Global Policy Volume 11 . Supplement 1 . January 2020

The Role of Capital and Liquidity in Bank Lending: Are Banks Safer?

Salvatore Polizzi and Enzo Scannella
University of Palermo
Nuria Suárez
Autónoma University of Madrid

Special Issue Article

Abstract

The aim of this paper is to examine whether and to what extent bank capital requirements and liquidity standards influence the level of bank stability. Our approach is that both capital and liquidity affect lending growth, which in turn affects bank stability. We construct a panel dataset on a sample of 2,054 commercial banks from 117 developed and developing countries during the 2000–16 period. By applying a two-stage least squares (2SLS) empirical methodology, our findings show that capital and liquidity have a negative direct impact on the level of bank stability. However, this influence is counteracted by an indirect positive effect through the increased level of credit. Our results are not homogeneous across legal and institutional environments. In particular, we provide evidence on more relevant relationships in countries with higher level of protection of creditor rights and lower restrictions on non-traditional banking activities. Our empirical findings are robust to different specifications of the empirical model and to potential endogeneity problems.

Policy Implications

- Notwithstanding the tightening Basel III regulation, lending has increased in the presence of higher capital requirements and liquidity coverage ratios. However, this increased in lending is not independent upon the legal and institutional setup.
- Although it is fundamental to study the direct effects of capital and liquidity requirements on stability, policymakers should deal not only with these direct effects, but also with the different channels of this transmission mechanism and, specifically, with the lending channel.
- Our findings have a bearing not only for a better understanding of the effectiveness of the capital- and liquidity-based regulatory framework, but offer also potential suggestions to policymakers and researchers in evaluating possible consequences of bank regulation at bank- and industry-level.
- Policymakers should consider that the relationships among capital and liquidity requirements, loan growth and bank stability are not homogeneous across legal and institutional environments. In particular, the level of protection of creditor rights and restrictions on banking activities are two important factors to consider when implementing specific bank regulations.

Bank capital and liquidity requirements have been put under the spotlight from both regulators and scholars over the last decades with the aim of reducing the probability of crises and enhancing transparency and fair business practices in banking, as well as their efficiency and competitiveness (Tutino, 2015; Tutino et al., 2011). The first relevant regulatory attempt to tackle these issues dates back to 1988 with the first Basel Capital Accord (Basel Committee on Banking Supervision, 1988), while the last significant step of this evolutionary process was Basel III regulation in 2010 (Basel Committee on Banking Supervision, 2010) and the implementation of CRR/CRD IV from 1 January 2014. This new framework is based on three standards: capital, liquidity, and corporate governance. Capital standards have imposed banks a stricter definition of the eligible instruments to be used for capital requirements, as well as additional buffers. As for the liquidity standards, two new buffers have been introduced: the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) (Basel Committee on Banking Supervision (2013, 2014). The main objective of the LCR is to enhance the liquidity risk profiles in the short term by imposing banks to maintain an adequate stock of high quality liquid assets. The NSFR requires banks to maintain a stable funding profile over the medium term.

Financial research has tried to shed light on the role played by capital and liquidity on bank stability in order to search for an appropriate design of regulation. However, the study of this relationship has provided mixed results. From one side, papers such as Behn et al. (2016) present evidence on a negative relationship between capital and lending. Noss and Toffano (2016) show that an increase in capital is associated with a reduction in lending during economic

upswings. Aiyar et al. (2016) draw similar conclusions from their analysis of the UK banking system, underlining the importance of capital and monetary policy in determining the level of lending.

From the other side, Carlson et al. (2013) cast doubts on the relationship between capital requirements and credit. According to them, this relationship is significant during and only shortly following the 2008 financial crisis, but not for other periods. Deli and Hasan (2017), over a sample of 125 countries during the 1998–2011 period, show that capital stringency has a weak negative effect on loan growth, but this impact is completely offset when banks hold a relatively high level of capital. Košak et al. (2015) document a positive and significant effect of high quality capital on loan growth during the financial crisis episode.

As for the relationship between liquidity and lending, the literature is scarcer. Cornett et al. (2011) show that banks that held more illiquid assets increased liquidity and reduced lending during the recent crisis. Kim and Sohn (2017) remark the importance of liquidity in determining the sign of the relationship between capital and lending. They show that capital has a significant positive effect on lending only if banks already retain a sufficient amount of liquid assets. Moreover, this relationship seems to hold only for large banks.

Naceur et al. (2018) make it clear that the relationship between capital, liquidity, and lending is extremely complex. They find that US banks, especially small ones, increase their capital base when they boost lending, whereas capital ratios negatively affect European large banks' credit supply. As for liquidity indicators, they find a positive impact on lending for US banks, whereas for large European banks the sign of this relationship depends upon the type of lending.

Banking literature has also investigated the direct effect of capital on bank risk. Calem and Rob (1999), using data from the US banking industry for the period 1984–93, find a non-linear (U-shaped) relationship between capital and risk. They suggest that imposing banks stricter regulatory requirements is a good strategy for regulators only if banks hold a relatively low amount of capital. In contrast, if banks were already highly capitalized, an increase in capital would lead to a higher risk exposure. Schliephake (2016) confirms this effect. In particular, capital requirements seem to reduce risk, unless banks operate in a highly competitive environment during and in the aftermath of a crisis. In this scenario, stricter capital requirements could increase bank risk exposure. Laeven et al. (2016) provide empirical evidence on the role played by size. Specifically, they show that the level of risk is lower for better capitalized banks and that this effect is more pronounced for large financial institutions.

Previous literature has also tested the relationship between bank lending and stability. Salas and Saurina (2002), using data on Spanish commercial and saving banks for the period 1985–97, find that credit risk is strongly influenced by individual bank-level variables, including lending growth. Dell'Ariccia and Marquez (2006) study the interaction between the informational structure of loan market and lending. Their results support the idea of a positive relationship between credit expansion and bank risk at aggregated level. Foos et al. (2010) find that lending growth leads to higher level of risk. This relationship became probably even stronger after the financial crisis, as pointed out by Demyanyk and Van Hemert (2009).

To our best knowledge, however, no paper studies the influence that capital and liquidity have on bank stability and how it could take place through the changes in credit supply that, at the same time, are motivated by capital and liquidity requirements. In this paper, therefore, we contribute to the literature that has tried to shed light on the channels through which capital and liquidity may affect bank stability. Given the above-referred mixed evidence, we state our basic hypothesis as follows:

> Hypothesis 1: Bank capital and liquidity requirements affect bank stability in a direct way and through changes in credit supply.

