How does Bank Capital Affect the Supply of Credit Lines?

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ABSTRACT

This paper examines whether a bank's equity capital affects the magnitude of the credit lines banks provide as liquidity insurance for borrowers. We find a positive relationship between capital and credit line supply, which is intensified during financial crises. This result is robust even after controlling for potential endogeneity through a dynamic panel generalized method of moments (GMM). We also find that illiquid banks and banks with high credit risk provide more lines of credit as they become better capitalized, whereas large banks and banks with high wholesale funding ratios reduce their credit line supply as their equity ratios increase.

Keywords: Credit Lines, Bank Capital, Liquidity Insurance, Financial Crises
JEL classification: G21, G28

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1. Introduction

A line of credit allows a borrower to draw funds during a specified period within predetermined terms when facing unpredictable liquidity needs. Credit lines offer liquidity insurance to borrowers who are uncertain about their ability to obtain future credit from banks (Holmstrom and Tirole, 1997; Kashyap et al., 2002; Thakor, 2005; Gatev and Strahan, 2006; Acharya et al., 2014). Firms use lines of credit to manage their liquidity (Shockley and Thakor, 1997; Sufi, 2009; Lins et al., 2010). Many studies have examined credit lines as a corporate liquidity management tool, but few have analyzed the banking factors that affect credit line supply.

The 2008 global financial crisis revealed the importance of bank equity capital as a buffer against shocks. Equity capital is an important mean of maintaining the stability and soundness of the banking system. Recent studies indicate that weak supervision of bank capital and insufficient capital buffers contributed to the 2008 financial crisis (Maddaloni and Peydro, 2011; Berger and Bouwman, 2013). During the past decade, banks dramatically increased their leverage by relying on wholesale funding while aggressively expanding their balance sheets (Brunnermeier, 2009; Allen and Carletti, 2010; Beltratti and Stulz, 2012; Farhi and Tirole, 2012). Accordingly, Figure 1 shows that banks' wholesale funds and loan supply rapidly increased until 2007. The aggregate wholesale funds of commercial banks in 24 OECD countries more than quadrupled, from $2,868 billion in 2000 to $12,684 billion in 2007, increasing banks' liquidity risk through reliance on volatile wholesale funding. Aggregate bank loans more than tripled, from $8,106 billion in 2000 to $30,504 billion in 2007. These changes reduced bank capital, leaving banks vulnerable during market downturns.

[Insert Figure 1 around here]

This paper examines whether bank capital affects credit line supply in the context of liquidity provisions to borrowing firms by addressing several questions. First, how does bank equity capital affect the supply of credit lines? Second, does capital help banks grant more lines of credit to borrowers during financial crises? Third, how does capital's effect on credit line supply differ cross-sectionally depending on the level of bank credit risk, liquidity risk,

funding structure, and bank size? This issue has apparently not been studied, despite equity capital's key role in providing liquidity to customers.

Previous literature focuses on liquidity risk caused by sudden withdrawals by depositors fearing bank failure. Recently, however, committed credit lines have become a main source of banks' liquidity risk, as borrowers draw from their existing credit lines when market liquidity dries up (Ivashina and Scharfstein, 2010; Cornett et al., 2011). Meanwhile, deposits are made because of government safety nets such as deposit insurance.[1] In line with this argument, Figure 2 shows that committed lines of credit declined sharply from 2007 to 2010 during the 2008 financial crisis, whereas customer deposits slightly increased during the same period. Figure 2 also shows that the loan supply did not collapse, implying that lending increased through credit line drawdowns from borrowers who needed liquidity during the crisis, consistent with Ivashina and Scharfstein (2010). Thus, capital's role in providing liquidity in the form of credit lines has become more important than its liquidity provision in the form of deposits.

[Insert Figure 2 around here]

We examine the relationship between bank capital and credit line supply using a panel dataset for 10,703 commercial banks in 24 OECD countries covering 2000 to 2010. We employ the fixed effects model to control for both unobservable time-invariant bank characteristics and changes in the economic environment. We also address the persistence of credit line supply through applying the dynamic panel generalized method of moments (GMM) of Arellano and Bond (1991) because banks providing large credit lines tend to maintain similar credit line supplies.

We find a positive relationship between equity capital and credit line provision, suggesting that better capitalized banks provide more lines of credit to their borrowers given their higher risk-bearing capacity. During financial crises, banks increase their credit line provision when they have more capital and deposits, which are stable sources of funding. These results are robust even after controlling for the persistence of the credit line supply. We also find that banks with high credit risk and illiquid banks provide more credit lines as they

[1] Deposit inflows during market stress help banks hedge liquidity risk from sudden credit-line drawdowns (Kashyap et al., 2002; Gatev and Strahan, 2006; Gatev et al., 2009; Cornett et al., 2011).

become better capitalized, implying an increased ability to handle credit and liquidity risk by using increased capital as a buffer. However, large banks and banks relying more on wholesale funding reduce credit line supply as their equity ratios increase. These results suggest that the holdup problem attributable to increased capital is more critical for large banks, whereas risk absorption through increased capital is more valuable for small banks, which are more likely to suffer from high default risk.

This paper is closely related to Berger and Bouwman (2009), who empirically examine the effect of capital on the provision of liquidity by considering the on- and off-balance-sheet accounts to measure the liquidity supply. However, as mentioned above, recently committed credit lines become a main source of bank liquidity risk while capital's effect on deposits—as a buffer or enhanced bargaining power—becomes less important. Therefore, we focus on capital's effects on credit line supply among two sources of liquidity provisions: deposits and unused lines of credit.

The rest of the paper proceeds as follows. Section 2 reviews the literature and develops our hypotheses. Section 3 describes the data and methodology. Section 4 discusses our main findings. Finally, Section 5 concludes the paper.

2. Literature Review and Hypotheses

Findings on the relationship between capital and liquidity supply have been mixed. On the one hand, equity capital may hinder banks from providing liquidity to customers while strengthening their capital structure (Diamond and Rajan, 2000, 2001; Berger and Bouwman, 2009). A fragile bank with sufficient deposits—with respect to a bank run—that attempts to extract rents from depositors by renegotiating contract terms will face a run because depositors seek to avoid losses. By contrast, capital may encourage banks to provide more liquidity to customers because equity capital can absorb the risk against losses in their risky asset investments (Bhattacharya and Thakor, 1993; Repullo, 2004; Berger and Bouwman, 2009).

A liquidity provision exposes a bank to liquidity risk, as it may liquidate many illiquid assets at a loss to meet customers' sudden withdrawals (Bryant, 1980; Diamond and Dybvig, 1983; Allen and Gale, 2004). Capital is a source of loanable funds and buffers against potential loan losses, thereby protecting a bank from insolvency (Besanko and Kanatas, 1996; Hughes and Mester, 1998). Therefore, well-capitalized banks may deal with earnings shocks

without reducing the supply of liquidity because they are safer given their higher risk-bearing capacity. We thus develop the following hypothesis:

H1. Better capitalized banks provide more credit lines to borrowers.

During a financial crisis, bank capital may become more important in providing liquidity because reduced capital buffers makes banks vulnerable (Holmstrom and Tirole, 1997): a capital increase during a crisis enhances a bank's risk-bearing capacity and, therefore, its stability. Similarly, banks reliant on more deposits, a stable source of funding (particularly during a crisis), are expected to supply more lines of credit to borrowing firms. We thus propose the following hypothesis:

H2. Banks funded with more capital and more deposits supply more credit lines during financial crises.

