(0.137)
AVGASSET	6.64e-08	6.30e-06**
	(2.07e-06)	(1.95e-06)
RASSET	0.747***	0.805***
	(0.186)	(0.185)
RDGAP	-0.920^{+}	-1.422**
	(0.482)	(0.502)
AVGROA	0.415	-0.0156
	(0.493)	(0.472)
LEV	1.946***	
	(0.276)	
PLEV	1.722***	
	(0.283)	
DELTA		1.044***
		(0.298)
Intercept	-4.099***	-3.890***
	(0.423)	(0.428)
N	8440	8440
Groups	2074	2074
Avg. n. of obs per group	4.1	4.1

Standard errors in parentheses $^{+}$ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

4.5. Conclusions

In this chapter, I have shown that financial health and leverage are important considerations in selecting alliance partners. In particular, it has been argued that highly levered partners are less attractive in the context of an alliance for multiple reasons. First, highly leveraged partners are more prone to liquidation and bankruptcy risks, and thus they expose the alliance (and all investments involved) to the threat of unplanned termination, potentially even despite the firm's best intentions. Second, I have also argued that even when liquidation is not imminent, highly levered firms have incentives to 'default' on their implicit claims and reduce their efforts towards the alliance. Finally a high leverage firm facing financial distress may threaten to prematurely terminate an alliance in order to obtain more favorable terms. Rational firms will anticipate these risks and hence will evaluate each other's level of leverage when structuring transactions in the market for collaboration.

Using a large sample of strategic alliances, I found several empirical patterns consistent with this theoretical framework. The first part of the analysis clearly suggests that counter-parts' leverage is critical during the process of partner selection. A 'double sided matching' of leverage levels emerges, whereby low leverage firms partner with other low leverage firms and high leverage firms seem to be constrained to partner with other high leverage firms. Similarly, I also find that after controlling for partner resources, highly levered firms tend to ally with relatively lower quality counter-parts. These findings provide additional insight to recent works applying the 'theory of marriage' to the context of the market for collaboration (Rodhes-Kropf and Robinson 2008). This literature shows that firms tend to acquire targets possessing similar levels of resource quality, and that this matching occurs in order to minimize the costs of *ex post* integration while maximizing value. My results show that in the context of alliances, partner attractiveness is not determined exclusively by its resource endowments but also by its financial health, as firms appear to take into account both aspects when scanning for potential partners.

The second part of the analysis reveals an important link between firm leverage and the choice of governance form in alliances. The findings show that leverage increases the probability of an alliance being structured as a JV. Equally interestingly, JVs appear to be more likely in the presence of greater difference among partners' leverage. Stakeholder

theories of capital structure point out that high leverage makes firms less attractive transacting partners without suggesting any *ex post* mechanisms to mitigate concerns related to capital structure decisions. In this respect, the evidence provided has important implications because it highlights the importance of governance structures as an *ex post* contractual solution to such a situation. Leveraged firms can adopt equity in order to support their exchanges in the face of termination risks. Thus, equity-based governance induces relation specific investments not only by aligning incentives through shared surplus, but also by providing an enforceable mechanism to mitigate the hazards posed by high leverage partners.

The findings of this chapter also have interesting implications for research analyzing alliance governance from a transaction cost perspective and from a real option perspective. From a transaction cost view, the analysis shows that leverage is a critical source of relational uncertainty at the transaction level. Thus, in contrast to work that has explained governance choices by looking only at appropriability hazards (e.g. Pisano, 1989), my analysis calls for a broader view by showing that some exchange hazards may also arise from firm-level characteristics such as leverage which may lead to the adoption of equity governance. From a real options perspective, the results provide additional insight into the 'dueling options' often inherent in the tradeoff between flexibility and commitment (Folta and O'Brien, 2004). According to real options logic, firms value flexibility when faced with high uncertainty (Steensma and Corley 2001, Santoro and McGill 2005, Cuypers and Martin, 2007; Tong Reuer and Peng 2008). Thus, they prefer less hierarchical governance modes in order to avoid the opportunity costs of irreversible investments in a shared venture. However, my analysis suggests that firms may be willing to commit to a more hierarchical form when faced with uncertainty arising from a partner's bankruptcy risks. By increasing barriers to exit with a JV structure, a firm mitigates the uncertainty associated with a leveraged partner as any potential scaling back of commitment from the relationship becomes more expensive. Although this sacrifices the deferment option, it also provides the low leverage firm with the option to take on the venture in the event of unplanned termination by the partner. As a result, although it comes with an *ex ante* cost, this lack of flexibility reduces *ex post* sunk costs much more effectively as compared to a non-equity agreement in the presence of a high leverage firm.

Finally, the analysis conducted in this chapter also opens some avenues for future research. First, an important limitation of the study is that I only analyzed the negative aspects of

partner leverage. To a certain extent, I overcome this limitation when I show that high leverage firms offer equity participations as a form of commitment towards the alliance in order to attract better partners. However, there may be also other benefits associated with highly levered partners. Extant literature suggests that financially constrained (*i.e.*, highly levered) firms are more prone to form alliances in order to develop projects that they would not be able to pursue independently (Patzelt et al. 2008, Lerner et al. 2003). Thus, while bringing instability, leverage could also force firms to externalize valuable projects that would be otherwise lost, and non-levered firms may be able to capitalize upon these opportunities. Future work could study the circumstances under which this may happen, such as how the liquidity of the market impacts alliancing behavior. Second, in this chapter I focused on the implications of firm's leverage in terms of partner selection and alliance governance choice. Another interesting avenue for future research could be to analyze whether bankruptcy risks influence other contractual characteristics of alliances as well. For example, firms allying with highly levered counterparts may prefer agreements with a predetermined duration or with a limited scope in order to limit the dependence on the counterpart. While lack of detailed data on my sample of alliances prevented the study of these issues, future research on these topics could prove highly insightful.

CHAPTER 5

FINANCIAL SLACK, ALLIANCE PORTFOLIO DIVERSITY, AND FIRM FINANCIAL PERFORMANCE

5.1. Introduction

The analysis conducted in Chapter 4 clearly suggests that a firm's capital structure decisions are critical during the alliance making process, as they can be a source of risks and costs for alliance partners. Accordingly, I documented a strong empirical relationship between a firm's leverage and its choices in terms of alliance partner selection and alliance governance. In this chapter I further extend this theoretical framework and consider the implications of a firm's financing decisions during the implementation and coordination of alliances. More specifically, in line with other studies focusing on this phase of the alliance making process, I analyze whether capital structure decisions hinder or facilitate a firm's ability to implement its overall alliance strategy. Therefore, the focus of this last part of the thesis is to study whether a consistent matching between financing policies and alliance strategies represents a source of competitive advantage, which helps firms improving their overall financial performance.

In order to pursue this general goal I build on two additional streams of literature that have not been reviewed in previous chapters. First, I build on prior research that has extensively noted that a firm's capital structure is a key determinant of its financial slack, (Bourgeois, 1981; Bromiley, 1991). Generally speaking, slack comprises those resources in excess of what is strictly necessary to maintain the regular operations of a firm (Bourgeois, 1981). Financial slack in particular refers to the existence of financial resources potentially

available to the firm in the form of unused borrowing capacity. These resources significantly influence both the ability of managers to make or maintain discretionary strategic investments (Jensen, 1986; Stearns & Mizruchi, 1993), as well as the governance of those investments (David, O'Brien and Yoshikawa, 2008). Hence, according to this view capital structure decisions are "among the most important decisions that managers make" (Mizruchi & Stearns, 1994: 118). In this chapter I build on this stream and explore the consequences of financial slack availability (and thus of capital structure) in the context of strategic alliances management. In doing so, I also consider other forms of slack not directly linked to capital structure decision, such as cash reserves and liquid short-term assets.

Second, to study the performance implications of alliances I also follow previous research that concentrated on alliance portfolios, rather than on individual alliances. Indeed, today many firms get involved into multiple ongoing alliances and face the challenge of managing these relationships simultaneously (Hoffman, 2005). Previous literature traditionally adopted a dyadic view while analyzing the formation, implementation and performance of individual alliances (Kale et al. 2002). However, due to the existence of synergies and interdependencies between ongoing relationships, managing multiple alliances goes beyond the mere realization of each alliance's individual goals (Hoffman, 2005; Vasudeva and Anand, 2011). Accordingly, in this part of the analysis I study the performance consequences of alliance portfolios – defined as a firm's collection of direct alliances with other partners (Lavie, 2007). This choice is also in line with my focus on capital structure. Indeed, financing choices represent a firm-level policy, and, as such, the risks they imply are likely to influence not only individual dyads, but also the overall set of alliances formed by a firm. Accordingly, in order to analyze the interplay between capital structure decisions and alliance strategies in determining firm performance a firm-level unit of analysis is warranted.

Research on alliance portfolios focuses on the structural properties of alliance portfolios and analyzes their impact on firm performance (Hoffman 2005; Lavie and Miller, 2008; Jiang et al. 2010; Mouri et al. 2011; Vasudeva and Anand, 2011; Ozcan and Eisenhardt, 2006). In this research context, alliance portfolio diversity has been proposed as one of the most important aspects to consider. The notion of diversity refers to the degree of variance in the characteristics of a firm's alliance partners (Jiang et al., 2010). On the one hand, a more diverse portfolio is certainly beneficial, as it provides the firm with access to non-redundant information and a wider array of complementary resources and capabilities. On the other hand, greater diversity has also drawbacks, because it increases costs by making

coordination of production activities more difficult. Accordingly, extant research investigated the performance consequences of diversity and found a non-monotonic relationship between alliance portfolio partner diversity and firm financial performance (Goerzen and Beamish, 2005; Jiang et al. 2010; Lavie and Miller, 2008). Nonetheless, some important aspects of partner diversity still remain unaddressed.

While extant research shows that partner diversity can be either beneficial as well as value destroying, it pays relatively little attention to the question of how a firm should govern this aspect of alliances in order to maximize value. This is an important question as empirical evidence shows that most firms seem to face mainly the costs of partner diversity, while not being able to fully realize the synergies between different alliances (Goerzen and Beamish, 2005; Jiang et al. 2010). Moreover, research also lends support for the idea that the ability to manage a portfolio of alliances critically depends on the existence of cognitive limits within the firm and the availability of proper resources and tools (Goerzen and Beamish, 2005; Oerlemans et al., 2013). Accordingly, not all firms should benefit to the same extent from a given level of portfolio diversity. For these reasons, it has been suggested that in order to better understand the performance implications of alliance portfolios a contingency perspective is needed, wherein firms have to consider how portfolio characteristics fit their internal and external environment (Oerlemans et al., 2013; Yamakawa et al. 2011; Cui and O'Connor, 2012; Heimeriks et al., 2009). The research presented in this chapter answers to this call and analyzes how firms can leverage their internal organizational resources in order to face the various challenges posed by growing diversity in their alliances portfolio. More specifically, I focus on one trait of alliance portfolio – its degree of partner diversity – and I show (and find) that its final impact on financial performance is critically moderated by the presence of financial slack. Therefore, the analysis seeks answers to the following research question:

(i) Does financial slack (and thus, capital structure decisions) influence a firm's ability to manage diversity within a portfolio of alliances?