We contribute to previous literature analyzing the direct and indirect effects of capital and liquidity on bank stability. Using a panel dataset of 2,054 commercial banks examined during the 2000–16 period, our results indicate that capital and liquidity are positively related to loan growth. Although both regulatory aspects have a negative direct effect on stability, it emerges that lending growth helps banks to improve their stability levels.

The above-referred effects of capital and liquidity on lending are robust to the inclusion of a specific set of control variables and after considering the quality of the existent loan portfolio. Furthermore, in countries with higher levels of protection of creditor rights and lower restrictions to non-traditional banking activities, the magnitude of the effects of capital and liquidity requirements to promote stability through the *lending channel* is higher.

Overall, although there is a direct effect of capital and liquidity requirements on bank stability, it is important to take into consideration also the indirect effect, mediated through bank lending. Moreover, our evidence highlights the role of both bank- and country-level characteristics, which may affect the relationships among Basel III regulatory environment, lending and stability.

In the following section, we describe the sample, model, and variables. Section 2 presents the empirical results. The final section concludes.

Method

Sample

Bank-level information comes from ORBIS Bank Focus. Whenever they are available, we use consolidated bank balance sheet and income statement data. We drop banks for which we do not have financial data during our sample period to construct measures of capital and liquidity, loan growth, and stability.

Country-level data on bank market characteristics, creditor rights, and macroeconomic variables come from the World Bank Global Financial Development database, World Bank Development Indicators, and the Institute's Governance

Group. Variables measuring restrictions on non-traditional banking activities come from the World Bank's surveys on Bank Regulation and Supervision by Barth et al. (2013).

Our final sample consists of an unbalanced panel dataset from up to 2,054 banks and a maximum of 12,538 bank-year observations in 117 countries during the 2000–2016 period.

Econometric model

Our empirical analysis considers that capital and liquidity requirements may affect loan growth and stability simultaneously and that changes in granted loans may be an indirect channel leading to changes in bank stability. This analysis requires a procedure in two stages in order to control for endogeneity about loan growth and stability and their potential simultaneous dependence on both regulatory features. We combine a two stage least squares (2SLS) procedure with panel data estimators.

We regress our proxy for bank stability on capital and liquidity variables and on our measure of loan growth, controlling for other factors at both bank and country-level. The structural equation to be estimated is defined as follows:

$$\begin{aligned} ZSCORE_{ijt} = & \beta_0 + \beta_1 TIER1_{ijt-1} + \beta_2 LIQUIDITY_{j,t-1} \\ & + \beta_3 \Delta LOANSp_{ijt} + \beta_4 BANK_{ijt-1} + \beta_5 COUNTRY_{jt} \\ & + \pi_j + \varphi_t + \lambda_{jt} + \mu_i + \varepsilon_{ijt}, \end{aligned} \tag{1}$$

where *i, j,* and *t* refer to the bank, country, and year, respectively. We consider the bank Z-Score as the main dependent variable of our study. $TIER1_{ijt\text{-}1}$, is our proxy for capital requirements. $LIQUIDITY_{ijt\text{-}1}$ contains the two variables that we define to proxy for the Basel III liquidity standards. We include additional bank ($BANK_{ijt}$) and country ($COUNTRY_{jt}$) level control variables. As bank-level controls, we include asset size, the share of non-interest income in total bank income, and overhead costs. We include the annual Lerner index, the annual growth rate of per capita GDP, and the inflation rate, as country-level controls. π_j and φ_t are the set of country and year-fixed effects to control for characteristics that are specific to each country and year. These specific controls allow us to capture most of the unobserved bank-invariant effects that are specific to each country or year and that are not included in the regression. The country-year specific effect (λ_{jt}) controls for aggregate country-specific shocks and potential changes in institutional and regulatory country-level characteristics. This approach has the advantage that it is not necessary for additional country time-varying variables to be included in the regression on their own. μ_i is a bank-specific effect, which is assumed to be constant for bank i over t. ε_{ijt} is a white-noise error term.

$\Delta LOANSp_{ijt}$ approximates the growth of bank net loans. In order to examine if the effect of capital and liquidity on bank stability could be mediated by the different lending behavior of banks, we calculate the predicted value of $\Delta LOANS$ by estimating a first-stage regression in which the observed values of this variable are the dependent variable. The first-stage equation explaining the growth in bank loans ($\Delta LOANS_{ijt}$) is:

$$\begin{aligned} \Delta LOANS_{ijt} = & \alpha_0 + \alpha_1 TIER1_{ijt-1} + \alpha_2 LIQUIDITY_{ijt-1} + \alpha_3 KKZ_{jt} \\ & + \alpha_4 BANK_{ijt-1} + \alpha_5 COUNTRY_{jt} + \varphi_{jt} + \varepsilon_{ijt} + \mu_{i.} \end{aligned} \tag{2}$$

Given the endogenous nature of the relationships among regulation, lending, and stability, our method requires all the explanatory variables in model (1)(1) to be included as independent variables of the first-stage regression obtaining the predicted values of $\Delta LOANS$. This equation has its own predetermined variable, *KKZ*. It is an index capturing the level of institutional quality on each country (Kaufmann et al., 2009). Appropriate instruments should affect the second-stage dependent variable only through their effect on the first-stage endogenous variable. In our case, *KKZ* should affect bank stability only through its impact on the variation of loans. Institutional quality promotes financial development and, thus, economic growth (La Porta et al., 1998). The argument is that operating in an environment where the financial system is well developed is an advantage for more financially dependent industries given the well-functioning *lending channel*. The provision of credit is higher in such environments and, therefore, it spurs economic growth. Given this reasoning, we expect *KKZ* to affect banks' growth of net loans positively. In addition to selecting our instrument based on economic arguments, we require it to pass relevance conditions from an econometric point of view. We ensure that the first-stage Wald test for the instrument is statistically significant; thereby indicating that it is relevant for the empirical explanation of the endogenous variable.

The fitted values of $\Delta LOANS$ ($\Delta LOANSp$) are used in the second stage as independent variable to estimate model (1). The 2SLS approach allows us to separate different effects of capital and liquidity requirements in the equation explaining bank stability. Hence, the coefficients β_1 and β_2 of model (1) would respectively indicate the direct effect of capital requirements and liquidity standards on the level of bank stability regardless of potential changes in lending. The coefficient β_3 would capture the extent to which both regulatory requirements influence bank stability through changes in the growth of loans.