Cross-sectionally, riskier banks may be able to supply more lines of credit when they are better capitalized, given their increased risk-bearing capacity. This paper considers bank liquidity, credit risk, size, and funding structure as variables of interest. First, banks with more illiquid assets have greater liquidity risk on their balance sheets (Cornett et al., 2011) and may therefore provide more credit lines when they increase their reliance on equity capital financing. Second, a well-capitalized bank with high credit risk may supply more lines of credit. Third, large banks are expected to decrease the supply of credit lines as their capital ratios increase. Risk is not critical for large banks because they can manage risk by diversifying their loan portfolios and deposit bases (Diamond, 1984; Demsetz and Strahan, 1997; Hughes and Mester, 1998) or may simply be too big to fail (Ohara and Shaw, 1991). Therefore, for large banks, the effect of enhanced bargaining power attributable to a higher level of capital is more dominant than that of increased risk-bearing capacity. As banks' bargaining power increases, they may attempt to extract higher rents from borrowers and thus provide less liquidity in the form of committed credit lines. Finally, the effects of capital on the provision of credit lines depending on the magnitude of short-term wholesale funds are ambiguous ex-ante. One possibility is that banks with significant wholesale funding provide more lines of credit as their equity ratios increase because banks heavily reliant on wholesale funds have higher liquidity risk than those with sufficient deposits (Demirgüç-Kunt and

Huizinga, 2010): uninsured wholesale funds are riskier than insured deposits and must be rolled over at short intervals (Ivashina and Scharfstein, 2010; Huang and Ratnovski, 2011).[2] Another possibility is that high wholesale funded banks reduce credit line supplies when they are better capitalized. This view considers that large banks are more likely to have more wholesale funds because they are sounder than small banks, which struggle to raise wholesale funds in the capital market (Kashyap and Stein, 1997; Park and Pennacchi, 2009). Therefore, the reduced fragility attributable to increased capital leads banks to rely on wholesale funding to provide less liquidity in the form of lines of credit. We therefore propose the following hypothesis:

H3. Illiquid banks and banks with high credit risk provide more credit lines when better capitalized, whereas large banks and banks with more wholesale funding provide fewer credit lines when better capitalized.

3. Data and Methodology

3.1 Data

We construct a panel dataset for commercial banks in 24 OECD countries with bank regulation and supervision data and sufficient bank financial data covering 2000 to 2010. The bank-level financial data come from the Bankscope database, commonly used to investigate banks' capital structures (e.g., Peura and Jokivuolle, 2004). Data on merger and acquisition transactions come from the Thomson Reuters SDC platinum database. Macroeconomic data come from World Development Indicators (WDI). Monetary aggregate (M2) levels are taken from IMF international Financial Statistics (IFS). Data on bank supervisions and regulations come from the database provided by Djankov et al. (2007) and the Heritage Foundation.

We first exclude banks with missing balance sheet data for the variables. Second, we delete banks whose total assets, equity, deposits, gross loans, and lines of credit have zero values. Finally, we reduce the impact of outliers by winsorizing bank-level financial statement variables at the top and bottom 1% of the distribution. Our final sample contains

[2] Banks that heavily relied on wholesale funding, such as Northern Rock, were exposed to significant liquidity risk and thus experienced a bank run from the refusal to roll over short-term wholesale funds during the 2008 global financial crisis.

93,072 bank-year observations for 10,703 banks covering 2000 to 2010 in 24 OECD countries.

3.2 Econometric Methods

We test the impact of a bank's equity capital on the supply of credit lines (undrawn credit lines) using the fixed effects model because it is more robust to the potential endogeneity in estimations. We also perform dynamic panel GMM estimations to control for the persistence of the credit line supply.

3.2.1 Fixed Effects Model

Using an unbalanced bank-level panel dataset, we estimate the following model:

$$Commitment_{ijt} = \alpha + \beta Capital_{ijt-1} + \xi Bank_{ijt-1} + \rho Country_{jt} + \mu_i + \varphi_{jt} + \varepsilon_{ijt} \quad (1)$$

where $Commitment_{ijt}$ denotes the credit line supply of bank *i* in country *j* at time *t*, which is associated with a bank's equity capital ($Capital_{ijt-1}$). The committed credit lines (credit line supply) are normalized by total assets plus committed credit lines to compare between banks. $Capital_{ijt-1}$ is the ratio of capital to total assets. $Bank_{ijt-1}$ refers to a vector of lagged bank-specific characteristics affecting credit line provision. We use one-year lagged values to account for the potential endogeneity between the dependent variable and bank control variables. $Country_{jt}$ represents a vector of country-specific characteristics such as bank supervisions and regulations and macroeconomic indicators. μ_i denotes bank fixed effects, which control for time-invariant differences between banks. φ_{jt} denotes time fixed effects that account for changes in the economic and business environment across years that are common among banks. ε_{ijt} is the error term. All regressions use robust standard errors clustered by country to control for both heteroskedasticity and potential serial correlation at the country level.

3.2.2 Dynamic Panel GMM Estimation

To obtain unbiased and consistent estimates considering the dynamic aspect of the credit line supply, we estimate the following dynamic panel model using an Arellano and Bond (1991) difference GMM estimator:

$$Commitment_{ijt} = \delta Commitment_{ijt-1} + \vartheta Capital_{ijt-1} + \sigma Bank_{ijt-1} + \gamma Country_{jt} + \omega_i + \tau_{jt} + \eta_{ijt} \quad (2)$$

where $Commitment_{ijt-1}$ is the lagged value of the credit line supply. The Hansen J-statistic of over-identifying restrictions tests the validity of the instruments used in the specifications. AR(1) and AR(2) show the Arellano-Bond tests for first- and second-order autocorrelation in the first-differenced residuals. We treat the ratio of deposits to total assets as endogenous because the causality may run in both directions, as observed by Kashyap et al. (2002). Standard errors are robust to heteroskedasticity and clustered by country. ω_i indicates bank fixed effects, τ_{jt} denotes year fixed effects, and η_{ijt} is the error term.

3.3 Variables

Bank-specific characteristics ($Bank_{ijt-1}$) include bank credit risk, size, mergers and acquisitions activities, and funding structure. Bank credit risk is calculated as the ratio of non-performing loans to total loans (*Non-performing loans/Total loans*). Bank size, measured as the natural logarithm of total assets (*Ln(Total assets)*), is included to account for cross-bank heterogeneity related to bank scale. We use a dummy variable (*Mergers and acquisitions*), equal to 1 if a bank entered into one or more mergers and acquisitions during the previous three years, because banks' corporate strategies for liquidity supply are affected by merger and acquisitions via changes in reserve holdings and asset portfolios (Carletti et al., 2007). We primarily use deposits divided by total assets (*Deposits/Total assets*) as a proxy for funding structure. However, endogeneity may exist between deposits and credit-line supply. Kashyap et al. (2002) find that increases in deposits produce increases in loan commitments attributable to a synergy from sharing costly liquid asset holdings to honor unexpected customer liquidity demands. Furthermore, Gatev and Strahan (2006) and Gatev et al. (2009) show that banks can hedge the loan demand shocks from the drawdown of credit lines

because deposits flow in during periods of lower market liquidity. Therefore, we also use the ratio of wholesale funding to deposits as a proxy for funding structure to test our results' robustness.