Extant research suggests that the presence of slack buffers the firm from internal pressures as well as from changes in the external environment, thus impacting firm's strategic behavior in various ways (Cyert and March, 1963; Bourgeois, 1981; Nohria and Gulati, 1996). However, while the role of slack has been shown in a variety of contexts – such as innovation, managers' risk taking, internationalization, and diversification (Huan and Chen, 2010; Chen

et al., 2013; George, 2005; Lin, Cheng, and Lie, 2009; Bromiley, 1991) – it has never been explored in the context of alliance portfolio management. This gap is particularly relevant, given that internal resources availability should be critical during the implementation of such a strategy. For instance, Gary (2005) shows that the presence of slack within the firm is important not only to motivate but also to implement any strategy based on the realization of synergies, such diversification.

In this chapter I aim at filing this vacuum and explicitly analyze the role of slack resources during the implementation of an alliance portfolio strategy. In particular, I analyze how the availability of slack influences the relationship between alliance partner diversity and firm financial performance. In this respect, the main argument proposed is that slack can act as a double-edged sword when managing a portfolio of alliances. On the one hand, slack can be beneficial because it acts as a buffer against the heavy coordination costs related to partner diversity and provides the firm with greater flexibility to invest across different alliances and realize synergies. On the other hand, slack entails costs that could be exacerbated in the context of a diversified alliance portfolio, as activities become difficult to monitor and managers may have incentives to divert part of these resources to unproductive uses. Accordingly, I propose that the impact of slack shall depend on the level of discretion over its use by managers, and, ultimately, on the type of slack considered. I suggest that, while low-discretion financial slack in the form of unused borrowing capacity provides additional resources that facilitate the management of diversity within the portfolio, high discretion available slack (in the form of cash reserves) has the opposite effect, because it is more prone to inefficient allocation by managers. Nonetheless, I further argue that available slack still has some potential benefits with respect to portfolio management that could be unleashed in the presence of appropriate corporate governance tools to curb managers' self-interest. Thus, I also focus on financial leverage (which is the inverse of low discretion financial slack) as one of such mechanisms, given its ability to discipline managers (Jensen, 1986). Accordingly, it is further argued that when available slack is combined with the discipline brought about by higher leverage the former's negative effects will be mitigated.

Empirical analysis on a sample of firms operating in the automobile industry provides large support for the proposed hypotheses. The findings confirm that financial slack significantly moderates the relationship between alliance partner diversity and firm financial performance. I also find that this impact differs across different slack types. In particular, while low discretion financial slack positively moderates the relation between portfolio diversity and

financial performance, high discretion slack, in the form of cash reserves, has a negative moderating effect. Moreover, when high discretion slack is combined with the discipline and corporate governance associated with financial leverage this negative tendency is curbed, as there is a positive three-way interaction between diversity, leverage and high discretion slack. These results generally support the view that the availability of financial slack within the firm is a critical dimension to understand how its alliance portfolio strategy contributes to financial performance.

The findings of this chapter make several important contributions. First, they contribute to alliance portfolio research by showing that a firm policies related to slack retention or absorption critically impact its ability to extract value from a diverse pool of alliance partners. Previous studies have shown the moderating effect of factors such as alliance experience (Duysters et al., 2012), the existence of a dedicated alliance function (Cui and O'Connor, 2012) or the adoption of technology management tools (Oerlemans et al., 2013). I add to this stream of literature by proposing financial slack as another important contingent factor that needs to be considered when analyzing the performance implications of alliance portfolios. Second, the analysis conducted also contributes to the literature on slack. Extant perspectives have looked at the consequences of slack within firm boundaries, for instance by analyzing its importance during the implementation of strategies such as internationalization or internal technological diversification (Lin, Cheng, and Liu, 2009; Huang and Chen, 2010). In this chapter, I extend this stream of literature by looking at the role of slack outside firm boundaries and by demonstrating it holds important consequences also when the firm alliancing activity with external partners is considered. In a related vein, I also add to the contingency perspective on slack (Tan and Peng, 2003) by analyzing the different mechanisms through which low and high discretion slack influence a firm's ability to manage partner diversity in its alliance portfolio.

The chapter is structured as follows. Section 5.2 discusses the theoretical background of the study by reviewing relevant organizational slack research and alliance portfolio research. Research hypotheses are developed in section 5.3. Section 5.4 describes the research methodology employed to test the proposed theoretical arguments, while section 5.5 summarizes the empirical findings of the study. Finally, conclusions and directions for future research are discussed in section 5.6.

5.2. Theoretical background

Partner diversity and financial performance

Partner diversity generally refers to the heterogeneity in the resources possessed by alliance partners (Jiang et al., 2010). Consistently with this definition, extant research has generally referred to this aspect of diversity by looking at the extent to which a firm forms alliances with partners from different industries (Jiang et al., 2010; Cui and O'Connor, 2012). As accessing complementary resources held by other firms is a major driver of alliance formation, research has shown that greater variety in partner resources provides the firm with several benefits. A broader reach in available external resources helps the firm access to less redundant information on current technologies, best practices and market trends, as well as to a broader set of complementary assets from which to draw upon. This helps the firm to leverage its internal resources more effectively while enhancing strategic flexibility, as it can maintain multiple options open and postpone the decision to invest organically (Goerzen and Beamish, 2005). Greater partner diversity also helps tapping into multiple sources of knowledge and learning opportunities. In this regard, several studies have suggested that by combining heterogeneous knowledge gained from different alliances firms stimulate learning and creativity, which in turn positively affects innovation (Cui and O'Connor, 2012).

These benefits notwithstanding, partner diversity also has costs. Partners from different industries could have very different albeit conflicting goals, while competing for the same scarce organizational resources within the firm (Goerzen and Beamish, 2005). Moreover, as a result of their different industrial contexts and competitive environments, partners could possess very different routines and managerial practices that need to be aligned with those of the focal firm (Jiang et al, 2010). Thus, as the firm starts forming alliances with partners in related and unrelated industries more complexity is brought into the organization, which makes it more difficult to coordinate alliance activities with the firm internal operations. For these reasons, partner diversity entails substantial transaction costs and may result in unwieldy managerial structures that breed inefficiency (Goerzen and Beamish, 2005).

Extant research provides support for the idea that the costs of partner diversity arise immediately as the firm starts collaborating with different partners and may initially offset

the associated benefits (Goerzen and Beamish, 2005; Jiang et al. 2010). However, as the firm becomes more experienced in dealing with such costs and learning and knowledge sharing across alliances accumulate within the firm, a minimum threshold of diversity is reached, after which the marginal benefits of further diversity increase. In support of these points many studies report a U-shaped relation between partner diversity and firm financial performance (Jiang et al., 2010; Goerzaen and Beamish, 2005). These results imply that only very few firms are able to enjoy the benefits of a resource-diversified portfolio of alliances (i.e. those at the far end of diversity), while firms "stuck" at low or moderate levels of diversity experience declines in financial performance. This evidence also corroborates previous findings on alliance experience and alliance management capability that found that firms "learn" how to manage alliances by repeatedly engaging in multiple relationships over time (Duysters et al., 2012; Rothaermel and Deeds, 2006).

While these studies find compelling support for the benefits and costs associated with partner diversity, extant research is relatively silent as to whether and how managerial policies and decision-making can influence such a relationship. This is an important gap because many firms start diversifying their alliance portfolio but fail to reap economic benefits from such a strategic move (Goerzen and Beamish, 2005; Cui et al., 2012; Jiang et al. 2010). Moreover, as a result of their different capabilities and internal resources, firms may systematically differ in their ability to deal with partner diversity (Kale et al. 2002). Following these arguments, recent studies call for a contingency perspective and argue that in order to better understand the performance implications of alliance portfolios, research needs also to consider how portfolio characteristics fit the firm's internal and external environment (Oerlemans et al., 2013; Yamakawa et al. 2011; Cui and O'Connor, 2012). For instance, Oerlemans et al. (2013) analyze how the adoption of technology management tools moderates the relation between alliance portfolio diversity and firm innovation. Their findings show that by using such tools, which are a form of alliance management capability, firms mitigate the negative side of higher diversity in their alliances. Similarly, Cui and O'Connor (2012) suggest that firms with more alliance experience are better able to facilitate information and knowledge sharing across alliances in different functional domains and they find that alliance experience positively moderates the relation between functional diversity and innovation performance. Taken together, these insights suggest that firm level characteristics significantly influence the extent to which a firm is able to extract value from

its alliance portfolio, and that untangling these mechanisms represents a major gap in extant literature.

Organizational slack and firm performance

Organizational slack is defined as that cushion of resources in excess of what is required to maintain an organization's normal operations (Bourgeois, 1981). As these resources are not strictly necessary to sustain firm activities, research scholars have long questioned their existence and different theories have been applied to understand the impact of slack resources on firm outcomes. Organizational theories study the effect of slack adopting either a resource-based view or the behavioral theory of the firm. Economic theories include resource constraint theory and agency theory.

Generally speaking, organization theory proposes that slack has a positive influence on organizations. Resource-based theorists suggest that firms need resources to obtain a sustainable competitive advantage. Firms deploy their resource endowments to respond to new opportunities as well as to environmental threats, and their ability to do so varies with each firm's availability of resources. As resources are unevenly distributed across firms, this view would predict that firms characterized by abundant resources should have greater opportunities to build a competitive advantage (Eisenhardt and Schoonhoven, 1996).

In a related fashion, the behavioral theory (Cyert and March, 1963) considers firm managers as sitting at a nexus of relationships with coalitions bargaining with each other for the realization of their own agendas and the allocation of scarce resources. Accordingly, this stream of research has shown that slack buffers a firm's operations from internal pressures, as it helps retaining key internal stakeholders while mitigating conflicts among different stakeholders groups within the firm (Cyert and March, 1963). At the same time, slack has been shown to insulate the firm from hostile changes in the external environments and to allow commitment on risky investments, which would not be approved in the face of scarcity (Cyert and March, 1963; Bourgeois, 1981). In support of this point several studies find that slack is positively associated with investments in innovation (Norhia and Gulati, 1996) and risk taking (Singh, 1986). Similarly, Lin, Cheng and Liu (2009) show that managers of firms possessing a cushion of excess resources are more prone to pursue internationalization strategies, which require investments in less familiar foreign markets.