Variables

Bank stability and loan growth

We use the Z-Score (*ZSCORE*) to proxy for the level of bank stability.[1] This variable has been traditionally used as an inverse measure of bank risk (Cubillas and Suárez, 2018). It is computed equaling the return on assets plus the capital asset ratio divided by the standard deviation of asset returns. A 4-year moving window is used to estimate standard deviations for each bank in each year. A higher Z-score indicates that a bank is more stable because it is inversely related to the probability of bank insolvency. Given that the Z-score is highly skewed, we use its natural logarithm, which is normally distributed.

Following Deli and Hasan (2017) or Naceur et al. (2018), among others, the growth in the amount of lending is defined as the annual growth rate of bank net loans over the level of total loans in the previous year (*ΔLOANS*) expressed in US dollars.

Capital and liquidity

We use the TIER1 capital ratio as the variable that approximates the Basel III capital requirements. In order to consider the new liquidity standards defined by Basel III framework, we compute the ratio liquid assets-to-total assets for each bank and year as a proxy for the LCR. Moreover, we define a proxy for the NSFR as the ratio total equity plus customer deposits over total assets.

Control variables

We include a set of both bank- and country-level control variables to take into consideration cross-bank and cross-country heterogeneity over time, which might affect our dependent variables. First, we use a wide set of bank-level control variables to rule out the possibility that effects attributed to capital and liquidity are caused by alternative bank characteristics. Following previous studies, we include control variables that have been traditionally considered as factors explaining both lending and stability (Cubillas and Suárez, 2018; Leroy, 2014). In particular, we consider bank size, proxied by the natural logarithm of bank total assets (SIZE). In order to control for the importance of additional sources of bank income, we include the non-interest income-to-total revenue ratio (NONINT), which can be interpreted as a proxy of the degree of diversification. We also control for bank efficiency by including COST. This variable is defined as non-interest bank expenses expressed as a percentage of total assets. Thus, higher values of this variable would be associated with less efficient banks.

We also introduce a set of country-level controls. We include the Lerner index (*LERNER*) that proxies for the level of market power in each country and year. It is calculated as the difference between price (interest rate) and marginal cost expressed as a percentage of price. It assumes that the divergence between product price and marginal cost of production is the essence of monopoly power. According to this definition, the Lerner index takes value zero in the case of perfect competition and it takes value one under perfect monopoly.

Finally, we include the growth in GDP per capita as a macroeconomic control variable (ΔGDPpc) and the annual growth rate of the consumer prices index (INFLATION) of each country. Both variables are collected from World Development Indicators dataset (Table 1).

Results

Capital, liquidity and loans growth

First, we test the impact of both capital and liquidity on the growth of loans. Especially relevant is to consider the effect of the quality of the existent amount of credit previously

Table 1. Descriptive statistics

	ΔLOANS	*ZSCORE*	*IMPAIRED*	*TIER1*	LCR	NSFR	*SIZE*	*NONINT*	*COST*	KKZ	*LERNER*	GDP	*INFLATION*
Mean	0.1609	1.5556	0.0052	0.1489	0.0135	0.2648	6.4620	−0.0484	0.5755	0.4490	0.2892	0.0239	0.0467
Std. Dev.	0.3776	0.4668	7.8549	11.1385	0.0806	0.1660	0.9404	10.5195	17.4241	0.8952	0.1146	0.0386	0.0692
Median	0.0946	1.5726	0.0028	0.1187	0.0006	0.2272	6.4544	−0.0197	0.5762	0.4923	0.2900	0.0217	0.0295
Maximum	3.0786	2.9227	0.6166	1.0675	3.4378	2.0535	8.6823	0.0086	2.0963	1.9088	0.5900	0.3303	2.6953
Minimum	−0.6331	−0.0343	0	0.0046	5.32e-07	0	3.8459	−0.8473	0.1327	−1.7713	0.0100	−0.1514	−0.1862

ΔLOANS is the annual growth rate of bank net loans. *ZSCORE* is the natural logarithm of the *Z*-score. *IMPAIRED* is the ratio impaired and nonperforming loans over gross loans. *TIER1* is the *TIER1* capital ratio. LCR is the liquidity coverage ratio measured as the liquid assets-to-total assets ratio. NSFR is the net stable funding ratio computed as total equity plus customers' deposits over total assets. *SIZE* is the natural logarithm of total bank assets. *NONINT* is the non-interest income-to-total revenue ratio. *COST* is personnel expenses and other non-interest expenses over total assets. *KKZ* is the *KKZ* index of institutional quality. *LERNER* is the Lerner index. Δ*GDPpc* is the annual growth rate in real GDP per capita. *INFLATION* is the annual growth rate of consumer prices index.

Table 2. Capital, liquidity and loans growth: the role of credit quality

	Panel A: All Banks		Panel B: High *IMPAIRED*		Panel C: Low *IMPAIRED*	
	(1)	(2)	(3)	(4)	(5)	(6)
$TIER1_{t-1}$	0.0011***	0.0011***	0.0011***	0.0016***	0.0009***	0.0007**
	(6.69)	(4.88)	(4.28)	(4.47)	(4.57)	(2.45)
LCR_{t-1}	2.8289***		1.6474***		6.4802***	
	(5.60)		(2.94)		(5.29)	
$NSFR_{t-1}$		0.0318		0.0111		0.0392
		(1.31)		(0.34)		(1.07)
$SIZE_{t-1}$	−0.1305***	−0.1856***	−0.1579***	−0.1847***	−0.1044***	−0.1833***
	(−22.68)	(−15.14)	(−19.44)	(−10.89)	(−12.47)	(−9.95)
$NONINT_{t-1}$	0.0003***	0.0005***	0.0003***	0.0003	0.0002	0.0007***
	(3.72)	(3.28)	(2.88)	(1.59)	(1.63)	(2.93)
$COST_{t-1}$	0.0001	0.0000	−0.0003**	−0.0001	0.0005***	0.0004**
	(1.27)	(0.61)	(−2.29)	(−0.87)	(4.01)	(1.97)
$IMPAIRED_{t-1}$	−0.2107***	−0.1986***	−0.1824***	−0.1764***	−0.2093***	−0.1941***
	(−11.73)	(−5.90)	(−8.67)	(−4.07)	(−5.70)	(−3.47)
LERNER	−0.0387***	0.0263	−0.0224	−0.0862***	−0.0380**	−0.0403
	(−3.29)	(1.27)	(−1.42)	(−2.93)	(−2.12)	(−1.36)
ΔGDPpc	0.4917***	0.3433***	0.4965***	0.2577***	0.3723***	0.4106***
	(13.99)	(6.26)	(10.89)	(3.31)	(6.62)	(5.23)
INFLATION	−0.2129***	0.0392	−0.2565***	−0.0375	−0.1501***	0.0809
	(−8.67)	(0.86)	(−7.98)	(−0.57)	(−3.91)	(1.28)
Country – year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.2696	0.2551	0.3584	0.2926	0.1833	0.2363
F-test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
#Observations	11,075	4,368	5,603	2,249	5,432	2,119
#Banks	1,883	997	961	496	922	501