Country-specific characteristics ($Country_{jt}$) consist of GDP per capita, GDP growth rate, the real interest rate, the ratio of money and quasi money (M2) to GDP, banking freedom, and credit information depth. We include the natural logarithm of GDP per capita (*Ln(GDP per capita)*) to control for economic development. The GDP growth rate accounts for the effect of the business cycle. The real interest rate (*Real interest rate*) is used because decisions regarding liquidity provision are usually based on interest rates. We also control for the magnitude of national market liquidity by employing the money supply level (*M2/GDP*). If abundant market liquidity exists, banks may provide more liquidity by taking advantage of rich market liquidity. *Banking freedom* is an annual index measuring banking efficiency and independence from government interference in loans, accepting deposits, and market operations. The index spans from 0 to 100, with higher values indicating fewer banking restrictions. We use the depth of the credit information index to control for national information-sharing levels. Information sharing among creditors decreases information asymmetries and thus encourages lenders to grant more credit (Djankov et al., 2007). The depth of the credit information index represents the availability of credit information to facilitate credit supply through public or private credit registries. The values range from 0 to 6, with higher values indicating greater sharing of credit information on borrowers.

Among bank- and country-specific variables, *Capital/Total assets*, *Deposits/Total assets*, *Ln(Total assets)*, *Non-performing loans/Total loans*, *GDP growth rate*, *M2/GDP*, and *Real interest rate* are used as one-year lagged values to mitigate potential endogeneity with the dependent variable for all estimations. Table 1 provides detailed information on the variables used in the estimations.

[Insert Table 1 around here]

Table 2 shows the descriptive statistics (mean values) by country. Lines of credit, reflecting the magnitude of the credit line supply, are measured as the ratio of committed credit lines to total assets plus committed credit lines (%). Capital denotes the ratio of bank equity to total assets (%). Bank size is determined by total assets, measured in real 2010 US millions of dollars. Deposits are the ratio of deposits to total assets (%). The annual average

number of banks is based on the final dataset. GDP growth rate is the GDP growth rate (%). Finally, M2/GDP is calculated as M2 divided by GDP (%).

[Insert Table 2 around here]

Table 3 reports the summary statistics of the variables used in the regressions. As previously discussed, the levels of both deposits and wholesale funding are included to capture the effects of the funding structure of banks. Observations showed that mergers and acquisitions were fewer than expected because many are performed by bank holding companies affiliated with banks.

[Insert Table 3 around here]

4. Regression Results

4.1 Relation between Bank Equity and Committed Credit Lines in the Context of Liquidity Insurance

Table 4 shows that bank capital is positively (0.0278, column [1]) correlated with liquidity provision in the form of undrawn lines of credit. These positive relationships remain unchanged and are still statistically significant at the 1% level regardless of the inclusion of aggregate market liquidity (*M2/GDP*) and real interest rates (columns [2] and [3]). These results are consistent with Berger and Bouwman (2009), who show that equity capital increases liquidity provision by enhancing banks' risk-bearing capacity.

Larger banks (*Ln(Total assets)*) grant fewer lines of credit. As bank credit risk (*Non-performing loans/Total loans*) increases, banks reduce the supply of credit lines. Mergers and acquisitions are positively associated with credit line supply, implying that banks recently engaged in mergers and acquisitions grant more lines of credit. Moreover, the coefficients of *Banking freedom* and *Depth of credit information* are positive and statistically significant, suggesting that, in an environment with improved banking efficiency, fewer restrictions on banks' operation and more information sharing about borrowers' credit information through public and private credit registries, banks can provide greater liquidity in the form of credit

lines to borrowing firms.

[Insert Table 4 around here]

4.2 How do Financial Crises Affect the Relation between Equity Capital and the Supply of Credit Lines?

Table 5 reports how bank capital affects the behavior of banks that grant lines of credit during financial crises. *Systemic banking crisis* is a dummy variable equal to 1 if a country is in a systemic banking crisis. Data on national banking crises come from Laeven and Valencia (2012). Columns (1), (2), and (3) feature an interaction term between each bank's equity ratio and a dummy variable for a crisis. The coefficients of this interaction term test whether a bank changes the extent of its credit line supply depending on its bank capital amount during financial crises. In columns (4), (5), and (6), we consider the interaction effect of deposits and capital on credit line supply during turbulent times.

[Insert Table 5 around here]

As with Table 4, banks grant more lines of credit as their equity ratios (*Capital/Total assets*) increase in all columns. During crises (*Systemic banking crisis*), unused bank lines of credit decrease, consistent with Ivashina and Scharfstein (2010). In columns (1), (2), and (3), the interactions between *Capital/Total assets* and *Systemic banking crisis* have positive and significant coefficients, supporting the notion that equity capital's role as a buffer against shocks becomes more important during market stresses (Holmstrom and Tirole, 1997; Diamond and Rajan, 2000). Well-capitalized banks can thus afford to provide greater liquidity in the form of credit lines during financial crises. Columns (4), (5), and (6) show that banks with stable funding sources, such as deposits and equity capital (*Deposits/Total assets*Capital/Total assets*Systemic baking crisis*), provide more lines of credit during systemic banking crises.

4.3 Cross-sectional Variations in the Relation between Bank Capital and the Supply of Credit Lines

This section investigates whether banks change the extent of credit line supply differently depending on the levels of bank capital ratios, credit risk, liquidity, size, and funding structure.

Table 6 shows the effect of equity capital on credit line supply according to the degree of bank credit risk. The interaction term *Non-performing loans/Total loans*Capital/Total assets* determines whether a bank's response to credit line supply changes with the extent of its credit risk. Columns (1), (2), and (3) of Table 6 report that the non-performing loans ratio is negatively correlated with credit line supply at the 1% significance level, suggesting that significant bank credit risk decreases the liquidity provision to borrowers. However, the coefficients of *Non-performing loans/Total loans*Capital/Total assets* are positive and statistically significant. That is, the effects of increases in the equity ratio on committed credit lines are greater for riskier banks with more non-performing loans, suggesting that equity capital's role as a buffer against earning shocks is more important to riskier banks.

[Insert Table 6 around here]

Table 7 reports on the test of whether equity capital's effect on the supply of credit lines depends on the amount of bank liquidity. Following Cornett et al. (2011), illiquid banks are defined as banks with high loan-to-total-asset ratios. We sort all banks into four categories according to the magnitude of annual bank liquidity by country. Panels A and B show the regression results for the full sample and subsample, respectively.

Panel A includes the interaction between the ratio of net loans to assets and the equity ratio (*Net Loans/Total assets*Capital/Total assets*) to examine the relationships among the provision of credit lines, bank capital, and bank liquidity. In Panel A, we find that *Net Loans/Total assets*Capital/Total assets* has positive and significant coefficients, indicating that bank capital is more valuable for illiquid banks. Panels B1 and B2 report the regression results for illiquid and liquid banks, respectively. Panel B reports the same results as Panel A, both showing that illiquid banks supply more liquidity in the form of credit lines when they have more capital (Panel B1), whereas liquid banks show no significant changes in credit line provision according to the equity ratio (Panel B2).

[Insert Table 7 around here]

Table 8 shows the relationship between bank capital and credit line supply depending on bank size. We find that *Ln(Total assets)*Capital/Total assets* is negatively associated with credit line provision, suggesting that large banks—more stable and thus less concerned about risk—provide fewer lines of credit when well-capitalized. By contrast, capital's buffer effect is more important for small banks.

Our results differ from those of Berger and Bouwman (2009), who find that large banks provide more liquidity as their equity ratios increase, whereas small banks create less liquidity as they are better capitalized. Their results could be attributed to the fact that they do not account for the stability of deposits, which could distort capital's effect on liquidity provision. As mentioned, deposits are almost all insured and thus stable. Omitting the stability of deposits may have obscured the real effects of enhanced bargaining power or an increase in the risk-bearing capacity of bank capital on liquidity provision.