On the other hand, economic theory challenges this notion by pointing out that the existence of slack may breed inefficiencies. Resource constraints theory points out that the availability of resources alters the behavior of managers and the way firm resources are deployed (George, 2005; Lin, Cheng and Liu, 2009). Managers facing constraints may perceive a higher opportunity cost for their stock of available resources and they have incentives to use them more cautiously as compered to managers of firms with abundant resource endowment. Cyert and March (1963) suggested a similar argument by proposing that – due to the existence of cognitive limits and bounded rationality – search is likely to be more intense where slack is scarce, while where it is abundant managers are more likely to satisficing. Agency theory further support these arguments by suggesting that, since managers and firm owners typically possess divergent goals, managers may divert slack resources away from productive uses in order to pursue self-aggrandizing and private benefits (Jensen, 1986). Taken together, studies grounded on economic theories suggest that firm should keep slack as low as possible, as managers with fewer resources at their disposal are more likely to use them effectively.

Empirical evidence on the impact of slack on firm performance is mixed (Daniel et al., 2004). Consistently with organization theories, some studies find a positive impact of slack on firm financial performance (Bromiley, 1991). On the other hand, other scholars provide support for the economic view and show that slack has negative consequences for the firm (Tan and Peng, 2003). Empirical research tried to reconcile these contrasting evidences in several ways. Some scholars noted that slack can be found in various forms within the firm, and argued that each slack type may have different implication for firm outcomes. These scholars have characterized slack according to the level of managerial discretion over its use and differentiated between high discretion (HD) and low discretion (LD) slack (Bourgeois, 1981; Bourgeois and Singh, 1983). Examples of high discretion slack include cash reserves and receivables, which can be easily allocated to alternative purposes, while low-discretion slack refers to resources not so easy to deploy at a glance such as debt financing, fixed assets and excess capacity (George, 2005). For instance, Tan and Peng (2003) show that while organization theory is more suited to explain the effect of high discretion slack on financial performance, economic arguments are better able to predict the impact of low discretion slack. In contrast, Lin. Cheng and Liu (2009) study slack in the context of firm internationalization and find that high discretion slack engenders managerial self-interest and hinders firm's internationalization strategies while low discretion slack has a positive effect.

On the other hand, other scholars combine both behavioral and economic arguments and find support for a curvilinear relationship between slack and firm performance (Tan and Peng, 2003). Finally, more recent studies analyze the role of external factors, such as the presence of venture capitalists or angel investors, in moderating the slack-performance relationship (Vanacker et al., 2013) Overall, this body of research clearly suggests that there may be an optimal amount of slack for each firm and, more importantly, that it is critical to differentiate between various forms of slack when analyzing its impact on firm performance.

5.3. Hypotheses development

Academic literatures on organizational slack and alliance portfolio management have largely developed independently, leaving room for additional insights resulting from their integration. In this chapter I add to the contingency literature on alliance portfolios and propose organizational slack as an important strategic factor to consider when analyzing the performance implications of partner diversity. Exploring the strategic consequences of slack for alliance portfolios is particularly relevant in light of recent studies showing the importance of internal resources during the implementation of strategies motivated by the realization of synergies, such as diversification moves. For instance, Goerzaen and Beamish (2005) argue that, since building a diversified portfolio of alliance partners consumes managers' time and efforts, the ability of a firm to profit from such a strategy is bounded by its cognitive limits and resource constraints. Similarly, Gary (2005) shows that diversifying into new business increases complexity and results in steeply rising work demands that could easily outstrip the initial available internal resources of a firm. Accordingly, firms pursuing a strategy based on diversification should maintain adequate slack in order to buffer the implied coordination costs and avoid negative performance consequences.

In this chapter, I extend this intuition and propose that slack can play a similar role in the context of an alliance portfolio strategy. Specifically, I suggest slack resources act as a cushion that helps firms buffering the pressures posed by alliance partner diversity, while facilitating the realization of synergies and the pursuit of new growth opportunities. However, I also acknowledge that, when slack is not disposed properly, it generates costs that could be exacerbated in the context of a diversified alliance portfolio. Accordingly, I propose that the ultimate impact of slack should depend on the types of slack considered and the existence of appropriate corporate governance tools. The proposed theoretical arguments

are grounded on organizational theory and economic theory of organizational slack. In an attempt to reconcile and integrate the opposite predictions of these two theoretical strains, I first outline my general arguments on the interaction between slack resources and alliance portfolio diversity. Then, I develop testable hypotheses by distinguishing between two types of slack, namely high discretion and low discretion financial slack. This choice seemed reasonable for several reasons. First, the extent of discretion over slack resources captures more precisely the permanent dimension of slack (George, 2005). Second, extant research suggests that considering the discretionary nature of slack – that is distinguishing between high discretion and low discretion slack – is critical to reconcile the opposing predictions about its impact on firm outcomes (Tan and Peng, 2003). Third, the availability of financial resources has been shown to influence a firm's motivation to seek alliances, as well as its ability to effectively acquire new capabilities through them (Patzelt et al., 2008). Finally, financial slack is a generic and less "sticky" resource, as compared to other forms of slack which are absorbed into the firm's current routines and operations, such as human capital. For this reason they can be more easily allocated throughout the alliance portfolio, while absorbed resources do not provide such a flexibility. As a result, low discretion and high discretion financial slack seemed the most relevant typologies of slack to consider in the context of alliance portfolio management.

Slack resources and alliance portfolio diversity

Organization theory posits that slack is beneficial to the firm. Indeed, as a cushion of excess resources, slack helps smoothing firm's activities by acting as buffer against unexpected turbulences in the firm internal and external environment. Building on this logic, a few studies have recently suggested a link between slack and technological diversity *within* the firm. Greater diversification creates coordination problems among different projects competing for the same scarce organizational resources. In the absence of a cushion of excess resources to buffer these pressures, shared resources could become overextended and the costs of diversity may soon offset the benefits (Gary, 2005). The existence of slack within a firm acts as an internal 'shock absorber' that helps smoothing internal workflow, while reducing conflicts for internal resources. For example, in support of this function of slack Huang and Chen (2010) find that slack positively moderates the relation between technological diversification and innovation performance. Chen et al. (2013) show similar patterns but when firm financial performance is considered.

Extending this reasoning to the context of alliances I argue that slack can play a similar role when a firm simultaneously collaborates with a diverse pool of alliance partners. Greater portfolio diversity increases managerial complexity and may result in steeply rising work demands that overextend firm's internal resources. Managers must devote more time, effort and investments to resolve conflicts among partners and coordinate their activities, while internal resources could be insufficient to put up with these escalating demands. Slack can be easily employed as a buffer to reduce these pressures. Indeed, from a behavioral perspective alliance partners bargain with each other and with other political coalitions inside the firm for internal scarce resources. A cushion of extra resources helps to appease these conflicts, by allowing each alliance to receive adequate resources and progress smoothly towards its own goals. Similarly, holding slack ensures greater resources are allocated to individual projects, which in turn reduces interdependencies (at least general interdependencies) and makes the portfolio less complex to manage (Thompson, 1967; Galbraith, 1974). Finally, firms with more internal resources at their disposal can invest more flexibly across the alliance portfolio and take advantage of new opportunities as they arise.

These benefits notwithstanding, it is also important to acknowledge that portfolio diversity may exacerbate the dark side of slack if the employment of such resources is not disciplined properly. As slack increases, control systems could become lax and self-interested managers may grab a share of the uncommitted spoils to pursue their private goals (Jensen, 1986; Tan and Peng, 2003). The problem of loose control over slack resources is further exacerbated in a diversified portfolio of alliances because partner diversity makes portfolio activities difficult to understand and monitor. Thus, when the firm's strategy involves collaborating with a highly diverse pool of partners managers should have even more room and incentives to divert slack (if present) away from productive uses within the portfolio and allocate it according to their private interests.

Since slack could have opposing effects on a firm's ability to manage partner diversity within the portfolio, I argue that its ultimate impact depends on the extent to which these resources are subject to misallocation by managers, and thus on the typology of slack considered. Low discretional financial slack in the form of unused borrowing capacity represents a potential source of new financial resources that could be easily allocated in order to enhance the alliance portfolio. At the same time this form of slack is less prone to being allocated inefficiently. When funds are raised through debt the firm comes under greater scrutiny by prospective investors. Moreover, since using low-discretion slack may

significantly impact a firm's interest expense, performance, and stock price, managers will carefully scrutinize its allocation (Martinez & Artz, 2006). In support of these points several studies show that maintaining low discretion financial slack in the form of unused debt capacity helps firms sustaining their strategy. For instance, O'Brien (2003) finds that firms with more financial slack have higher R&D intensity and they are more successful in profiting from a strategy based on innovation. In a related vein, Simerly and Li (2000) find that firms operating in highly dynamic environment are more successful when they also keep a cushion of unused debt capacity. Arguably, these studies suggest that low discretion financial slack is beneficial as it can be carefully deployed even when the firm' strategy makes managers resource allocation difficult to monitor (such as in the case of firms competing on the base of innovation or in rapidly changing environments). Therefore, in line with these studies, I argue that low discretion financial slack is more likely to be deployed effectively across the alliance portfolio, and that its overall effect is to magnify the positive effects of partner diversity while minimizing its costs.

> *H1. Low discretion financial slack positively moderates the relationship between partner diversity and firm financial performance.*

While low discretion financial slack represents a more disciplined form of slack that can be effectively allocated across the alliance portfolio, this is not necessarily true also for high discretion financial slack. High discretion slack is easy to redeploy and thus more prone to inefficient allocation by self-interest managers well positioned within the firm to "grab a share of the uncommitted spoils" (Bourgeois, 1981). Moreover, the existence of abundant and readily available resources within the firm makes internal control systems more lax, while engendering managerial complacency (Tan and Peng, 2003; Jensen and Meckling, 1976; Jensen, 1986). For these reasons, the allocation of high discretion slack within the alliance portfolio may reflect managerial private preferences rather than economic and efficiency considerations. For instance, pet projects may not be discontinued or even attract more investments simply because there are enough resources and it is more difficult to justify termination (Bromiley, 1991; Nohria and Gulati, 1996). Similarly, managers could divert slack toward alliances that build on their own competencies or reinforce their prestige and power within the corporation (Jensen and Meckling, 1976). These negative effects may be further exacerbated in an alliance portfolio as partner diversity could make alliance activities difficult to monitor and internal control systems could be less effective. Indeed, if portfolio activities are diversified across a variety of partners, each with very different

routines and processes, it is more difficult for the firm to monitor them and prevent managers' inefficient investments. For these reasons, I argue that when partner diversity is high the escalating costs of high discretion slack may offset the potential benefits obtainable from its flexible allocation across the portfolio. Thus, although it may provide some benefits, I argue that the overall effect of high discretionary slack is to add to and magnify the costs of alliance portfolio diversity.