This table shows the results of the effect of capital and liquidity requirements on loan growth. The dependent variable is the annual growth rate of bank net loans (ΔLOANS). *TIER1* is the *TIER1* capital ratio. LCR is the liquidity coverage ratio. NSFR is the net stable funding ratio. *SIZE* is the natural logarithm of total assets. *NONINT* is the non-interest income-to-total revenue ratio. *COST* is the non-interest expenses over total assets ratio. *IMPAIRED* is the ratio impaired and nonperforming loans over gross loans. *LERNER* is the Lerner index. *ΔGDPpc* is the annual growth rate in real GDP per capita. *INFLATION* measures the annual growth rate of consumer prices index. *** and ** indicate statistical significance at 1 and 5 per cent, respectively.

granted. This is why in this initial set of results presented in Table 2 we control for the existent amount of impaired and nonperforming loans as a percentage of gross loans of each bank and year (*IMPAIRED*). In columns (1) and (2), we report our basic findings using the entire sample of banks and including the ratio impaired and nonperforming loans over gross loans lagged by one period as an additional control variable. Second, in columns (3) to (6), apart from controlling for the lagged value of the *IMPAIRED* variable, we show the results by subsamples of banks according to the level of impaired and nonperforming loans. In particular, we define a dummy variable that takes value one if the bank in a particular year is above the 50th percentile of impaired loans and nonperforming loans-to-gross loans ratio, and zero otherwise. We consider the value of the *IMPAIRED* variable in 2009 in order to take into account the increased levels of default rates in our sample because of the crisis episode and its potential impact on the capacity of capital and liquidity to affect the supply of new loans. In columns (1), (3), and (5), we use the LCR variable as the one related to liquidity standards. In columns (2), (4), and (6), our proxy for NSFR is used. In all the cases, our proxy for bank capital is the TIER1 ratio.

On average, there is a positive effect of capital on the growth of bank loans. These results, consistently with Ayuso et al. (2004), Košak et al. (2015) or Jiménez et al., (2012), suggest that higher levels of capital foster banks' ability to absorb losses from their asset-side operations and improve their capacity to accommodate faster loan growth. Hence, banks with higher TIER1 capital ratios can lend more than banks with small levels of capital.

As for liquidity standards, our results suggest that LCR and NSFR work in different ways. Results presented in panels A, B, and C indicate that, on average, the higher level of LCR promotes loan growth regardless the quality of the existent bank loans. This finding would be consistent with banks with buffer stocks of liquid assets being able to originate more credit (Naceur et al., 2018). We do not find, however, any significant result for the effect of the NSFR on the growth of loans.

We obtain a negative and statistically significant coefficient for size (*SIZE*) and for the variable that proxies for the quality of the existent amount of loans (*IMPAIRED*). Larger banks and banks with higher levels of impaired and nonperforming loans over gross loans are the ones with the relative lowest rates of growth of new loans. *NONINT* presents a

positive coefficient, although it is statistically significant in four out of the six estimates. This would indicate that the higher the relevance of non-traditional banking activities in the bank balance sheet, the higher the growth rate of net loans. Hence, the higher the ability of the bank to diversify risks across different types of investments, the higher its capability to hedge against potential losses and the higher the provision of new credit. *COST* shows different signs of its coefficient depending on the subsample of banks examined. In particular, we find a negative and statistically significant coefficient in column (3) and a positive one in columns (5) and (6). This indicates that, in the case of banks with lower quality of granted loans, higher levels of operational costs reduces the provision of new loans. The result is completely the opposite in the case of banks with better credit quality.

LERNER presents a negative coefficient. Consistently with the classic argument from the industrial organization literature, in less competitive banking markets there is a lower amount of loans provided by banks. The growth in per capita GDP ($\Delta GDPpc$) has a positive and significant coefficient in all estimates, whereas *INFLATION* is negatively and significantly associated to the growth of bank loans in three out of six regressions.

We now consider the extent to which the effect of capital and liquidity on loan growth could be shaped by the legal and institutional environment. First, we use the variable *CREDITOR* to measure a country's overall quality of creditor rights protection. This variable measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. Second, we consider a variable that approximates whether banks are allowed to take part in activities that generate non-interest income (*RESTRICT*). In particular, this variable indicates whether bank activities in the securities, insurance, real estate markets, and participation on the ownership and control of non-financial firms are: (1) unrestricted; (2) permitted; (3) restricted; or (4) prohibited. Higher values of this variable indicate more restrictions on bank activities. Third, we consider the extent to which bank participation on the ownership and control of non-financial firms is regulated (*OWN*). This variable can range from a minimum value of 1 to a maximum value of 4. It is constructed giving value 1, 2, 3, or 4 if the bank participation as an owner of a non-financial firm is (1) unrestricted, (2) permitted, (3) restricted, or (4) prohibited.

In Table 3, we present our findings. We obtain a positive and statistically significant coefficient for *TIER1* indicating that, on average, the impact of higher capital on loan growth remains positive after controlling for creditor rights and bank regulation. Our results suggest, however, that this effect is shaped by the quality of protection of creditor rights and by the regulatory restrictions on non-traditional banking activities. Specifically, although higher capital requirements are positively associated to loan growth, in countries with higher protection of creditor rights (*CREDITOR*) and higher levels of restrictions on non-traditional banking activities (*RESTRICT* and *OWN*), the effect is the opposite. This suggests the existence of a potential substitute effect between the effectiveness of requirements on bank capital and the features of the legal and institutional framework in terms of creditor rights protection and regulation on bank activities.