[Insert Table 8 around here]

Table 9 shows equity capital's effect on credit line supply according to the funding structure. Columns (1), (2), and (3) use the ratio of deposits to total assets as the funding structure, whereas columns (4), (5), and (6) employ the ratio of wholesale funding to deposits. The interaction terms *Deposits/Total assets*Capital/Total assets* of columns (1), (2), and (3) have positive and significant coefficients, implying that bank capital as a buffer is more valuable to banks with large deposits. By contrast, coefficients of interactions between wholesale funding and capital are negative and significant. Equity capital seems to give high wholesale funded banks an incentive to extract rents from borrowers by reducing credit line provision.

[Insert Table 9 around here]

In Table 10, we employ dynamic GMM regressions to address the persistence of credit line supply. There are fewer instruments than groups (banks). The ratio of deposits to total assets is treated as endogenous. The lower panel in Table 10 shows test statistics and p-

values for the Hansen J-test, and the AR(1) and AR(2) tests. The row for the Hansen J-test reports the p-values for the null hypothesis that the instruments are valid. The values reported for AR(1) and AR(2) show the Arellano-Bond tests for first- and second-order autocorrelation in the first-differenced residuals. Our results show that the Hansen J-test of over-identifying restrictions does not reject the null hypothesis, while the AR(1) and AR(2) tests show high first-order autocorrelation and no significant second-order autocorrelation of the residuals. Therefore, our test statistics suggest that the specifications are all appropriate.

[Insert Table 10 around here]

The lagged dependent variable *L.Credit lines/(Total assets+Credit lines)* is positively and significantly related to the dependent variable *(Credit lines/(Total assets+Credit lines))*, suggesting that credit line provision is highly persistent over time. Consistent with the results of Table 4, bank capital has a positive and highly significant effect on credit line supply even after controlling for the past supply of credit lines. Furthermore, the effect of equity capital on liquidity provision in the form of credit lines is intensified during financial crises.

5. Conclusion

Previous literature on the relationship between capital and liquidity provision focuses on the importance of deposits rather than lines of credit. However, bank capital's role as a buffer against either shocks or increased bargaining power is more meaningful for credit lines because they become a primary source of bank liquidity risk. The reason is that deposits are insured and therefore flow into banks during market turbulence. By contrast, nervous borrowers take down large amounts of their existing credit lines during the same period.

We exploit this concept to examine whether a bank's equity capital affects credit line supply in terms of capital's risk-bearing or enhanced bargaining power effect. We argue that bank capital is more valuable to high-risk banks in providing liquidity, given its increased risk-bearing capacity. Conversely, safe banks are more likely to be influenced by the bargaining power effect and attempt to hold up borrowers by extracting rents through reduced liquidity provision. We accordingly find that banks grant more lines of credit when they are better capitalized, and this effect is intensified during financial crises. This result is robust even after controlling for the persistence of credit line supply. We also find that banks that are

more illiquid, smaller, and have fewer wholesale funds and higher credit risk provide more lines of credit when they have more equity capital.

Our research may be extended to additional analyses on wholesale funding. A bank reliant on wholesale funding faces high liquidity risk because wholesale funds are uninsured and volatile. However, the bank is also relatively safe because only sound banks with high credit ratings and a rich credit history can obtain wholesale funds in the capital market. Therefore, an optimal funding structure may exist, reconciling these contradictory effects.

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Figure 1 Rapid Increase in Loan Supply and Wholesale Funding until the 2008 Global Financial Crisis

Figure 1 shows trends in aggregate bank loan supply and short-term wholesale funds, measured in real 2010 dollars, for 24 OECD countries from 2000 to 2010.

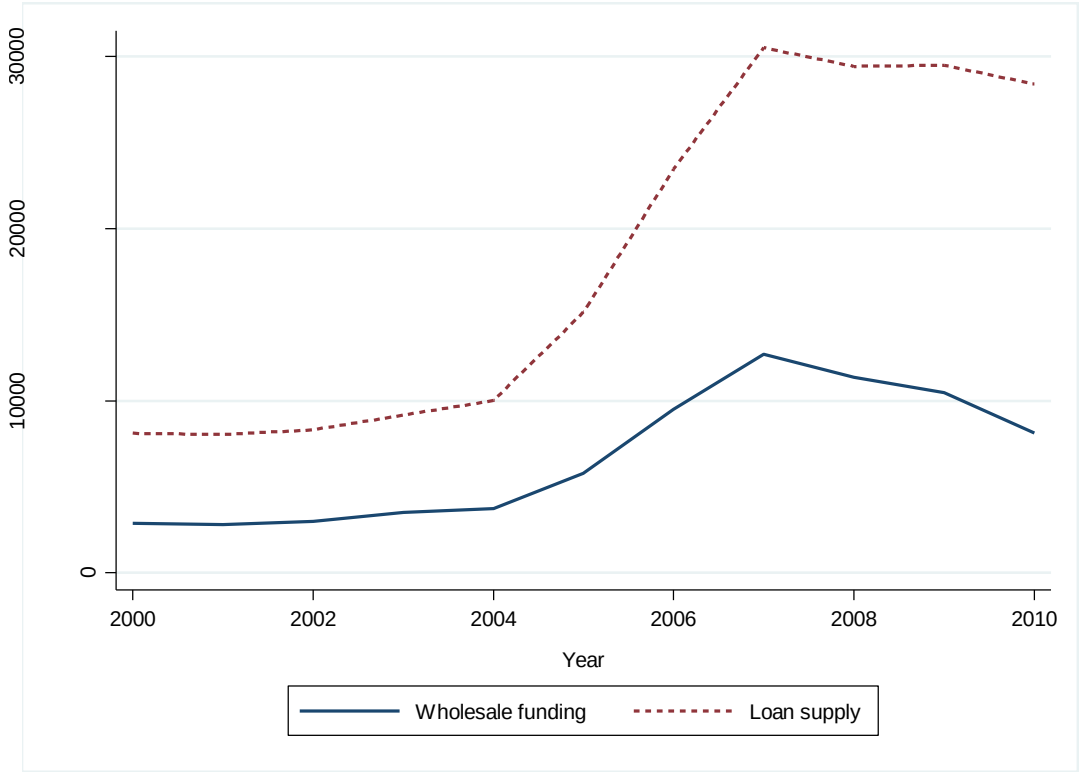

Figure 2 Stable Deposits during Dramatic Decrease in Committed Credit Lines in the Post-crisis Period

Figure 2 shows trends in aggregate bank loan supply, customer deposits, and undrawn credit lines, measured in real 2010 dollars, for 24 OECD countries from 2000 to 2010.