> *H2. High discretion financial slack negatively moderates the relationship between partner diversity and firm financial performance.*

Thus far, it has been argued that the overall negative effect of high discretion financial slack is the result of the lax control over its allocation and the lower incentives managers have to use it to improve efficiency and firm value. However, if the firm put in place adequate mechanisms to control and discipline managers the negative effects of high discretion slack could be mitigated and potential benefits may emerge. I propose leverage (i.e. the opposite of low discretion slack availability) as one of such mechanisms.

Debt financing introduces stricter rules within the firm because it forces managers to divert a larger portion of high discretion slack (such as cash reserves) in order to service debt payments. If the firm fails to meet its payment schedule, creditors step in and put the firm into bankruptcy with serious consequences also for managers who risk loosing their jobs. Hence, higher leverage implies more pressure on managers to improve efficiency in the allocation of resources and to enhance firm's short-term viability. It is important to note that leverage and low discretional financial slack refer to the same construct. When a firm has higher leverage it has already used its borrowing capacity and has less low discretion slack at disposal to invest in the alliance portfolio. However, quite paradoxically, by reducing this form of slack the firm can bring about more discipline and enhance the allocation of high discretion slack for the same purpose. Indeed, it is reasonable to assume that firms with higher debt burdens may carefully scrutinize the employment of high discretion slack, because the related agency costs may rapidly escalate in the presence of higher partner diversity and threaten firm's survival. As a result, by combing high discretion slack with higher leverage (less low discretion slack) firms may find a reasonable trade-off between flexibility and control in the allocation of slack resources across the alliance portfolio, which in turns enhances their ability to manage partner diversity or, at least, mitigate the negative effect of high discretion slack that motivated my second hypothesis. In other words, because

of the discipline associated with debt financing, firms with limited low discretion financial slack should be better able to deploy high discretion slack effectively across the alliance portfolio in the presence of higher partner diversity. Therefore, I formulate the following:

H3. *A three-way interaction between partner diversity, HD slack, financial Leverage will positively affect firm financial performance.*

5.4. Research methods

Data and sample

In order to test the above hypotheses I focused on a sample of firms operating in the global automobile industry (Jiang et al., 2010). In this sector, both the oil crisis of the seventies and the following advances in manufacturing processes by Japanese firms created industry-wide uncertainty that triggered the formation of alliances between US and European firms, and between Western and Japanese firms. As a result, since the eighties these firms have been characterized by extensive alliance activity and alliances have become a major driver of their financial performance (Garcia-Pont and Nohria, 2002). Also, the availability of financial resources is crucial in this industry, as recently exemplified by the effect of the global financial crisis on US automakers. For instance, in 2008 companies such as GM, Ford, and Chrysler were overwhelmed by substantial debt burdens and risked bankruptcy filing. The lack of immediate liquidity stimulated these firms to consider merging with other industry competitors to combine cash reserves and cut costs (New York Times, 2008), and prompted the government to approve a bail out program involving a loan of over $50 billions (Bloomberg, 2009). As a result, both the growing diffusion of alliances and the importance of financial health make the automobile industry an ideal context to test my theoretical arguments.

I follow previous research and use standard industry classification in order to identify my sample. The starting population includes all firms with available records in Compustat and operating in industries with the following SIC codes that have been related to the automobile industry: 3711, 3713, 3714, 3715 and 3751 (Jiang et al., 2010). Following prior studies on the impact of alliance portfolios, I consider the firm-year as the unit of analysis and employ a five-years moving window to define a firm's portfolio of active alliances (Lavie and Miller, 2008; Lavie, 2007; Stuart, 2000). Accordingly, the study's time frame spans over the years

1990-2006, with historical alliances tracked back to 1985 to incorporate information on active alliances in 1990. In addition, since the focus of the research is on the synergies and interdependencies among alliances rather than on their individual effects, I narrow my attention only to firms that have at least one alliance in their portfolio during the time span considered (Cui and O'Connore, 2012).

I draw alliance data from the Securities Data Corporation (SDC) database on mergers, acquisitions, and alliances. For each alliance, information was retrieved on partners' name, SIC code, state of incorporation, activities involved in the alliance, geographical locations, and equity participation. The remaining financial and accounting data that were necessary were gathered from Compustat. Overall, 62 firms were identified that formed 802 individual alliances over the time span considered. After removing observations with occasionally missing values, the final dataset comprises 52 individual firms and 363 firm-year observations.

Variables

Dependent variable. In order to assess the impact of alliance portfolio diversity on firm financial performance I follow previous studies and consider *Profitability (ROA)* as the main dependent variable (Lavie, 2008; Yamakawa et al. 2011). Return on assets is computed as the ratio of operating income before depreciation to the book value of assets (Cho and Pucik, 2005).

Independent variables. The main independent variables considered are partner diversity and slack. To measure partner diversity I follow extant research and refer to both the firm and its partners' SIC industry codes (Cui et al, 2012; Jiang et al 2010). I consider five alliance categories: alliances with partners in the same 4-digits SIC code, alliances with partners in the same 3-digits SIC code, alliances with partners in the same 2-digits SIC code, alliances with partners in the same 1-digit SIC code, and alliances with partners sharing no SIC code with the firm. Accordingly, for ease of categorization, I split multi-partner alliances into single alliances involving just one partner. Then, for each firm, I assigned each alliance in the portfolio to one category and obtained the *Partner diversity* measure by computing the Blau index of diversity based on these categories (Blau, 1977): $D = 1 - \sum_i {p_i}^2$, where D is the degree of diversity and p_i represents the fraction of alliances falling into category i. This variable is bounded between 0 (an entirely homogeneous group) and 1 (an entirely

heterogeneous group). Finally, since the extent of diversity in part depends on the number of alliances in the portfolio, this measure is divided by the maximum degree of potential diversity based on portfolio size (Jiang et al. 2010). The use of Blau index in order to measure diversity is a well-established approach in alliance portfolio research (Jiang et al., 2010; Mouri et al, 2011).

To test hypothesis 1 and hypothesis 2 I distinguish between two forms of financial slack, namely low discretion and high discretion slack. For *High discretion (HD) Slack*, I measure the ratio of a firm's cash reserves over total assets (George, 2005). This is a broadly accepted proxy for discretionary slack, as cash reserves provide the firm the greatest freedom in allocating them to alternative purposes. Low discretion slack includes financial resources potentially available to the firm in the form of unused borrowing capacity (George, 2005; Bromiley, 1991, Tan and Peng, 2003). I measure low-discretion slack (LD Slack) by computing the firm's level of financial leverage, defined as total debt over total market value of the firm (that is, total debt + total market value of outstanding shares) and to avoid misunderstanding I call this variable *Leverage*. Indeed, it is important to note that leverage is a proxy for the *lack* of low discretion slack. With higher leverage the firm is less able to raise additional debt to meet unfolding demands and thus has less low discretion slack at disposal to allocate. For this reason, increasing values of leverage indicate reduced levels of low discretion slack. Accordingly, by adopting this measure support for my first hypothesis, which predicts a positive interaction between low discretion slack and partner diversity, implies the opposite, that is, a negative moderating effect between leverage (i.e. the lack of low discretion slack) and partner diversity. This proxy is slightly different from those employed by previous studies that measured low discretion financial slack by computing a firm's equity to debt ratio (George, 2005; Bromiley, 1991). Nonetheless, *Leverage* was highly (and negatively) correlated with such alternative measure and my results remain unchanged when equity to debt ratio is used in order to test the hypotheses. Moreover, since financial leverage is usually also a proxy for the extent of discipline brought about by debt financing (Jensen, 1986), I can use the variable *Leverage* also to test H3.

Besides the main variables of interest I also control for several firm-level and portfolio-level variables that previous research linked with firm performance. In order to control for firm

size I compute the variable *Size* defined as the total number of a firm's employees[23] (Yamakawa et al., 2011). In order to capture differences in profitability between younger and older firms I include the variable *Age,* computed as the number of years since a firm first appeared in Compustat[24] (Majumdar, 1997). I control for the intensity of a firm's investment in research activities with the variable *R&D Intensity*, computed as the ratio of R&D expenses over total assets (O'Brien 2003; Lavie and Miller, 2008). The variable *Tangibles* controls for the ratio of firm tangible assets over total assets (O'Brien 2003). I also controlled for firm *Capital intensity* by including the ratio of firm total assets to total sales (O'Brien, 2003). Several studies suggest that the size of a firm's alliance portfolio is a major determinant of its financial performance. Accordingly, I control for *Portfolio Size,* calculated as the number of alliances formed by the firm during the last five years (Cui et al. 2012). To control for alliance governance form I defined the variable *Equity alliances*, as the percentage of equity-based alliances in the portfolio (Lavie and Miller, 2008). I included the variable *Foreign partners*, computed as the percentage of alliance partners from foreign countries, to capture the extent to which a firm forms alliances with international partners (Lavie and Miller, 2008). Further, I controlled for the extent to which a firm forms alliances in unrelated activities, i.e. those in industries different from the focal firm's primary business, as these alliances proxy its orientation towards exploration (Tong, Reuer and Peng 2008). Accordingly, I computed the variable *Unrelated Alliances* as the ratio of a firm's unrelated alliances over total portfolio alliances, based on available firm 4-digits SIC codes (Cui et al., 2012). The remaining firm-level heterogeneity is accounted for by including firm fixed effects, while time trends are controlled by a set of year dummies.

Empirical model

As a firm's decision to form alliances derives from firm-specific and industry-specific attributes, portfolio diversity strategies are self-selected (Lavie, 2008; Yamakawa et al. 2011). For this reason, models failing to account for such bias could lead to erroneous conclusions. In this vein, extant research suggests that the propensity to form alliances across different industries may depend not only on the industry in which a firm operates, but also

[23] Actually, these studies take the logarithm of the total number of employees to reduce skewness. However, undertaking such transformation of the data resulted in serious multicollinearity problems in my analysis. Accordingly, I addressed the problem by winsorizing the variable.

[24] This definition is in line with studies suggesting that the most meaningful measures of age is the number of years since listing, given the economic significance of this event (Shumway, 2001)

on the its technological, financial, and social resources (Lavie and Miller, 2008). For instance, Duysters et al. (2011) find that alliance portfolios of highly innovative firms tend to be broader in terms of partner types and international breadth, as compared to those of less innovative firms. Similarly, Lavie (2008) shows that overall alliance experience may facilitate the formation of alliances with partners from different industries or geographical contexts. In my research context this argument implies that firms falling in my final sample may differ from other firms in the industry based on unobservables, and that my results may simply reflect this bias. Accordingly, I follow previous research and adopt a two-stage approach in order to handle self-selection during the analysis (Lavie and Miller, 2008; Yamakawa, 2011).