We find a positive and statistically significant coefficient for the interaction between the LCR and *CREDITOR*, suggesting a complementary effect between LCR and the quality of protection of creditor rights to promote a higher loan growth. The sign of the interaction LCR**OWN* is negative and statistically significant, indicating that the effect of the LCR on loan growth is more negative in countries with higher levels of restrictions on bank ownership and control of non-financial firms. Although negative, the coefficient of the interaction term LCR**RESTRICT* is not statistically significant at conventional levels. These findings may indicate that the most positive effect of liquidity standards to incentivize banks to lend more takes place in countries with lower restrictions on non-traditional banking activities. In these environments, it is easier for them to hedge against potential losses from the credit activity and are more prone to increase the amount of lending.

Finally, we only obtain a positive and statistically significant coefficient for the interaction between our proxy for NSFR and *CREDITOR* in model (2). This result suggests that the higher amount of stable funding only promotes lending in the case of countries where the quality of protection of creditor rights is higher.

Capital, liquidity and loans growth: influence on bank stability

Once we have shown how bank capital and liquidity requirements influence loan growth and how bank-level characteristics and the features from the institutional and regulatory environment may shape these relationships, in Table 4 we examine the results for equations explaining bank stability. The individual coefficient of the capital and liquidity variables capture their impact on the level of bank stability due to channels different from changes in loan growth. The coefficient of $\Delta LOANSp$ indicates the impact of both capital and liquidity through changes in the growth of bank loans. The Wald test obtained in the first-stage equation confirms the significance and suitability of the instrument used to explain the variation on bank credit supply in the first stage (*KKZ*).

Results for the first-stage estimates in columns (1) and (2) confirm the positive effect of both *TIER1* and LCR on the growth of bank loans. According to our previous results, we do not find any statistically significant effect of the NSFR variable on loans growth. The individual coefficients for *TIER1* and LCR are negatively and significantly associated with the *ZSCORE* variable in column (3). The individual effect of the NSFR variable shown in column (4) indicates that higher amount of stable funding in the bank balance sheet positively affects stability through channels different from lending supply.

In columns (3) and (4), we obtain a positive and significant coefficient for the predicted values of the growth of loans obtained from the first-stage regression. The

Table 3. Capital, liquidity and loans growth: the role of the legal and institutional environment

	(1)	(2)	(3)	(4)	(5)	(6)
$TIER1_{t-1}$	0.0014***	0.0022***	0.0013***	0.0013***	0.0014***	0.0019***
	(10.11)	(9.20)	(7.11)	(4.36)	(8.38)	(6.71)
LCR_{t-1}	−1.3371***		1.1732		1.0032	
	(−3.17)		(1.15)		(1.56)	
$NSFR_{t-1}$		−0.0321*		0.0017		0.0280
		(−1.66)		(0.05)		(0.91)
$TIER1_{t-1}$*CREDITOR	−0.0008***	−0.0002***				
	(−6.57)	(−5.92)				
LCR_{t-1}*CREDITOR	0.5000***					
	(5.35)					
$NSFR_{t-1}$*CREDITOR		0.0076***				
		(2.68)				
$TIER1_{t-1}$*RESTRICT			−0.0003***	−0.0005**		
			(−3.18)	(−2.42)		
LCR_{t-1}*RESTRICT			−0.1569			
			(−1.47)			
$NSFR_{t-1}$*RESTRICT				0.0016		
				(0.41)		
$TIER1_{t-1}$*OWN					−0.0001***	−0.0004***
					(−4.53)	(−5.28)
LCR_{t-1}*OWN					−0.6701**	
					(−2.20)	
$NSFR_{t-1}$*OWN						0.0280
						(0.91)
$SIZE_{t-1}$	−0.0176***	−0.0148***	−0.0185***	−0.0123***	−0.0182***	−0.0115***
	(−10.25)	(−7.14)	(−10.16)	(−5.71)	(−9.97)	(−5.38)
$NONINT_{t-1}$	0.0005***	0.0006***	0.0005***	0.0005***	0.0005***	0.0005***
	(6.85)	(4.95)	(5.92)	(3.95)	(5.94)	(4.03)
$COST_{t-1}$	0.0000	0.0000	0.0000	−0.0005	6.36e − 06	−0.0000
	(0.96)	(1.00)	(0.15)	(−0.56)	(0.09)	(−0.54)
CREDITOR	−0.0007	0.0005				
	(−1.26)	(0.39)				
RESTRICT			−0.0003	−0.0006		
			(−0.47)	(−0.46)		
OWN					−0.0015	0.0021
					(−0.72)	(0.55)
LERNER	−0.0326***	−0.0518***	−0.0291***	−0.0635***	−0.0262**	−0.0721***
	(−3.40)	(−3.78)	(−2.87)	(−4.31)	(−2.56)	(−4.86)
Δ*GDPpc*	0.7330***	0.4665***	0.7408***	0.4745***	0.7392***	0.4720***
	(24.49)	(10.42)	(23.36)	(9.92)	(23.63)	(10.08)
INFLATION	−0.2019***	−0.0844**	−0.2154***	−0.1168***	−0.2165***	−0.1224***
	(−9.92)	(−2.39)	(−10.08)	(−2.95)	(−10.14)	(−3.11)
Country − year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Wald Test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R^2	0.2172	0.2738	0.2519	0.2815	0.2119	0.2923
#Observations	12,524	4,862	11,582	4,133	11,582	4,133
#Banks	2,052	1,071	1,869	927	1,869	927

This table shows the results if the impact of capital and liquidity on loan growth is shaped by the characteristics of the legal and institutional environment. The dependent variable is the annual growth rate of bank net loans (Δ*LOANS*). *TIER1* is the *TIER1* capital ratio. LCR is the liquidity coverage ratio. NSFR is the net stable funding ratio. *SIZE* is the natural logarithm of total assets. *NONINT* is the non-interest income-to-total revenue ratio. *COST* is the non-interest expenses over total assets ratio. *IMPAIRED* is the ratio impaired and nonperforming loans over gross loans. *CREDITOR* is the index of protection of creditor rights. *RESTRICT* is the indicator of the extent to which non-traditional banking activities are permitted in a country. *OWN* indicates the extent to which banks are allowed to participate the capital of a non-financial firm. *LERNER* is the Lerner index. Δ*GDPpc* is the annual growth rate in real GDP per capita. *INFLATION* measures the annual growth rate of consumer prices index. ***; ** and * indicate statistical significance at 1, 5, and 10 per cent, respectively.

arguments behind this finding could be related to the fact that the new loans are granted following prudential criteria and at rates that do compensate for the associated default risk of each lending operation. Moreover, under these (safer) circumstances, the growth in loans is coherent with the need for continuing holding sufficient amount of capital.