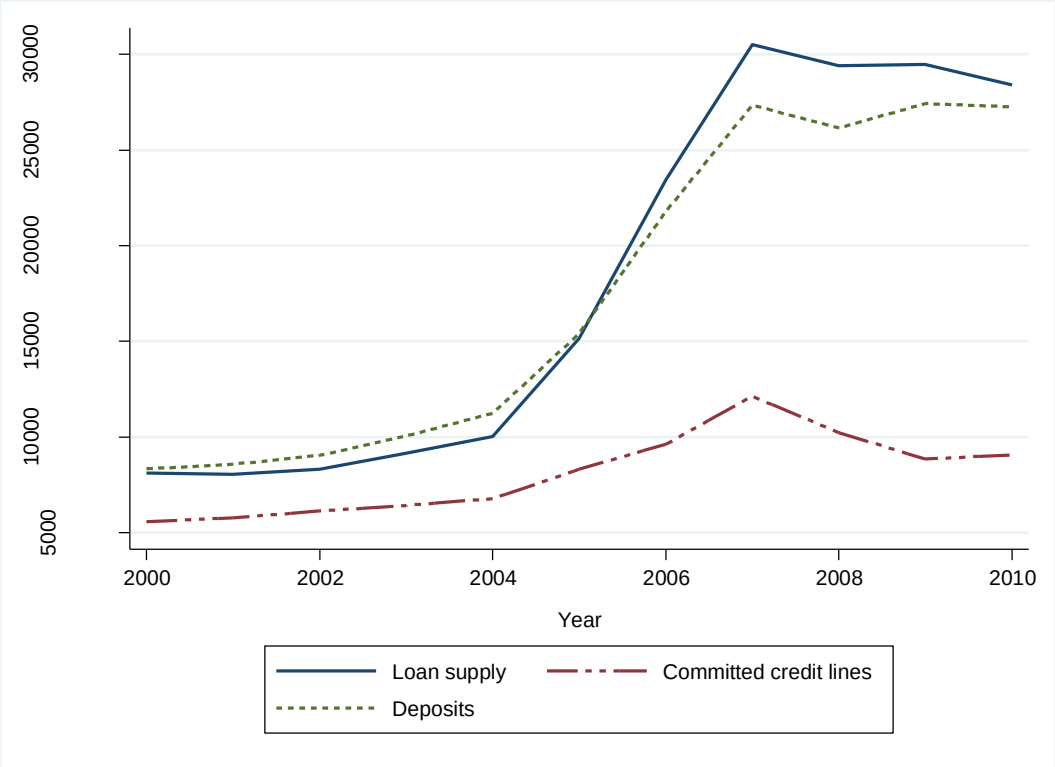

Table 1 Variable Definitions and Data Sources

Table 1 reports definitions and data sources for the variables used in the estimations.

Variables	Definition	Source
Dependent variables		
Credit lines/(Total assets + Credit lines)	The ratio of committed credit lines to total assets plus committed credit lines, which means the amount that a bank provides credit lines to borrowers.	Bankscope (2011)
Explanatory variables		
Capital/Total assets	The ratio of equity to total assets	Bankscope (2011)
Ln(Total assets)	Bank size, calculated as the log value of total assets	Bankscope (2011)
Deposits/Total assets	The ratio of customer deposits to total assets	Bankscope (2011)
Wholesale funding/ Total assets	The ratio of wholesale funding to total assets	Bankscope (2011)
Non-performing loans/ Total loans	Bank credit risk, measured as the ratio of non-performing loans to total loans	Bankscope (2011)
Mergers and acquisitions	A dummy variable that takes a value of 1 if a bank performed one or more mergers and acquisitions over the past three years, zero otherwise.	SDC Platinum
Ln(GDP per capita)	The log value of GDP per capita	WDI
GDP growth rate	The annual growth rate of GDP	WDI
M2/GDP	The ratio of money and quasi money (M2) to GDP	IMF IFS
Real interest rate	The lending interest rate adjusted for inflation by using the GDP deflator	WDI
Banking freedom	An annual index for banking efficiency and the extent to which banks are free to run their business, ranging from 0 to 100. Higher values indicate fewer restrictions.	Heritage Foundation
Depth of credit information	An annual index for the level of credit information available through either public or private credit registries, ranging from 0 to 6. Higher values represent the availability of more credit information about borrowers.	The World Bank's Doing Business database. Djankov, McLiesh et al. (2007)

Table 2 Summary Statistics by Country (Mean Values): 2000–2010

Table 2 shows descriptive statistics (mean values) for 24 OECD countries from 2000 to 2010. Lines of credit (the level of supply of credit lines) represent the ratio of committed credit lines to total assets plus committed credit lines (%). Capital is the ratio of bank equity to total assets (%). Bank size is total assets measured in real 2010 US dollars (millions). Deposits are the ratio of deposits to total assets (%). The annual average number of banks is based on the final dataset. GDP growth rate is the GDP growth rate (%). M2/GDP is calculated as M2 (money plus quasi money) divided by GDP (%).

	Lines of credit	Capital	Bank size (Total assets)	Deposits	Number of banks	GDP growth rate	M2/GDP	Banking freedom	Depth of credit information index
Country	(% of total assets plus credit lines)	(% of total assets)	(Real 2010 US dollars, millions)	(% of total assets)	(Final dataset)	(%)	(%)		
Austria	0.67	13.62	9,993	47.43	46	1.75	164.33	70.00	6.00
Belgium	1.04	7.89	42,420	54.84	22	1.60	123.3	72.73	4.00
Canada	9.70	9.57	60,926	61.16	34	2.19	131.13	72.73	6.00
Czech Republic	4.80	10.32	7,388	63.08	18	3.27	61.26	86.36	4.55
Denmark	0.39	11.91	14,504	60.62	42	0.96	68.82	86.36	4.00
France	7.91	9.89	43,475	48.19	92	1.27	118.47	57.00	4.00
Germany	4.06	11.91	35,062	49.01	105	1.10	177.26	52.73	6.00
Hungary	4.02	11.61	5,165	45.94	20	2.22	50.9	69.09	5.00
Israel	14.38	6.56	22,229	79.00	11	3.71	93.47	54.55	4.09
Italy	2.83	10.47	38,266	47.51	48	0.58	100.4	64.55	5.55
Korea, Rep.	3.93	5.32	86,821	51.90	8	4.55	65.92	53.64	5.27
Luxembourg	3.88	6.04	9,522	50.30	65	3.58	598.19	84.55	0.00
Mexico	3.45	16.25	12,474	49.52	24	2.25	27.03	60.91	6.00
Netherlands	4.61	7.84	100,804	48.85	17	1.60	171.78	88.18	5.00
Norway	2.63	9.15	24,758	55.61	7	1.74	51.19	51.82	4.00
Poland	3.26	12.25	5,333	47.70	23	3.94	44.16	61.82	4.18
Portugal	2.63	14.71	16,366	31.53	9	0.97	124.34	51.82	4.00
Slovak Republic	6.09	8.93	4,025	67.16	12	4.13	56.38	73.64	3.36
Slovenia	5.33	9.35	3,545	55.79	13	2.94	55.73	50.00	3.18
Spain	1.45	10.73	72,991	43.24	20	2.36	139.69	73.64	5.00
Sweden	2.07	11.62	24,344	72.78	14	2.28	71.37	80.00	4.00
Switzerland	1.39	17.68	17,668	48.98	132	1.81	141.24	83.64	5.00
United Kingdom	5.09	13.89	76,240	52.20	80	1.65	132.03	89.09	6.00
United States	8.91	11.21	1,349	82.46	7,598	1.91	76.18	83.64	6.00

Table 3 Descriptive Statistics of Variables Used in the Estimations

Table 3 reports summary statistics of variables used in the regressions for commercial banks in 24 OECD countries between 2000 and 2010. Detailed information on the variables is provided in Table 1.