In the first stage I use a probit model to analyze the antecedents of alliance portfolio formation. In this stage the dependent variable is a binary variable indicating whether or not a firm has a portfolio of alliances at time t, and it is thus included in our final sample. This binary choice variable takes the value of one when a firm has formed at least one alliance during the last five years, and is equal to zero otherwise. Control variables include *Firm size, R&D intensity, Leverage*, and a measure of a firm experience in alliance formation defined as the total number of alliance formed by a firm up to a given year (*Alliance Experience*) (Lavie and Miller, 2008). Time and industry effects are controlled for by including a set of year and industry dummies defined by 4-digits SIC codes, while controlling for the panel structure of the dataset. In the second stage, I use firm financial performance as dependent variable and include the inverse Mill's ratio from the first stage as a control, in order to account for the effects of self-selection (Heckman, 1979).

Similarly to previous studies, I implement the second stage by using a fixed effect regression model (Lavie, 2007; Lavie 2008). Fixed effects were deemed superior to random effect, as indicated by a Hausman test, which rejected the null hypothesis that coefficient estimates do not differ significantly across the two models ($p<0.001$). Year fixed effects were included in all models to control for time trends. All independent variables were lagged one year, that is, I model a firm financial performance at time t as a function of independent time-varying covariates computed at time t-1 (Lavie and Miller, 2008). In order to test hypotheses 1-2 on the moderating effect of slack resources I add to the baseline model the interactions between the variable *Partner diversity* and the variables *Leverage* and *HD Slack* respectively, while a three-way interaction between all these variables is added to test hypothesis 3. The following regression equation representing the full model was estimated:

$$Profitability_{it+1} = \alpha_0 + \mu_i + \sum_{1}^{j} \gamma_j X_{jt} +$$
$$+ \beta_1 Partner\ diversity_t + \beta_2 Leverage_t + \beta_3 HD\ Slack_t +$$
$$+ \beta_4 Partner\ diversity_t\ x\ Leverage_t +$$
$$+ \beta_5 Partner\ diversity_t\ x\ HD\ Slack_t +$$
$$+ \beta_6 Partner\ diversity_t\ x\ Leverage_t\ x\ HD\ Slack_t + \varepsilon_{it}$$

where α_0 indicates the intercept, μ_i is the firm fixed effect, $\sum_1^j \gamma_j X_{jt}$ represents the impact of all other control variables, and ε_{it} is the error term.

Table 11 reports the descriptive statistics and correlation matrix for the main variables. Firms in the final sample have been profitable over the span of time considered with an average *ROA* of ten percent. The average firm formed roughly 8 alliances during the last five years with only 15 percent of these alliances including R&D activities. On the other hand, 38 percent of alliances in firms' portfolios involve foreign partners, and more than a half includes activities in unrelated industries or some form of equity investment (51 percent and 54 percent, respectively). Finally, sample firms make extensive use of debt financing (average leverage is 0.4) and also retain significant reserve of HD slack (average HD slack is 0.09 percent). Correlations are relatively low with a few exceptions. For instance, *Portfolio size* shows a strong positive correlation with firm's *Size* (ρ=0.72), suggesting that larger firms are also those possessing extensive alliance portfolios. In addition, there is a positive correlation between the percentage of equity alliances and the percentage of foreign partners in the portfolio (ρ=-0.57), indicating that firms resort to the additional protection of equity-based governance structures when their alliance portfolio is internationalized. Nonetheless, as indicated by multicollinearity statistics, such correlations do not impact my estimates significantly. In this regard, some of estimated empirical models reported VIFs beyond the maximum acceptable threshold, raising potential concerns about multicollinearity. However, this does not represent an issue in my analysis because these values can be ascribed to multiple occurrences of the main effects (Partner Diversity, Leverage and HD Slack) in the explanatory variables, and thus fall to acceptable levels once the interaction terms are dropped from the model. Moreover, both in the full and partial models, VIFs drop to acceptable levels (less than 10) once main effects and interactions are demeaned, leaving

estimated coefficients for the main variables of interest unchanged. Besides these variables, the remaining values of VIF suggest no further concerns about multicollinearity.

Table 11. Descriptive statistics and correlation matrix

		Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	Profitability	0.10	0.17	1.00												
(2)	Age	5.19	4.50	-0.01	1.00											
(3)	Size	95.21	153.49	-0.03	0.24	1.00										
(4)	Tangibles	0.07	0.04	0.01	-0.09	0.03	1.00									
(5)	Capital Intensity	1.03	0.57	-0.49	0.26	0.35	-0.03	1.00								
(6)	R&D Intensity	0.04	0.05	-0.74	-0.07	-0.07	0.18	0.25	1.00							
(7)	Leverage	0.40	0.27	-0.06	0.17	0.55	-0.21	0.25	-0.26	1.00						
(8)	HD Slack	0.09	0.10	-0.29	0.03	-0.11	0.08	0.46	0.34	-0.37	1.00					
(9)	Portfolio Size	7.83	10.70	-0.03	0.41	0.72	0.02	0.32	0.02	0.38	-0.10	1.00				
(10)	R&D Alliances	0.15	0.24	-0.21	-0.12	0.11	0.08	0.10	0.33	0.03	-0.06	0.19	1.00			
(11)	Foreign Alliances	0.38	0.35	-0.11	0.08	0.01	-0.10	0.06	0.11	-0.09	0.10	0.05	0.07	1.00		
(12)	Unrelated Alliances	0.51	0.37	-0.03	0.04	0.02	-0.07	0.08	0.03	0.00	0.09	0.03	-0.20	0.27	1.00	
(13)	Equity Alliances	0.54	0.35	0.05	-0.10	0.00	0.11	-0.13	-0.01	0.04	-0.15	-0.05	-0.10	-0.57	-0.36	1.00
(14)	Partner diversity	0.52	0.41	-0.03	0.27	0.38	0.02	0.19	0.04	0.26	-0.08	0.45	0.10	-0.16	0.01	0.14

N=363

5.5. Results

In the sake of space I do not report results from the first stage probit model predicting whether a firm has an alliance portfolio in a given year or not. Nonetheless, results from this model mirror those of previous studies (Lavie, 2007) and show that firms with greater size and alliance experience are those more likely to have a portfolio of alliances. On the other hand, coefficients on industry dummies are not statistically significant, suggesting these factors do not play an important role as antecedents of alliance portfolio partner diversity for firms in my sample.

Table 2 reports results from the second stage fixed effect regression model. Model 1 represents the baseline model and includes control variables as well as the main effect of interest (i.e. *Partner Diversity, Leverage, HD Slack*). In this model leverage and profitability are negatively related, in line with most findings in capital structure literature (O'Brien, 2003; Vicente-Lorente, 2001), while high discretionary slack seems to have no effect. Similarly, in line with previous empirical studies, I find a negative impact of partner diversity on firm performance (Mouri et al. 2011, Goerzen and Beamish 2005; Jiang et al., 2010), suggesting that firms appear to experience problems in managing this aspect of their alliance portfolio strategy.

H1 and H2 propose that the relationship between partner diversity and financial performance will be moderated by the availability of financial slack. In particular, firms with lower leverage (higher low discretion slack at disposal) should be better positioned to buffer the costs of diversity while preventing managers from using these resources for inefficient investments. On the opposite, high discretion slack, although potentially beneficial, is more easily redeployable by self-interested mangers, who may invest it inefficiently across a diversified pool of alliance partners. Accordingly, while the availability of low discretion financial slack should positively moderate the impact of partner diversity on firm performance, high discretion slack should have the opposite effect. Results from Model 2-4 provide support for these predictions. In Model 2 and Model 3 I enter the proposed two-way interactions separately, while in Model 3 I test their significance jointly. Results from Model 3 confirm that there is a negative interaction between the variables *Leverage* and *Partner diversity* with respect to firm performance (β= -0.173, p-value<0.001), thus suggesting that

maintaining lower leverage helps firms preserving a cushion of potential resources to deal with alliance portfolio diversity. Conversely, the negative and significant coefficient on the interaction between *Partner diversity* and *HD Slack* (β= -0.471, p-value<0.001) confirms that high discretionary resources tend to be invested inefficiently when higher partner diversity makes alliance activities difficult to monitor.

Finally, in the full model (Model 5) I test hypothesis 3, which predicts a positive three-way interaction between the variables *Partner diversity*, *HD Slack*, and *Leverage*. Indeed, although *HD slack* may breed inefficiencies, firms could curb this tendency by adopting proper corporate governance tools, for example by increasing financial leverage, i.e. reducing low discretion slack (Jensen, 1986). In line with this prediction, the coefficient on the three-way interaction term is positive and highly significant (β= 1.133, p-value<0.05). Also, all the proposed interactions remain significant when tested jointly. In addition, while in Model 1 *Partner diversity* had a negative effect, this effect turns out to be positive after the moderating role of financial slack is considered in the full model (β= 0.09, p-value<0.001). This suggests that for firms with no HD slack (i.e. when HD Slack is zero) and highest low discretion slack at their disposal (i.e. leverage equal to zero) partner diversity increases profitability, consistently with my predictions. Similarly, the variable *HD slack* has a positive and significant effect in Model 3-5, while having no significant effect in the other models, thus indicating that the flexibility provided by highly discretionary slack is valuable only when partner diversity is zero and alliance activities are easier to monitor. For ease of interpretation, figures 1-4 graph the estimated interactions on the basis of the results from the full model. In Figure 1 I represent the relationship between partner diversity and profitability for low leverage and high leverage firms, respectively. The y-axis reports predicted values of the dependent variable, while the x-axis reports observed values of partner diversity. High leverage firms are defined as those with leverage equal to 0.65, while for low leverage firms leverage equals to 0.11. All other controls are held constant at their mean. Similarly, in figure 2 I graph the relation between profitability and partner diversity for firms with high and low levels of HD Slack, respectively (HD slack equals to 0 and 0.3, respectively). Both figures support my previous findings and show that diversity enhances financial performance only for firms with low HD Slack or low leverage. In figure 3-4 I graph the three-way interaction between *Partner diversity, HD slack* and *Leverage.* Figure 3 shows the impact of diversity on performance for low leverage and high leverage firms respectively, but when HD slack is low. Figure 4 similarly shows the impact of diversity on performance for low

leverage and high leverage firms and when HD slack is high. These figures again suggest that increasing leverage does not help a firm managing diversity when HD Slack is equal to zero, as the associated discipline is not needed and financial resources at disposal would be insufficient (that is, the firm would have both little high discretion and low discretion slack at disposal). Conversely, increasing leverage enhances a firm's ability to manage diversity when the firm has already accumulated substantial high discretion slack, providing support for the disciplining role of leverage with respect to the allocation of high discretion slack within the alliance portfolio.

As far as control variables are concerned, the variable *Inverse Mill's Ratio* has a significant and positive effect in all models. This result suggests that selection bias could have affected the estimates if not properly controlled for, as firms possessing a portfolio of alliances also seem to be significantly more profitable than firms who do not. Most of the year dummies also show a significant effect, although these coefficients are not report for matters of space. All other controls report coefficients with the expected signs but that are not statistically significant. For instance, in line with other studies the variable *Capital Intensity* is negatively related to financial performance (O'Brien, 2003), but it is statistically significant only in model 1 and 2. Similarly, the variable *Unrelated Alliances* has a negative effect, but it is statistically significant only in models 3 and 4 (Cui and O'Connor, 2012). All other controls have insignificant coefficient in all estimated models.