Table 4. Capital, liquidity and loans growth: influence on bank stability

	1st Stage: ΔLOANS		2nd Stage: ZSCORE	
	(1)	(2)	(3)	(4)
$TIER1_{t-1}$	0.0010***	0.0012***	−0.0032*	0.0021
	(6.93)	(5.79)	(−1.82)	(1.35)
LCR_{t-1}	1.0675***		−0.9090***	
	(4.38)		(−5.00)	
$NSFR_{t-1}$		0.0168		0.3152***
		(0.76)		(3.21)
ΔLOANSp			0.5845***	0.4431**
			(3.67)	(2.42)
$SIZE_{t-1}$	−0.1267***	−0.1915***	0.6925***	0.1021
	(−23.01)	(−16.85)	(3.43)	(0.51)
$NONINT_{t-1}$	0.0004***	0.0006***	0.0010	0.0032***
	(5.15)	(3.88)	(1.19)	(3.35)
$COST_{t-1}$	0.0000	−0.0000	−0.0013***	−0.0018***
	(0.72)	(−0.32)	(−3.36)	(−3.11)
KKZ	0.0285***	0.0684***		
	(2.62)	(4.05)		
LERNER	−0.0581***	−0.0115	0.4238***	0.0116
	(−4.93)	(−0.59)	(4.12)	(0.14)
ΔGDPpc	0.5417***	0.3197***	−1.8352**	0.6196
	(15.29)	(5.92)	(−2.07)	(1.41)
INFLATION	−0.2035***	0.0844*	0.8912**	−0.0577
	(−8.35)	(1.90)	(2.53)	(−0.29)
Country − year dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
R^2	0.2520	0.2630	0.1034	0.1086
First-stage Wald test (p-value)	0.0000	0.0000	-	-
F-Test (p-value)	0.0000	0.0000	0.0000	0.0000
#Observations	12,538	4,866	12,538	4,866
#Banks	2,054	1,702	2,054	1,702

This table presents the results examining the effect of both capital and liquidity on bank stability and its effect through changes in lending. The dependent variable in the second stage is the *ZSCORE*. *TIER1* is the *TIER1* capital ratio. LCR is the liquidity coverage ratio. NSFR is the net stable funding ratio. Δ*LOANSp* are the predicted values of the growth rate of loans obtained from the first-stage estimations. *SIZE* is the natural logarithm of total assets. *NONINT* is the non-interest income-to-total revenue ratio. *COST* is the non-interest expenses over total assets ratio. *KKZ* is the KKZ index of institutional quality in each country. *LERNER* is the Lerner index. Δ*GDPpc* is the annual growth rate in real GDP per capita. *INFLATION* is the annual growth rate of consumer prices index. ***; ** and * indicate statistical significance at 1, 5, and 10 per cent, respectively.

Overall, the higher levels of loans granted by banks that increased their capital and liquidity ratios promote more solvent and stable bank entities. Hence, new loans seem to act as a specific channel through which regulation helps banks to reduce their risk-taking incentives and, thereby, increase bank stability.

Regarding the control variables, *SIZE* is positively associated with the *ZSCORE*, suggesting that larger banks are safer than smaller ones as they are more able to diversify and manage risks than smaller banks. *NONINT* coefficient in column (4) suggests that banks with a higher proportion of non-interest income are more stable. We associate this result with the benefits of diversification of activities in risk management. *COST*, as an inverse proxy of efficiency, is also significant to explain *ZSCORE*. In particular, the negative sign of its coefficient in columns (3) and (4) indicates that banks that are less efficient keep lower levels of stability. The positive and significant coefficient of *LERNER* in column (3) suggests that, according to the arguments developed by the *competition-fragility view*, a higher degree of market power in the banking sector may encourage banks to reduce risk-taking and, therefore, increase their stability level. In column (3), we obtain a negative and a positive significant coefficient for ΔGDPpc and *INFLATION*, respectively.

Capital, liquidity, and loan growth: influence on bank stability in different legal and institutional environments

In this section, we examine the influence of the legal and institutional environment on the role played by loan growth to counteract the impact of capital and liquidity standards on bank stability. Results in Table 5 indicate that the effect of Δ*LOANSp* on *ZSCORE* remains positive and statistically significant. This indicates that although, on average, both *TIER1* and LCR reduce bank stability, the effect is counteracted by the increase in bank loans. Results in columns (1) and (4)

show that *CREDITOR* is negatively related to stability, suggesting that higher protection of creditor rights may increase banks incentives to take more risks and, therefore, reduce stability. We must be cautious, however, with this result as it is only statistically significant in column (4).

According to the coefficient of the interaction term, our results suggest that the quality of protection of creditor rights acts as a complementary of the predicted values of the growth of bank loans to increase bank stability. Hence, this evidence suggests that the role of Basel III capital and liquidity requirements to reduce bank risk-taking incentives through changes in the growth of loans is more relevant in countries with higher level of creditor rights protection. Consequently, overall, it emerges that capital and liquidity work better in a context where the quality of protection of creditor rights is higher.

In terms of activities regulation, we obtain positive and significant coefficients for both *RESTRICT* and *OWN* indicating that higher restrictions on non-traditional banking activities promotes higher stability levels. This result could be consistent with literature that states that allowing banks to expand into non-traditional businesses may increase systematic risk (DeYoung and Roland, 2001). However, the results for the interaction terms with the predicted value of the growth of loans suggest that the most relevant role of the increased lending to promote stability takes place in the case of countries with lower restrictions on non-traditional banking activities. This result remarks the suitability of allowing banks to enroll activities different from (traditional) credits and deposits to diversify risks and increase their capacity to absorb losses and, therefore, their stability levels. This result is also coherent with the positive sign found for the *NONINT* variable in Table 4.