Variables	Observations	Mean	Std. Dev.	Min	Max
Credit lines/(Total assets + Credit lines)	93,072	0.0840	0.0645	0	0.3289
Capital/Total assets	93,072	0.1128	0.0713	0.0294	0.7839
Ln(Total assets)	93,072	12.075	1.5523	9.1022	17.999
Deposits/Total assets	93,072	0.7893	0.1596	0.00001	0.9320
Wholesale funding/Total assets	93,072	0.0996	0.2063	0	1.5933
Non-performing loans/Total loans	93,072	0.0095	0.0176	0	0.1310
Mergers and acquisitions	93,072	0.0156	0.1239	0	1
Ln(GDP per capita)	93,072	10.605	0.2283	8.4016	11.686
GDP growth rate	93,072	0.0214	0.0203	-0.0780	0.1058
M2/GDP	92,531	0.8162	0.4580	0.2519	6.3651
Real interest rate	89,617	0.0374	0.0190	-0.1003	0.1438
Banking freedom	93,072	82.613	9.5047	30	90
Depth of credit information	93,072	5.8632	0.6471	0	6

Table 4 Fixed Effects Regressions of Credit Line Supply on Equity Capital

Table 4 shows the effect of a bank's equity capital on credit line supply. The sample consists of 93,072 bank-year observations of 10,703 commercial banks in 24 OECD countries from 2000 to 2010. The dependent variable is the ratio of committed credit lines to total assets plus committed credit lines. Table 1 describes the control variable definitions. All regressions use robust standard errors, clustered by country to control for heteroskedasticity and within-country serial correlation. T-statistics are in parentheses. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Capital/Total assets	0.0278***	0.0285***	0.0303***
	(3.33)	(3.46)	(3.80)
Deposits/Total assets	0.0011	0.0017	0.0019
	(0.20)	(0.32)	(0.32)
Ln(Total assets)	-0.0058***	-0.0058***	-0.0060***
	(-6.65)	(-6.99)	(-9.91)
Non-performing loans/Total loans	-0.3553***	-0.3596***	-0.3710***
	(-5.94)	(-6.37)	(-7.64)
Mergers and acquisitions	0.0036***	0.0037***	0.0046***
	(3.00)	(2.97)	(3.08)
Ln(GDP per capita)	-0.0043	-0.0084	-0.0093
	(-0.40)	(-0.80)	(-0.74)
GDP growth rate	0.0749	0.1191	0.1172
	(1.26)	(1.71)	(1.33)
Banking freedom	0.0005***	0.0006***	0.0005***
	(6.37)	(6.17)	(3.94)
Depth of credit information	0.0184*	0.0161*	0.0145*
	(1.93)	(2.01)	(1.87)
M2/GDP		-0.0062	-0.0124
		(-0.96)	(-1.06)
Real interest rate			0.0384
			(0.55)
Constant	0.0404	0.0942	0.1190
	(0.32)	(0.82)	(0.86)
Bank fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
R-squared	0.1228	0.1251	0.1337
Observations	93,072	92,531	89,617

Table 5 Fixed Effects Regressions of Credit Line Supply on Equity Capital: Financial Crises

Table 5 reports the effect of bank capital on credit line supply when national financial crises are considered. Financial crises are defined as periods in which a country experienced systemic banking crises between 2000 and 2010. The data on systemic banking crises by country come from Laeven and Valencia (2012). Columns (1), (2), and (3) are the effect of capital on credit line supply during financial crises. Columns (4), (5), and (6) consider the interaction effect of deposits and bank equity on credit line supply during financial crises. The dependent variable is the ratio of committed credit lines to total assets plus committed credit lines. Table 1 describes the control variable definitions. All regressions use robust standard errors, clustered by country, to control for heteroskedasticity and within-country serial correlation. T-statistics are in parentheses. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Capital/Total assets	0.0245***	0.0253***	0.0264***	0.0247***	0.0255***	0.0266***
	(3.27)	(3.45)	(3.48)	(3.29)	(3.46)	(3.50)
Systemic banking crises	-0.0020	-0.0021	-0.0066*	-0.0035	-0.0037*	-0.0082**
	(-0.89)	(-1.05)	(-1.82)	(-1.48)	(-1.77)	(-2.22)
*Capital/Total assets*Systemic baking crisis*	0.0232***	0.0225***	0.0279***	0.0098*	0.0087	0.0131***
	(3.23)	(2.92)	(6.11)	(1.92)	(1.50)	(3.51)
Deposits/Total assets	0.0011	0.0016	0.0019	0.0003	0.0008	0.0010
	(0.20)	(0.31)	(0.30)	(0.05)	(0.15)	(0.16)
*Deposits/Total assets*Capital/Total assets *Systemic baking crisis*				0.0423***	0.0435***	0.0440***
				(3.46)	(3.76)	(5.79)
Ln(Total assets)	-0.0058***	-0.0058***	-0.0060***	-0.0057***	-0.0057***	-0.0059***
	(-6.61)	(-6.92)	(-9.75)	(-6.63)	(-6.93)	(-9.77)
Non-performing loans/ Total loans	-0.3534***	-0.3577***	-0.3685***	-0.3520***	-0.3563***	-0.3670***
	(-5.98)	(-6.42)	(-7.65)	(-5.99)	(-6.43)	(-7.64)
Mergers and acquisitions	0.0035***	0.0037***	0.0046***	0.0035***	0.0037***	0.0046***
	(2.97)	(2.94)	(3.06)	(2.96)	(2.93)	(3.04)
Ln(GDP per capita)	-0.0043	-0.0085	-0.0104	-0.0034	-0.0077	-0.0094
	(-0.40)	(-0.80)	(-0.83)	(-0.32)	(-0.72)	(-0.75)
GDP growth rate	0.0716	0.1168	0.1155	0.0713	0.1160	0.1147
	(1.25)	(1.69)	(1.33)	(1.22)	(1.66)	(1.31)
Banking freedom	0.0005***	0.0006***	0.0005***	0.0005***	0.0006***	0.0006***
	(6.14)	(5.92)	(3.94)	(6.23)	(6.12)	(4.01)
Depth of credit information	0.0185*	0.0162*	0.0144*	0.0184*	0.0161*	0.0143*
	(1.98)	(2.06)	(1.90)	(1.98)	(2.06)	(1.89)
M2/GDP		-0.0062	-0.0130		-0.0055	-0.0120
		(-0.97)	(-1.12)		(-0.83)	(-1.01)
Real interest rate			0.0405			0.0367
			(0.58)			(0.52)
Constant	0.0404	0.0952	0.1310	0.0297	0.0845	0.1201
	(0.32)	(0.84)	(0.97)	(0.24)	(0.74)	(0.88)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1232	0.1255	0.1343	0.1234	0.1257	0.1345
Observations	93,072	92,531	89,617	93,072	92,531	89,617

Table 6 Fixed Effects Regressions of Credit Line Supply on Equity Capital: Bank Credit Risk

Table 6 shows the effect of equity capital on credit line supply depending on the degree of bank credit risk, adding an interaction between *Non-performing loans/Total loans* and *Capital/Total assets*. The dependent variable is the ratio of committed credit lines to total assets plus committed credit lines. Table 1 describes the control variable definitions. All regressions use robust standard errors, clustered by country, to control for heteroskedasticity and within-country serial correlation. T-statistics are in parentheses. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Capital/Total assets	0.0261***	0.0267***	0.0285***
	(3.36)	(3.47)	(3.81)
Non-performing loans/Total loans	-0.4936***	-0.5047***	-0.5240***
	(-4.39)	(-4.84)	(-5.56)
*Non-performing loans/Total loans*Capital/Total assets*	1.3389**	1.4046**	1.4856***
	(2.33)	(2.63)	(2.86)
Deposits/Total assets	0.0004	0.0010	0.0012
	(0.09)	(0.20)	(0.20)
Ln(Total assets)	-0.0057***	-0.0057***	-0.0059***
	(-6.41)	(-6.68)	(-9.12)
Mergers and acquisitions	0.0035***	0.0037***	0.0045***
	(2.94)	(2.90)	(3.04)
Ln(GDP per capita)	-0.0045	-0.0087	-0.0099
	(-0.42)	(-0.83)	(-0.78)
GDP growth rate	0.0710	0.1156	0.1101
	(1.22)	(1.69)	(1.27)
Banking freedom	0.0005***	0.0006***	0.0005***
	(6.38)	(6.21)	(3.97)
Depth of credit information	0.0182*	0.0159*	0.0144*
	(1.89)	(1.95)	(1.81)
M2/GDP		-0.0068	-0.0136
		(-1.07)	(-1.18)
Real interest rate			0.0372
			(0.53)
Constant	0.0426	0.0985	0.1255
	(0.34)	(0.86)	(0.90)
Bank fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
R-squared	0.1242	0.1267	0.1354
Observations	93,072	92,531	89,617