Table 12. Second stage fixed effect regression model. The dependent variable is firm return on assets at time t (ROA). All independent variables are lagged by one year.

Controls:	(1)	(2)	(3)	(4)	(5)
Age	0.00128	0.00173	0.00127	0.00193	0.00176
	(0.00176)	(0.00175)	(0.00172)	(0.00169)	(0.00170)
Size	-0.00002	-0.00003	-0.00003	-0.00004	-0.00006
	(0.00008)	(0.00007)	(0.00007)	(0.00007)	(0.00007)
Tangibles	-0.0240	-0.0490	-0.0414	-0.0841	-0.0862
	(0.120)	(0.119)	(0.118)	(0.115)	(0.115)
Capital Intensity	-0.0226*	-0.0220*	-0.0159	-0.0129	-0.0170
	(0.0106)	(0.0105)	(0.0105)	(0.0103)	(0.0104)
R&D Intensity	-0.270	-0.284	-0.0539	-0.00638	0.0281
	(0.184)	(0.182)	(0.190)	(0.186)	(0.186)
Portfolio Size	-0.00083	-0.00091	-0.00065	-0.00073	-0.00058
	(0.00091)	(0.00090)	(0.00089)	(0.00087)	(0.00089)
R&D Alliances	0.00922	0.0128	0.0161	0.0236	0.0126
	(0.0306)	(0.0303)	(0.0300)	(0.0293)	(0.0294)
Foreign Alliances	0.0195	0.0254	0.0162	0.0239	0.0195
	(0.0185)	(0.0184)	(0.0181)	(0.0178)	(0.0177)
Unrelated Alliances	-0.0184	-0.0180	-0.0239+	-0.0252+	-0.0178
	(0.0145)	(0.0143)	(0.0143)	(0.0139)	(0.0141)
Equity Alliances	0.00399	0.00672	-0.00387	-0.00228	-0.00405
	(0.0200)	(0.0198)	(0.0197)	(0.0192)	(0.0190)
Inverse Mill's Ratio	0.0391**	0.0431**	0.0319*	0.0355**	0.0280*
	(0.0134)	(0.0133)	(0.0133)	(0.0130)	(0.0132)

Main independent variables:					
LD Slack	-0.0759**	-0.0305	-0.0768**	-0.00950	0.0334
	(0.0283)	(0.0327)	(0.0278)	(0.0319)	(0.0370)
HD Slack	0.0462	0.0441	0.203*	0.249**	0.353***
	(0.0740)	(0.0733)	(0.0846)	(0.0833)	(0.0926)
Partner diversity	-0.0262*	0.0166	0.00834	0.0830***	0.0924***
	(0.0128)	(0.0204)	(0.0158)	(0.0243)	(0.0250)
Partner diversity x Leverage		-0.116**		-0.173***	-0.237***
		(0.0433)		(0.0435)	(0.0518)
Partner diversity x HD Slack			-0.358***	-0.471***	-0.606***
			(0.0997)	(0.101)	(0.121)
HD Slack x LD Slack					-1.050*
					(0.435)
Partner diversity x HD Slack x LD Slack					1.133*
					(0.445)
Constant	0.123**	0.109**	0.108**	0.0829*	0.0977**
	(0.0372)	(0.0371)	(0.0366)	(0.0363)	(0.0364)
N	363	363	363	363	363
R^2	0.254	0.273	0.287	0.324	0.341

Standard errors in parentheses

$^{+}$ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Figure 1. Interaction between low discretion slack and partner diversity

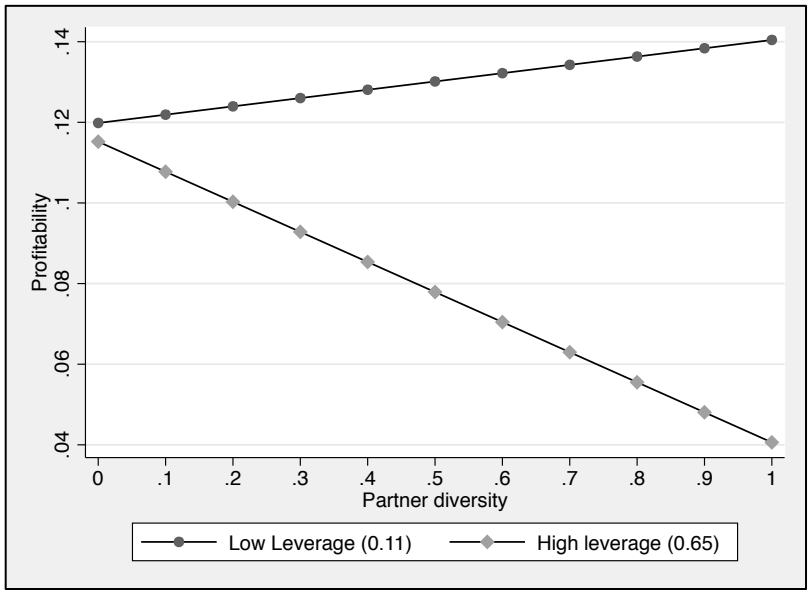


Figure 2. Interaction between high discretion slack and partner diversity

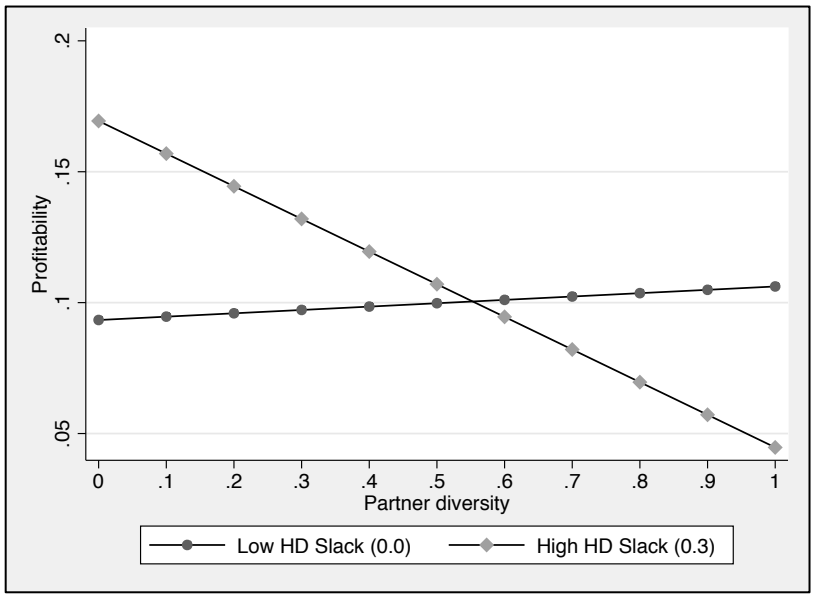


Figure 3. Interaction between diversity and leverage when HD Slack is low (0.0)

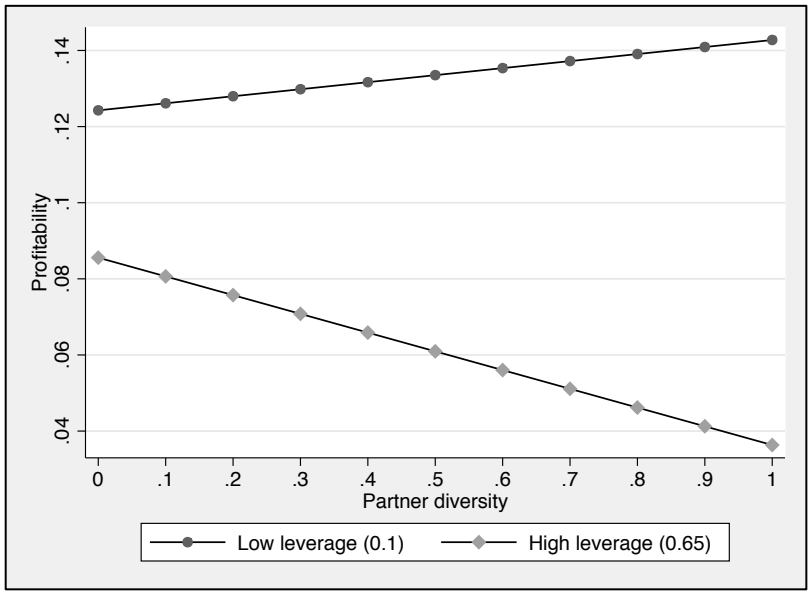
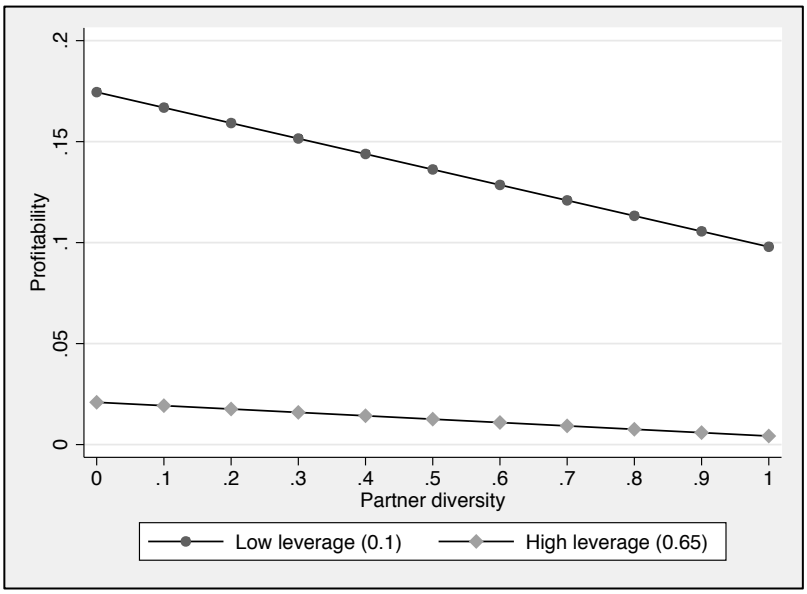


Figure 4. Interaction between diversity and leverage when HD Slack is high (0.3)



5.6. Discussion and conclusions

This chapter analyzes how the presence of internal resources in the form of financial slack influences the relation between alliance portfolio partner diversity and firm financial performance. Extant research suggests that partner diversity can be a source of value as it

helps the firm to reach a broader pool of resources while accessing different sources of knowledge and information (Goerzen and Beamish, 2005). On the other hand, coordinating a diverse pool of partners is a complex task and may result in steeply rising work demands that outstrip a firm's available internal resources (Gary, 2005; Jiang et al., 2010; Goerzen and Beamish, 2005). Accordingly, in this chapter I propose that the availability of a cushion of excess resources in the form of financial slack is a critical factor to consider when studying the performance implications of partner diversity.