Finally, in a similar vein, our results are consistent with the more positive role of capital and liquidity to promote higher bank stability through the *lending channel* in countries with lower level of restrictions on banks participation in the ownership structure of non-financial firms. This finding suggests again the positive role of Basel III new regulatory framework to promote safer lending and increase bank

Table 5. Capital, liquidity and loan growth: influence on bank stability in different legal and institutional environments

	(1)	(2)	(3)	(4)	(5)	(6)
$TIER1_{t-1}$	−0.0006	−0.0013**	−0.0013**	0.0006	0.0006	0.0008
	(−0.98)	(−2.11)	(−2.10)	(0.89)	(0.80)	(1.00)
LCR_{t-1}	−0.0063***	−0.6729***	−0.6903***			
	(−7.01)	(−5.74)	(−5.87)			
$NSFR_{t-1}$				0.2484***	0.2028***	0.2130***
				(4.59)	(3.53)	(3.72)
Δ*LOANSp*	3.0689***	4.6773***	4.4629***	0.7826***	1.7351***	1.2534***
	(8.14)	(11.19)	(11.39)	(3.01)	(4.67)	(4.02)
Δ*LOANSp***CREDITOR*	0.0597***			0.0795***		
	(3.48)			(3.58)		
Δ*LOANSp***RESTRICT*		−0.0556**			−0.0433	
		(−2.57)			(−1.56)	
Δ*LOANSp***OWN*			−0.1523**			0.0048
			(−2.40)			(0.06)
CREDITOR	−0.0012			−0.0106**		
	(−0.37)			(−2.11)		
RESTRICT		0.0192***			0.0151**	
		(4.91)			(2.58)	
OWN			0.0758***			0.0645***
			(6.69)			(3.81)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Country − year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1234	0.1434	0.1463	0.1612	0.1631	0.1667
First-stage Wald test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Wald test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
#Observations	12,524	11,582	11,582	4,862	4,133	4,133
#Banks	2,052	1,869	1,869	1,071	927	927

This table presents results examining if the legal and institutional environment shapes the effect of capital, liquidity, and loan growth on bank stability. The dependent variable is the *ZSCORE*. *TIER1* is the *TIER1* capital ratio. LCR is the liquidity coverage ratio. NSFR is the net stable funding ratio. Δ*LOANSp* are the predicted values of the growth rate of loans obtained from the first-stage estimations. *SIZE* is the natural logarithm of total assets. *NONINT* is the non-interest income-to-total revenue ratio. *COST* is personnel expenses and other non-interest expenses over total assets. *CREDITOR* is the index of protection of creditor rights. *RESTRICT* is the indicator of the extent to which non-traditional banking activities are permitted in a country. *OWN* indicates the extent to which banks are allowed to participate the capital of a non-financial firm *LERNER* is the Lerner index. Δ*GDPpc* is the annual growth rate in real GDP per capita. *INFLATION* is the annual growth rate of consumer prices index. *** and ** indicate statistical significance at 1 and 5, respectively.

stability especially in countries with less stringent restrictions on banks diversification strategies.

Conclusions

This paper examines two key aspects of the ever-increasing complexity of the Basel III standards: the relationship between capital and liquidity requirements and banks' loan growth, and the effects of loan growth on bank stability. Using data of more than 2,000 commercial banks from 117 countries, we examine the nexus among regulatory requirements, lending, and stability. We find that there are positive effects of capital requirements and short-term liquidity buffers on the growth of lending. Notwithstanding the tightening Basel III regulation, lending has increased in the presence of higher capital requirements and liquidity coverage ratios. Our findings suggest that the intensity of the relationship between bank capital and liquidity and loan growth is affected by creditor rights protection and bank activity regulation.

By applying a 2SLS methodology, we provide evidence on a positive relationship between the increased level of loan growth and bank Z-score that is consistent with the higher growth of loans –promoted by higher capital and liquidity standards– increasing bank stability at the same time. Moreover, our analysis provides evidence on the existence of a potential substitute effect between capital requirements and creditor rights protection and regulation on bank activities.

More generally, our study supports the idea that a holistic approach to analyze the interaction among capital and liquidity and bank lending is required. The 2SLS analysis is coherent with the need to adopt an integrated and unitary framework to explain and assess the strategic interaction at bank-level. Thus, our evidence contributes to the debate on whether the more stringent Basel III conditions have a positive impact on loan growth. Particularly important appears the finding that capital and liquidity affect bank stability differently concerning the level of creditor rights protection, bank diversification strategies, and bank participation in the ownership structure of non-financial firms. Our findings have a bearing not only for a better understanding of the effectiveness of the capital and liquidity-based regulatory framework, but offer also potential suggestions to policymakers and researchers in evaluating possible consequences of bank regulation at bank- and industry-level.

Our approach sheds light on the fact that, although it is fundamental to study the direct effect of capital and liquidity requirements on stability, it is equally important to consider the different channels of this transmission mechanism. In our research setting, looking at the sole direct effect of our analysis, it would be straightforward to conclude that capital and liquidity requirements have had a detrimental effect on the banking sector. Unfortunately, this hasty conclusion would be wrong, not only because of the increased level of loans, but also in view of the fact that the loan growth is associated to a higher level of stability. Our paper contributes to the extant literature investigating into the role of the *lending channel* in the relationship between capital and liquidity on the one hand, and bank stability on the other. In this regard, further research to detect and analyze other transmission mechanisms might be extremely valuable.

The aforementioned positive indirect relationship is even stronger in countries with higher level of protection of creditor rights. This finding is related to the fact that the increased level of lending is safer and does not lead to higher level of instability if creditor rights are properly protected.

As for bank activity regulation, looking at the direct effects of capital and liquidity requirements on stability, it emerges that higher restrictions on non-traditional banking activities lead to lower level of risk. This finding suggests that allowing financial institutions to expand into non-traditional businesses may increase their risk exposure. However, our results also suggest that the most relevant role of the increased lending to promote stability takes place in countries with lower restrictions on non-traditional banking activities. Hence, this finding remarks the importance of allowing banks to engage in activities different from traditional ones, in order to diversify their risk exposure and enhance their stability levels. Once again, the closer inspection on the *lending channel* provides crucial information to assess the impact of capital and liquidity requirements on bank stability.

In conclusion, it is important to remark that when it comes to the introduction of new regulatory requirements, policymakers should deal not only with the direct effects of their decisions, but also to any indirect transmission mechanism that could completely revert the overall effects of their corrective actions.

Notes

We thank Pablo de Andrés, Myriam García, Philip Molyneux, Eleuterio Vallelado, participants at the I Banca March Workshop on Contemporary Issues in Banking (2019), the INFINITI Conference on International Finance (2019), and the anonymous referees for helpful comments and suggestions. Nuria Suárez acknowledges financial support from the Spanish Ministry of Economy and Competitiveness (Projects: ECO2016-79693-P and ECO2017-85356-P) and from the ACRI Young Investigator Training Program (2017).