Table 7 Fixed Effects Regressions of Credit Line Supply on Equity Capital: Bank Liquidity

Table 7 shows the effect of equity capital on credit line supply depending on the level of bank liquidity. Panels A and B show the regression results for the full sample and subsamples, respectively. Panels B1 and B2 are the regression results for subsamples divided into illiquid banks and liquid banks, respectively. Illiquid banks are defined as banks with high levels of illiquid assets: if the ratio of net loans to total assets is high, the bank is illiquid. We sort all banks into four categories depending on the annual magnitude of bank liquidity by country. The sample consists of 23,166 bank-year observations for the 25% of banks with high loan to asset ratios and 23,368 bank-year observations for the 25% of banks with low loan to asset ratios in 24 OECD countries from 2000 to 2010. The dependent variable is the ratio of committed credit lines to total assets plus committed credit lines. Table 1 describes the control variable definitions. All regressions use robust standard errors, clustered by country to control for heteroskedasticity and within-country serial correlation. T-statistics are in parentheses. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Full sample tests of the relation between the supply of credit lines, equity capital, and bank liquidity

	(1)	(2)	(3)
Capital/Total assets	0.0264**	0.0271**	0.0298***
	(2.45)	(2.49)	(2.85)
Net Loans/Total assets	0.0165***	0.0166***	0.0182***
	(3.31)	(3.36)	(4.51)
*Net Loans/Total assets*Capital/Total assets*	0.0416***	0.0423***	0.0432***
	(4.79)	(5.19)	(6.75)
Deposits/Total assets	-0.0004	0.0002	-0.0000
	(-0.07)	(0.04)	(-0.00)
Ln(Total assets)	-0.0062***	-0.0062***	-0.0064***
	(-6.06)	(-6.34)	(-9.05)
Non-performing loans/ Total loans	-0.3486***	-0.3528***	-0.3632***
	(-6.12)	(-6.58)	(-7.87)
Mergers and acquisitions	0.0036***	0.0038***	0.0047***
	(3.07)	(3.05)	(3.26)
Ln(GDP per capita)	-0.0038	-0.0081	-0.0094
	(-0.35)	(-0.77)	(-0.76)
GDP growth rate	0.0856	0.1303*	0.1303
	(1.38)	(1.82)	(1.45)
Banking freedom	0.0005***	0.0006***	0.0006***
	(6.41)	(6.30)	(4.13)
Depth of credit information	0.0175*	0.0153*	0.0137*
	(1.93)	(2.02)	(1.88)
M2/GDP		-0.0062	-0.0122
		(-0.96)	(-1.03)
Real interest rate			0.0374
			(0.52)
Constant	0.0323	0.0879	0.1165
	(0.26)	(0.78)	(0.85)
Bank fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
R-squared	0.1262	0.1286	0.1377
Observations	93,072	92,531	89,617

Panel B: Subsample tests of the relation between the supply of credit lines, equity capital, and bank liquidity

	Panel B1: Regression results for illiquid banks			Panel B2: Regression results for liquid banks		
	(1)	(2)	(3)	(1)	(2)	(3)
Capital/Total assets	0.0491***	0.0490***	0.0509***	0.0096	0.0095	0.0123
	(9.40)	(9.33)	(12.85)	(1.30)	(1.28)	(1.48)
Deposits/Total assets	0.0126***	0.0127***	0.0126***	0.0021	-0.0001	0.0010
	(4.42)	(4.24)	(3.63)	(0.42)	(-0.03)	(0.20)
Ln(Total assets)	-0.0112***	-0.0112***	-0.0108***	0.0017*	0.0023**	0.0019**
	(-11.85)	(-13.38)	(-34.60)	(1.76)	(2.29)	(2.62)
Non-performing loans/Total loans	-0.4225***	-0.4253***	-0.4461***	-0.1360***	-0.1360***	-0.1498***
	(-6.43)	(-6.68)	(-9.20)	(-4.23)	(-4.16)	(-6.58)
Mergers and acquisitions	0.0013	0.0014	0.0013	0.0085	0.0073	0.0087
	(0.33)	(0.38)	(0.31)	(1.42)	(1.51)	(1.67)
Ln(GDP per capita)	0.0153	0.0071	0.0263	-0.0246	-0.0277	-0.0410
	(0.96)	(0.40)	(1.12)	(-1.18)	(-1.34)	(-1.60)
GDP growth rate	0.1440	0.2131	0.3252**	0.0736	0.0959	-0.0015
	(1.08)	(1.59)	(2.46)	(0.72)	(0.84)	(-0.01)
Banking freedom	0.0006***	0.0007***	0.0008***	0.0003***	0.0005**	0.0003*
	(5.03)	(4.77)	(6.32)	(3.76)	(2.41)	(2.04)
Depth of credit information	0.0322**	0.0282**	0.0291***	0.0088	0.0064	0.0037
	(2.23)	(2.52)	(2.89)	(1.27)	(1.02)	(1.05)
M2/GDP		-0.0073	-0.0017		-0.0281	-0.0566
		(-0.99)	(-0.21)		(-1.09)	(-1.61)
Real interest rate			-0.0565			0.0616
			(-0.74)			(0.75)
Constant	-0.1821	-0.0764	-0.3013	0.2089	0.2596	0.4502
	(-0.92)	(-0.39)	(-1.26)	(0.99)	(1.15)	(1.71)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1898	0.1925	0.2024	0.0465	0.0499	0.0559
Observations	23,166	23,035	22,328	23,368	23,227	22,477

Table 8 Fixed Effects Regressions of Credit Line Supply on Equity Capital: Bank Size

Table 8 shows the effect of equity capital on credit line supply depending on bank size, adding an interaction between total assets and equity capital. The dependent variable is the ratio of committed credit lines to total assets plus committed credit lines. Table 1 describes the control variable definitions. All regressions use robust standard errors, clustered by country to control for heteroskedasticity and within-country serial correlation. T-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Capital/Total assets	0.0863***	0.0920***	0.0797***
	(3.87)	(3.72)	(3.16)
Ln(Total assets)	-0.0051***	-0.0051***	-0.0054***
	(-4.75)	(-4.72)	(-6.20)
*Ln(Total assets)*Capital/Total assets*	-0.0055**	-0.0059**	-0.0047
	(-2.19)	(-2.12)	(-1.63)
Deposits/Total assets	0.0024	0.0031	0.0030
	(0.50)	(0.66)	(0.55)
Non-performing loans/Total loans	-0.3556***	-0.3600***	-0.3714***
	(-5.92)	(-6.34)	(-7.64)
Mergers and acquisitions	0.0036***	0.0037***	0.0046***
	(3.03)	(3.00)	(3.07)
Ln(GDP per capita)	-0.0044	-0.0085	-0.0094
	(-0.41)	(-0.81)	(-0.74)
GDP growth rate	0.0738	0.1178	0.1164
	(1.24)	(1.69)	(1.32)
Banking freedom	0.0005***	0.0006***	0.0005***
	(6.30)	(6.09)	(3.92)
Depth of credit information	0.0183*	0.0160*	0.0145*
	(1.94)	(2.01)	(1.88)
M2/GDP		-0.0063	-0.0126
		(-0.98)	(-1.08)
Real interest rate			0.0385
			(0.55)
Constant	0.0341	0.0874	0.1130
	(0.27)	(0.77)	(0.82)
Bank fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
R-squared	0.1229	0.1253	0.1338
Observations	93,072	92,531	89,617