Building on organization theory and economic theory, it has been argued that the presence of slack within a firm acts either to buffer or to exacerbate the issues related to partner diversity. Economic theory suggests that the availability of slack may relax resource constraints and engender managerial complacency, thus reducing managers' incentives to allocate resources efficiently across the alliance portfolio. On the other hand, organization theory points out slack may hold various benefits in the context of a diversified alliance portfolio by acting as a buffer for conflicts resolution and for facilitating coordination between alliances. In order to reconcile these opposing views, I propose that the ultimate impact of financial slack will depend on the extent of discretion over its use by managers. Low-discretion financial slack in the form of unused borrowing capacity provides a stock of potential resources that facilitate the management of diversity within the portfolio, while being less subject to misallocation by managers because of tighter control from external investors. High discretion slack (in the form of cash reserves) has the opposite effect, because, while it may provide similar advantages, it is more prone to inefficient allocation especially when higher partner diversity makes alliance activities difficult to monitor. Nonetheless, I also propose that managers' tendency to inefficiently invest high discretion slack across the alliance portfolio could be mitigated in the presence of appropriate governance mechanisms, such as higher financial leverage. Indeed, while higher leverage implies reduced low discretion slack at disposal, it also disciplines managers by curbing their tendency to over-invest readily available cash reserves. As a result, firms could combine higher reserves of discretionary slack with higher levels of leverage in order to obtain an optimal trade off between flexibility and discipline in the management of diversity within the alliance portfolio.

Results from an empirical analysis conducted on a sample of firms operating in the automobile industry provide large support for the above predictions and show that slack resources critically moderate the relation between partner diversity and firm financial

performance. Consistently with the benefits associated with low discretion financial slack, I find that financial leverage (which is synonymous of reduced low discretion slack) negatively moderates the relationship between partner diversity and profitability. Conversely, I find that high discretion financial slack has a negative moderating effect, thus suggesting that in the context of a diversified alliance portfolio the agency costs associated with this form of slack outweigh the associated benefits. Finally, I also find evidence of a positive three-way-interaction between diversity, leverage and high discretion slack, which supports the view that the negative effects of high discretion slack are somewhat curbed in the presence of the discipline implied by debt financing.

These findings have interesting implications for extant research. From the perspective of alliance literature, this chapter adds to research calling for a contingency perspective on the study of alliance portfolio characteristics (Oerlemans et al., 2013, Duysters et al., 2012). These studies suggest that, as a result of different resource endowments and capabilities, firms may differ in their ability to extract value from their alliance portfolios. Accordingly, they analyze how factors such as alliance experience, dedicated functional roles, technology management tool or environmental factors (such as market uncertainty) moderate the impact of portfolio characteristics on various firm outcomes (Cui and O'Connor, 2012; Oerlemans et al., 2013, Duysters et al., 2012). The analysis of this chapter adds to this stream by proposing another important moderating factor, namely financial slack, in the study of the relationship between alliance portfolio partner diversity and firm financial performance.

The results also have some implications for slack literature. Extant research has analyzed slack by looking exclusively at the consequences it holds within firm boundaries. For instance, various studies find that slack significantly impacts a firm ability to make and sustain risky investments that would not be approved in the face of scarcity, such as investment in R&D (Norhia and Gulati, 1996), internationalization (Lin et al., 2009) and technological diversification (Huang and Chen, 2010). I add to this stream of literature by showing that slack has critical consequences with respect to the firm relationship with important external stakeholders, such as alliance partners. The theoretical arguments developed also unravel important distinct mechanisms through which different forms of slack influence firm relations with alliance partners. My findings suggest that, while low discretionary financial slack provides a cushion of additional resources that helps firms managing partner diversity, high discretionary slack has the opposite effect, arguably because self-interested managers could more easily invest it inefficiently in the alliance

portfolio. Thus, these insights also contribute to recent studies calling for a contingency perspective on the role of different slack types, by proposing important differences between high discretion and low discretion slack in the context of alliance portfolio management (Tan and Peng, 2003; George, 2005).

Finally, the research conducted in this chapter also has interesting managerial implications as it highlights the importance of managerial decision-making in the context of alliance portfolio management. While previous studies analyzed the direct effects of partner diversity and extensively outlined its various benefits and costs, they paid relatively little attention to the question of whether and how mangers could actively influence the implementation of such a strategy. My analysis addresses this gap and suggests that financial decisions such as capital structure or cash policies can make the difference in the context of a diversified pool of alliance partners.

In summary, the empirical evidence provided sheds light on the role of organizational slack in the context of alliance portfolio management. Nonetheless, the analysis conducted has some important limitations that also constitute potential avenues of future research. First, I concentrate on a sample of firms operating in the automobile industry, thus raising concerns about the external validity of the findings. Future research may empirically test the validity of the proposed arguments in other industry contexts characterized by extensive alliancing activity. Second, the analysis focuses only on financial slack and distinguishes slack types according to the extent of discretion over their use. However, also other forms of slack exist (such as slack absorbed in the form of human resources and skills) that have different characteristics and may differently impact the relationship between alliance portfolio partner diversity and firm financial performance. Similarly, while I focus on partner diversity, there are also other relevant characteristics of alliance portfolios whose impact on various firm outcomes may be critically moderated by the presence of slack resources (for instance portfolio internationalization or functional diversity). Future research could address these points and extend my approach by analyzing the contingent role of other forms of slack with respect to different dimensions of alliance portfolio and their impact on various firm's outcomes not limited to financial performance.

CHAPTER 6

CONCLUSIONS

6.1. Summary and main findings

Alliances provide the firm with access to valuable resources and capabilities possessed by others, yet which are fundamental to create a competitive advantage. However, these collaborations are also prone to the risk of unplanned termination, which is further magnified when the partner faces looming bankruptcy or just experiences financial difficulties. Accordingly, besides resources considerations another important aspect of alliances is partner's financial condition, along with the implied risk for the stability of the alliance. In this thesis I explore this intuition by investigating the interplay between a firm's capital structure and its alliance activity. Capital structure directly influences a firm's exposure to the risk of bankruptcy and financial distress, and thus it should be a relevant concern for prospective partner willing to collaborate. Nonetheless, extant literatures on both alliances and capital structure have, buy and large, developed independently leaving a gap in our understanding about the risk implications of corporate financing policies in the context of alliances. This lack of knowledge motivated the attempt of the present research to consistently integrate the two fields in order to enhance our understanding of both alliances and capital structure decisions.

The research is divided into four main phases. In the first phase, an in depth literature review of both alliance and capital structure research is conducted which suggests a lack of cross-fertilization between the two fields. Alliance research has looked at the importance of partner financial condition, but only through the perspective of resources while ignoring the risk implications of financial policies. Conversely, although capital structure research extensively acknowledges the consequences that a firm's capital structure holds for its relationships with external stakeholders, these arguments have never been extended to alliance partners.

Accordingly, in this first phase of the thesis I set the stage of the research by pointing out the need to consistently integrate these research streams.

In the second phase, I analyze the impact that strategic alliance formation exerts on a firm capital structure. The main argument developed is that, since liquidation can impose substantial costs on alliance partners, these stakeholders will be reluctant to undertake R-S investments when their counter-parts is highly levered. Thus, as managers generally acknowledge the pitfalls of forming alliances with financially weak firms, they will reduce leverage ex-ante whenever inducing investments from alliance partners is important. The empirical analysis conducted corroborates this argument and shows that firms forming alliances indeed tend to adopt lower levels of leverage. Moreover, it shows that this impact depends on the characteristics of the alliances considered (such as the typology of activities and partners involved in the collaboration), as these factors can exacerbate the hazards related to partner's leverage.

In the third phase, I analyze the inverse causal link, that is, I investigate how capital structure decisions, once taken, impact on a firm's alliance strategy. In Chapter 4 I show that financial health and leverage are important considerations in selecting alliance partners. More specifically, I argue that highly levered partners are less attractive in the context of an alliance for multiple reasons. First, highly leveraged partners are more prone to liquidation and bankruptcy risks, and thus they expose the alliance (and all investments involved) to the threat of unplanned termination, potentially even despite the firm's best intentions. Second, I also argue that even when liquidation is not imminent, highly levered firms have incentives to 'default' on their partners' implicit claims and reduce efforts towards the alliance. Finally, a high leverage firm facing financial distress may threaten to prematurely terminate an alliance in order to obtain more favorable terms. Rational firms will anticipate these risks and hence will evaluate each other's level of leverage when structuring transactions in the market for collaboration. Empirical evidence from a large sample of alliances largely corroborates these arguments and confirms a strong link between a firm leverage and the characteristics of the alliances it forms. A 'double sided matching' of leverage levels emerges, whereby more attractive low leverage firms partner with other low leverage firms, and less attractive high leverage firms seem to be constrained to partner with other high leverage firms. Similarly, I also find that highly levered firms tend to ally with relatively lower quality counter-parts, again consistently with my argument that the formers are perceived as being less attractive. A second set of results in this chapter also supports the

existence of a link between capital structure and the choice of alliance governance. In this regard, I find that leverage increases the probability of an alliance being structured as a JV, and that JVs appear to be more likely also in the presence of greater difference among partners' leverage. These findings suggest that JVs represent an ex post contractual solution to the hazards posed by high leverage firms.

Finally, in fourth phase (Chapter 5) I explore the importance of capital structure during the implementation and coordination of an alliance portfolio strategy. Here, I suggest that capital structure is a critical determinant of a firm's low discretion slack and, as such, it impacts its ability to invest properly in order to sustain its alliance portfolio strategy. More specifically, I argue that by keeping leverage low firms can preserve a cushion of potentially available financial resources to buffer the pressures and heavy coordination costs implied by higher partner diversity in their portfolio. Conversely, accumulating high discretion financial resources (in the form of cash or equivalents) does not provide the same benefits because these resources are more prone to misallocation by self interested managers, especially when higher partner diversity makes alliance activities more difficult to monitor. An empirical analysis conducted on a sample of firms in the automobile industry confirms these predictions and shows that financial slack moderates the relationship between alliance portfolio diversity and firm financial performance. More specifically, while low discretion slack (i.e. low leverage) positively moderates this relation, high discretion slack has the opposite effect. In addition, this negative tendency is curbed when higher levels of discretionary slack are combined with the discipline brought about by higher leverage.

6.2. Theoretical contributions

Generally speaking, the overall findings of this research document a strong interplay between corporate financing decisions and strategic alliance decisions. More specifically, they support the view that capital structure decisions represent a relevant aspect to consider during the entire strategic alliance making process, from the very first step of partner selection, to the planned coordination and management of the relationships formed. Accordingly, a reciprocal relation emerges wherein capital structure and alliance activity are jointly determined. On the one hand, the risk and resource implications of a firm's capital structure influence its ability to deal with alliance partners. On the other hand, managers also have incentives to anticipate these considerations ex-ante and incorporate them in their

financing decisions. Thus, from this standpoint my thesis contributes to the growing and important stream of research pointing out a reciprocal link between corporate finance and corporate strategy (Parson and Titman, 2007).