1. We check that our results do not vary when we use the impaired and non-performing loans over total gross loans ratio as the proxy of bank risk.

References

Aiyar, S., Calomiris, C. W. and Wieladek, T. (2016) 'How Does Credit Supply Respond to Monetary Policy and Bank Minimum Capital Requirements?', *European Economic Review*, 82, pp. 142–165.

Ayuso, J., Pérez, D. and Saurina, J. (2004) 'Are Capital Buffers Procyclical? Evidence from Spanish Panel Data', *Journal of Financial Intermediation*, 13 (2), pp. 249–264.

Barth, J., Caprio, G. and Levine, R. (2013) 'Bank Regulation and Supervision in 180 Countries from 1999 to 2011', *Journal of Financial Economic Policy*, 5 (2), pp. 111–219.

Basel Committee on Banking Supervision. (1988) *International Convergence of Capital Measurement and Capital Standards*. Basel: Bank for International Settlements.

Basel Committee on Banking Supervision. (2010) Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems. Basel: Bank for International Settlements.
Basel Committee on Banking Supervision. (2013) *Basel III: The Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools*. Basel: Bank for International Settlements.
Basel Committee on Banking Supervision. (2014) *Basel III: The Net Stable Funding Ratio*. Basel: Bank for International Settlements.
Behn, M., Haselmann, R. and Wachtel, P. (2016) 'Procyclical Capital Regulation and Lending', *The Journal of Finance*, 71 (2), pp. 919–956.
Calem, P. and Rob, R. (1999) 'The Impact of Capital-based Regulation on Bank Risk-taking', *Journal of Financial Intermediation*, 8 (4), pp. 317–352.
Carlson, M., Shan, H. and Warusawitharana, M. (2013) 'Capital Ratios and Bank Lending: A Matched Bank Approach', *Journal of Financial Intermediation*, 22 (4), pp. 663–687.
Cornett, M. M., McNutt, J. J., Strahan, P. E. and Tehranian, H. (2011) 'Liquidity Risk Management and Credit Supply in the Financial Crisis', *Journal of Financial Economics*, 101 (2), pp. 297–312.
Cubillas, E. and Suárez, N. (2018) 'Bank Market Power and Lending During the Global Financial Crisis', *Journal of International Money and Finance*, 89, pp. 1–22.
Deli, Y. D. and Hasan, I. (2017) 'Real Effects of Bank Capital Regulations: Global Evidence', *Journal of Banking and Finance*, 82, pp. 217–228.
Dell'Ariccia, G. and Marquez, R. (2006) 'Lending Booms and Lending Standards', *The Journal of Finance*, 61 (5), pp. 2511–2546.
Demyanyk, Y. and Van Hemert, O. (2009) 'Understanding the Subprime Mortgage Crisis', *The Review of Financial Studies*, 24 (6), pp. 1848–1880.
DeYoung, R. and Roland, K. P. (2001) 'Product Mix and Earnings Volatility at Commercial Banks: Evidence from a Degree of Total Leverage Model', *Journal of Financial Intermediation*, 10 (1), pp. 54–84.
Foos, D., Norden, L. and Weber, M. (2010) 'Loan Growth and Riskiness of Banks', *Journal of Banking and Finance*, 34 (12), pp. 2929–2940.
Jiménez, G., Ongena, S., Peydró, J. L. and Saurina, J. (2012) 'Credit Supply and Monetary Policy: Identifying the Bank Balance-sheet Channel with Loan Applications', *American Economic Review*, 102 (5), pp. 2301–2326.
Kaufmann, D., Kraay, A. and Mastruzzi, M. (2009) Governance matters VIII : aggregate and individual governance indicators 1996-2008', Policy Research Working Paper no. WPS 4978, World Bank, Washington, DC.
Kim, D. and Sohn, W. (2017) 'The Effect of Bank Capital on Lending: Does Liquidity Matter?', *Journal of Banking and Finance*, 77, pp. 95–107.
Košak, M., Li, S., Lončarski, I. and Marinč, M. (2015) 'Quality of Bank Capital and Bank Lending Behavior During the Global Financial Crisis', *International Review of Financial Analysis*, 37, pp. 168–183.
La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (1998) 'Law and Finance', *Journal of Political Economy*, 106 (6), pp. 1113–1155.
Laeven, L., Ratnovski, L. and Tong, H. (2016) 'Bank Size, Capital, and Systemic Risk: Some International Evidence', *Journal of Banking and Finance*, 69 (Suppl. 1), pp. S25–S34.
Leroy, A. (2014) 'Competition and the Bank Lending Channel in Eurozone', *Journal of International Financial Markets, Institutions and Money*, 31, pp. 296–314.
Naceur, S. B., Marton, K. and Roulet, C. (2018) 'Basel III and Bank-lending: Evidence from the United States and Europe', *Journal of Financial Stability*, 39, pp. 1–27.
Noss, J. and Toffano, P. (2016) 'Estimating the Impact of Changes in Aggregate Bank Capital Requirements on Lending and Growth during an Upswing', *Journal of Banking and Finance*, 62, pp. 15–27.
Salas, V. and Saurina, J. (2002) 'Credit Risk in Two Institutional Regimes: Spanish Commercial and Savings Banks', *Journal of Financial Services Research*, 22 (3), pp. 203–224.
Schliephake, E. (2016) 'Capital Regulation and Competition as a Moderator for Banking Stability', *Journal of Money, Credit and Banking*, 48 (8), pp. 1787–1814.
Tutino, F. (2015) *La Banca. Economia, Finanza, Gestione*. Bologna: Il Mulino.
Tutino, F., Birindelli, G. and Ferretti, P. (2011) *Basilea 3. Quali Impatti Per Le Banche*. Milano: Egea.

Author Information

Salvatore Polizzi is a PhD student in Economics at the University of Palermo, Italy. He held a visiting researcher position at the Bangor Business School. His research interests include banking, risk disclosure, and financial regulation. He is a member of the European Association of University Teachers of Banking and Finance.

Enzo Scannella is an Associate Professor of Banking and Finance at the University of Palermo, Italy. His main research interests are: banking, risk management, and financial innovation. He held visiting positions at Harvard Business School. He is a member of the European Association of University Teachers of Banking and Finance.

Nuria Suárez is an Assistant Professor of Finance at the Autónoma University of Madrid, Spain. Her main research interests are: banking, corporate finance, and governance. She has published articles in Journal of Corporate Finance or Journal of Financial Stability, among others. She held a visiting position at the University of Palermo.