Table 9 Fixed Effects Regressions of Credit Line Supply on Equity Capital: Funding Structure

Table 9 shows the effect of equity capital on credit line supply depending on funding structure. Columns (1), (2), and (3) employ the ratio of deposits to total assets as a bank's funding structure and include an interaction between the magnitude of deposits and the capital ratio. Columns (4), (5), and (6) use the ratio of wholesale funds to deposits as a bank's funding structure and add an interaction term between the level of wholesale funding and the equity ratio. The dependent variable is the ratio of committed credit lines to total assets plus committed credit lines. Table 1 describes the control variable definitions. All regressions use robust standard errors, clustered by country to control for heteroskedasticity and within-country serial correlation. T-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Capital/Total assets	0.0015	0.0020	0.0024	0.0288***	0.0289***	0.0299***
	(0.21)	(0.28)	(0.29)	(7.36)	(7.62)	(10.55)
Deposits/Total assets	-0.0080	-0.0075	-0.0079			
	(-1.60)	(-1.48)	(-1.29)			
Deposits/Total assets Capital/Total assets*	0.0745***	0.0745***	0.0747***			
	(15.58)	(13.90)	(15.33)			
Wholesale funding/Deposits				0.0094***	0.0093***	0.0091**
				(2.90)	(3.12)	(2.83)
Wholesale funding/Deposits Capital/Total assets*				-0.0190**	-0.0184**	-0.0150**
				(-2.30)	(-2.35)	(-2.19)
Ln(Total assets)	-0.0055***	-0.0055***	-0.0057***	-0.0061***	-0.0061***	-0.0062***
	(-6.04)	(-6.30)	(-9.12)	(-6.89)	(-7.12)	(-9.84)
Non-performing loans/Total loans	-0.3526***	-0.3569***	-0.3684***	-0.3543***	-0.3587***	-0.3703***
	(-5.92)	(-6.34)	(-7.63)	(-6.02)	(-6.46)	(-7.81)
Mergers and acquisitions	0.0035***	0.0037***	0.0046***	0.0035***	0.0037***	0.0046***
	(2.99)	(2.96)	(3.06)	(3.00)	(2.99)	(3.16)
Ln(GDP per capita)	-0.0043	-0.0084	-0.0094	-0.0036	-0.0078	-0.0087
	(-0.40)	(-0.80)	(-0.75)	(-0.34)	(-0.74)	(-0.69)
GDP growth rate	0.0769	0.1210*	0.1190	0.0812	0.1260*	0.1224
	(1.30)	(1.73)	(1.35)	(1.38)	(1.82)	(1.40)
Banking freedom	0.0005***	0.0006***	0.0005***	0.0005***	0.0006***	0.0005***
	(6.38)	(6.26)	(3.97)	(6.40)	(6.18)	(3.93)
Depth of credit information	0.0183*	0.0160*	0.0145*	0.0180*	0.0157*	0.0142*
	(1.92)	(1.99)	(1.86)	(1.89)	(1.96)	(1.83)
M2/GDP		-0.0062	-0.0123		-0.0058	-0.0121
		(-0.96)	(-1.05)		(-0.90)	(-1.01)
Real interest rate			0.0379			0.0369
			(0.54)			(0.54)
Constant	0.0411	0.0957	0.1214	0.0392	0.0938	0.1197
	(0.33)	(0.84)	(0.87)	(0.31)	(0.81)	(0.86)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1238	0.1261	0.1347	0.1236	0.1259	0.1343
Observations	93,072	92,531	89,617	93,072	92,531	89,617

Table 10 Dynamic Panel GMM Regressions of Credit Line Supply on Equity Capital

Table 10 reports the effect of bank capital on credit line supply when we consider the persistence of credit line supply. We employ the Arellano and Bond (1991) difference-GMM for bank-year level data. The dependent variable is the ratio of committed credit lines to total assets plus committed credit lines. Table 1 describes the control variable definitions. The number of instruments is fewer than the number of groups. The Hansen test of over-identifying restrictions tests the instrument sets' validity. AR(1) and AR(2) show the Arellano-Bond tests for first- and second-order autocorrelation in the first-differenced residuals. The ratio of deposits to total assets is treated as endogenous. All regressions use robust standard errors, clustered by country to control for heteroskedasticity and within-country serial correlation. T-statistics are in parentheses. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
L.Credit lines/(Total assets+Credit lines)	0.6779***	0.6752***	0.6689***	0.6776***	0.6750***	0.6682***
	(43.09)	(43.46)	(43.00)	(41.92)	(42.31)	(42.48)
Capital/Total assets	0.0266***	0.0269***	0.0388***	0.0240***	0.0243***	0.0341***
	(4.17)	(4.38)	(5.65)	(3.84)	(4.07)	(4.92)
Systemic banking crises				0.0006	0.0005	-0.0012
				(0.51)	(0.41)	(-0.50)
*Capital/Total assets*Systemic baking crises*				0.0136**	0.0134**	0.0168***
				(2.34)	(2.29)	(3.46)
Deposits/Total assets	0.0191	0.0183	0.0278*	0.0191	0.0182	0.0255*
	(1.24)	(1.25)	(1.85)	(1.17)	(1.18)	(1.66)
Ln(Total assets)	-0.0014	-0.0015	-0.0024	-0.0014	-0.0016	-0.0025
	(-0.50)	(-0.59)	(-1.20)	(-0.52)	(-0.61)	(-1.24)
Non-performing loans/ Total loans	-0.0589***	-0.0604***	-0.0639***	-0.0581***	-0.0596***	-0.0630***
	(-4.87)	(-4.84)	(-5.42)	(-4.80)	(-4.77)	(-5.34)
Mergers and acquisitions	0.0008	0.0009	0.0006	0.0007	0.0008	0.0006
	(0.31)	(0.38)	(0.22)	(0.25)	(0.33)	(0.21)
Ln(GDP per capita)	-0.0124	-0.0129	-0.0173	-0.0142*	-0.0147*	-0.0176*
	(-1.46)	(-1.59)	(-1.57)	(-1.69)	(-1.82)	(-1.66)
GDP growth rate	0.1046	0.1450*	0.0496	0.0971	0.1385*	0.0454
	(1.44)	(1.88)	(0.55)	(1.38)	(1.88)	(0.52)
Banking freedom	0.0001	0.0001	-0.0001	0.0000	0.0001	-0.0001
	(0.53)	(0.85)	(-0.66)	(0.46)	(0.73)	(-0.80)
Depth of credit information	0.0062	0.0059	0.0078	0.0056	0.0054	0.0077
	(1.15)	(1.12)	(1.17)	(0.96)	(0.94)	(1.06)
M2/GDP		0.0009	-0.0120		0.0015	-0.0118
		(0.26)	(-1.36)		(0.46)	(-1.33)
Real interest rate			-0.0422			-0.0393
			(-0.65)			(-0.61)
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,682	71,562	69,420	71,682	71,562	69,420
Number of banks	10,048	10,041	9,747	10,048	10,041	9,747
Number of Instruments	116	117	118	118	119	120
AR(1) (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) (p-value)	0.398	0.412	0.399	0.396	0.409	0.397
Hansen J-test (p-value)	1.000	1.000	1.000	1.000	1.000	1.000