The research conducted in the previous chapters has focused on different aspects of the alliance making process across different unit of analyses (capital structure determination, partner selection, alliance governance choice, alliance portfolio management), thus integrating finance and alliance research from a variety of perspectives. Accordingly, I will discuss the major contributions of each chapter separately (except for chapter 1 and 2 that just set the research context and motivations for the research) in order to better highlight the new insights provided with respect to the different streams analyzed.

The findings of chapter 3 support the view that firms forming alliances maintain lower leverage arguably in order to induce investments from their alliance partners. This result has important implications for finance research. While extant literature provides evidence that firms tend to reduce leverage whenever inducing R-S investments from external stakeholders is important, these studies have only focused on the role of customers, suppliers and employees in shaping a firm's capital structure. I contribute to this stream of research by showing that another important stakeholders group cares about a firm's financing policy, namely alliance partners. I show that firms take into account costs imposed on alliance partners when setting their leverage and that these costs depend on alliance characteristics and the characteristics of the alliance partners. These results are noteworthy as they suggest that in a world where inter-firm collaborations are increasingly popular, alliances and their characteristics should be considered when establishing corporate financing policies.

The results of this chapter also contribute to alliance literature. Extant research in this area suggests that firms adopt contractual solutions to mitigate hazards and to induce investments involved in alliances. Accordingly, the main take-away from this body of works is that attributes of the transaction, rather than firm-level factors, influence the hazards implied by R-S assets (Billitteri *et al*., 2013). My analysis advances this perspective by showing that capital structure decisions are critical in preserving partners' incentive to invest in alliances. This finding is interesting as it shows that incentives to undertake R-S investments at the *alliance level* can be important in determining corporate financing policies at the *firm level*.

The analysis conducted in chapter 4 has shown that financial health and leverage are important considerations in selecting alliance partners as well as in choosing the appropriate

governance form for the alliance. These findings contribute to alliance research in many ways. First, extant literature on partner selection has suggested that firms select partners based on resource considerations. My results complement this view by showing that partner attractiveness is not determined exclusively by its resource endowments but also by its financial health (and the implied risks), as firms appear to take into account both aspects when scanning for potential partners.

Second, the findings also contribute to research analyzing alliance governance. Scholars in this stream have usually built on TCE and explained governance choices by looking mainly at appropriability hazards arising from transaction characteristics (e.g. Pisano, 1989). My analysis calls for a broader view by showing that some exchange hazards may also arise from firm-level characteristics such as leverage, which may lead to the adoption of equity governance. In particular, from a transaction cost view, my findings suggest that leverage is a critical source of relational uncertainty at the transaction level. Also, from a real options perspective, the results provide additional insight into the 'dueling options' often inherent in the tradeoff between flexibility and commitment (Folta and O'Brien, 2004). According to real options logic, firms value flexibility when faced with high uncertainty and they prefer less hierarchical governance modes in order to avoid the opportunity costs of irreversible investments in a shared venture. In contrast with this view, my analysis suggests that firms may be willing to commit to a more hierarchical form when faced with uncertainty arising from a partner's bankruptcy risks. Indeed, although this sacrifices the deferment option, it also provides the low leverage firm with the option to take on the venture in the event of unplanned termination by the partner.

Third, the findings provided about the link between capital structure and alliance governance are also important to finance research. Stakeholder theories of capital structure point out that high leverage makes firms less attractive transacting partners without suggesting any *ex post* mechanisms to mitigate concerns related to capital structure decisions. In this respect, my study has important implications because it proposes governance structures as an *ex post* contractual solution to such a situation, as leveraged firms can adopt equity in order to support their exchanges in the face of termination risks. Thus, equity-based governance induces relation specific investments not only by aligning incentives through shared surplus, but also by providing an enforceable mechanism to mitigate the hazards posed by high leverage partners.

In chapter 5, I focus on the interplay between a firm's level of financial slack and its alliance portfolio strategy in determining financial performance. Here, I suggest that: (i) by keeping leverage low firms preserve a cushion of potential resources (in the form of unused borrowing capacity) to buffer the costs of partner diversity and thus improve their ability to profit from their alliance portfolio strategy; and (ii) that easily redeployable financial resource (in the form of cash) do not provide such a benefit. These findings contribute to the recent contingency view on alliance portfolios, which suggests that, due to different resource endowments, not all firms should benefit to the same extent from portfolio diversity. The evidence provided adds to this stream by proposing another important moderating factor, namely financial slack, in the study of the relationship between alliance portfolio partner diversity and firm financial performance.

The results also have some implications for slack literature. Extant research has analyzed slack by looking exclusively at the consequences it holds within firm boundaries, such as in the context of innovation. My research add to this stream by showing that slack has critical consequences also with respect to the firm relationship with important external stakeholders, such as alliance partners. Moreover, the theoretical arguments developed in the chapter also unravel important distinct mechanisms through which different forms of slack influence firm relations with alliance partners. From this standpoint, the insights provided contribute to recent studies calling for a contingency perspective on the role of slack and discuss important differences between high discretion and low discretion slack in the context of alliance portfolio management.

6.3. Managerial implications

The evidence provided in this research has further important implications for managers. Overall, the analyses conducted suggest that in a world where firm boundaries are becoming increasingly fuzzy managers should be aware of the profound consequences of firm financial health for its relations with external alliance partners and embody these considerations in their decision making process. First, the results suggest that CFOs should incorporate the concerns of prospective as well as present alliance partners when setting corporate financing policies. Indeed, by adopting conservative financing policies (such as by keeping leverage low) a firm can enhance the stability of its alliances, while inducing R-S investments and extracting better terms from alliance partners. Accordingly, a consistent matching between

the firm's financial and its alliance strategy can represent a source of competitive advantage over competitors pursuing similar objectives.

Second, the research also speaks to CEOs or other managers in charge of defining a firm's alliance strategy. In this respect, my findings stress the importance of evaluating the attractiveness of prospective partners not only on the basis of the resources they possess, but also by gauging their financial health and the implied risks for the successful achievement of alliance goals. Equally interestingly, my research proposes that managers should consider partners' financial condition also when negotiating and structuring an alliance in order to deal with the implied risks through proper contractual solutions (such as by resorting to an equity JV).

Finally, my findings show the importance of managers' active decision making in the context of alliance portfolio management. Extant research stresses the implications of partner diversity for firm financial performance, without discussing what managers could do in order to better handle this aspect of their alliance portfolio strategy. In this respect, my findings have important implications as they suggest that managers can play a critical role by setting adequate policies in terms of capital structure. Indeed, by keeping leverage low managers can make sure that a cushion of potential financial resources will be available to facilitate the coordination of alliances in the portfolio. In contrast, by increasing leverage managers reduce such buffer of resources, but enhance the discipline through which more liquid and easily redeployable financial resources (such as cash reserves) can be disposed across the alliance portfolio. Overall, these considerations suggest that CEOs, CFOs and alliance managers should closely coordinate their decisions in order to ensure a consistent alignment between the firm overall alliance strategy and its corporate financing policy.

6.4. Future research directions

Although it makes several important contributions to different research fields, this research has also some limitations, which represent also potential avenues for future research. First, from a methodological standpoint probably the most critical aspect of the analysis is the problem of reverse causality between capital structure and alliance activity. I propose that financing decisions may well reflect alliance partners concerns and thus a firm capital structure could be the result of its alliance strategy. However, also the opposite is arguably true, as I show that capital structure decisions similarly constrain several aspects of a firm's

alliance activity (that is partner selection, governance choice, and alliance portfolio management). As a result, both capital structure decisions and alliance decisions could be jointly determined, raising the concern that endogeneity may bias my estimates. Although I took into account this problem by adopting an instrumental variable approach in chapter 3 or by analyzing the potential distortion of self-selection bias in chapter 4, still much could be done to test the robustness of my findings. For instance, in chapter 3 I was not able to apply the instrumental variables approach to test my predictions on the impact of particular typologies of alliances, because of the inherent difficulty of finding appropriate instruments for the related variables. Future research could address these points by analyzing with more rigorous empirical methods the importance of alliance heterogeneity in specific industries.

Second, while I find that firms forming alliances tend to reduce leverage arguably to induce investments from their external partners, my analysis does not rule out alternative financial explanations for why this is indeed the case. Target adjustments models of capital structure suggest that firm possess target debt ratios that depend on the anticipated benefits and costs of debt financing. However, since issuing or retiring financial securities is costly, firms do not always operate at target levels of leverage, but instead they gradually adjust toward it with a given speed of adjustment (Shyam-Sunder and Myers, 1999). In this respect, my analysis is still not able to assess whether firms with alliances possess lower target debt ratios (that is alliances have a long-term effect on capital structure), or if the need to induce investments from alliance partners just temporarily bump them away from their targets. Future research could address this limitation by investigating whether strategic alliances influence target capital structure or rather the "speed" with which firms are able to tend to their targets.

Third, from a theoretical point of view probably the major limitation of this work is that it mostly addresses the negative aspects implied by partners' leverage. To a certain extent, I overcome this limitation when I show that high leverage firms offer equity participation as a form of commitment towards the alliance in order to attract better partners. Similarly, I also show that leverage has a positive side when it disciplines the way managers deploy high discretion financial slack across the firm's alliance portfolio. However, there may be also other benefits associated with highly levered partners. For instance, extant literature suggests that financially constrained (*i.e.*, highly levered) firms are more prone to form alliances in order to develop projects that they would not be able to pursue independently (Patzelt et al. 2008, Lerner et al. 2003). Thus, while bringing instability, leverage could also force firms to

externalize valuable projects that would be otherwise lost, and non-levered firms may be able to capitalize upon these opportunities. Future work could study the circumstances under which this may happen, such as how the liquidity of the market impacts alliancing behavior.

Forth and lastly, in this thesis I discuss the implications of firm's capital structure in terms of partner selection, alliance governance choice and alliance portfolio management. Nonetheless, the proposed theoretical framework could be easily extended in order to include other important aspects of alliances that have not been addressed here. For instance, another interesting avenue for future research could be to analyze whether bankruptcy risks influence other contractual characteristics of alliances as well. For example, firms allying with highly levered counterparts may prefer agreements with a predetermined duration or with a limited scope in order to reduce their dependence on the counterpart. Similarly, they may prefer to include early termination clauses contingent upon the counter-part's financial condition or adopt more complex and stringent contracts to prevent any scaling back of effort from the financially weak partner. While lack of detailed data prevented the study of these issues within this thesis, future research on these topics could prove highly insightful.

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