WP/17/245

IMF Working Paper

Basel III and Bank-Lending: Evidence from the United States and Europe

by Sami Ben Naceur, Jérémy Pépy and Caroline Roulet

INTERNATIONAL MONETARY FUND

 WP/17/245

IMF Working Paper

Institute for Capacity Development

Basel III and Bank-Lending: Evidence from the United States and Europe

Prepared by Sami Ben Naceur, Jérémy Pépy and Caroline Roulet[1]
Authorized for distribution by Ralph Chami

September 2017

Abstract

Using data on commercial banks in the United States and Europe, this paper analyses the impact of the new Basel III capital and liquidity regulation on bank-lending following the 2008 financial crisis. We find that U.S. banks reinforce their risk absorption capacities when expanding their credit activities. Capital ratios have significant, negative impacts on bank-retail-and-other-lending-growth for large European banks in the context of deleveraging and the "credit crunch" in Europe over the post-2008 financial crisis period. Additionally, liquidity indicators have positive but perverse effects on bank-lending-growth, which supports the need to consider heterogeneous banks' characteristics and behaviors when implementing new regulatory policies.

JEL Classification Numbers: G21, G28

Keywords: lending supply, bank regulatory capital, liquidity requirements, banking regulation

Author's E-Mail Address: sbennaceur@imf.org, jeremy.pepy@uca.fr, caroline.roulet@oecd.org

[1] Sami Ben Naceur is at the International Monetary Fund (IMF); Jérémy Pépy is at the Université Clermont Auvergne, CNRS, CERDI, CleRMa, F-63000 Clermont-Ferrand, France; Caroline Roulet is at the Organization of Economic Co-operation and Development (OECD). The authors would like to thank Iftekhar Hasan, Ralph Chami, Udaibir Das, Mary Goodman, Patrick Gitton, Lev Ratnovski, Mitsuru Katagiri, Michelle Hassine, Anna Ilyina, Nigel Jenkinson, Claudio Enrique, Cyril Pouvelle, Felix Vardi, Jana Gieck, Xiang Fang, Claudio Raddatz, and Saad Alnahed for their comments on an earlier version of our paper; Stephanie Fallas and Lisette Atiyeh for editorial assistance; Aliya Levinstein for administrative assistance. All errors and omissions are our own. All of the views expressed in this paper are those of the authors, and do not purport to represent the views of member governments of the IMF and of the OECD.

CONTENTS PAGE

I. INTRODUCTION

The implementation of the Basel accords (i.e., Basel I and II) over the 1990–2000s period gave rise to a large body of literature focusing on the consequences of capital rules on bank behavior, and on the relationship between bank capital and lending behavior. Following the 2008 financial crisis, and in recognition of the need for banks to improve liquidity management and financial stability, the Basel Committee on Banking Regulation and Supervision (BCBS) developed an international framework for liquidity assessment, in addition to more stringent capital adequacy rules. Among other guidelines, the Basel III accord includes the implementation of a regulatory leverage ratio, in addition to the risk-weighted capital ratio, concomitant to liquidity ratios. To comply with regulatory standards, banks would thus have to strengthen capitalization and modify their balance sheet structures to improve the liquidity of their assets and the stability of their funding. Subsequently, a broad array of bank activities may be affected, notably, one of their core functions as liquidity providers, namely, their credit activities. Loans are subject to higher risk weights than trading securities. In addition, they are qualified as semiliquid and even illiquid assets compared to marketable assets, which are qualified as liquid (Berger and Bouwman, 2009). Ben Naceur et al. (2009) extensively discuss the need to implement further regulations to strengthen the stability of the financial system following a financial crisis. However, a question remains: Are regulatory requirements set up so as not to jeopardize the banks' core functions as liquidity providers to service the real economy?

The objective of this paper is to analyze the impact of capital and liquidity on bank-lending following the 2008 financial crisis, and the new measures inspired by the Basel III regulatory framework. There is a large body of theoretical and empirical literature on the determinants of bank-lending that focuses on the topic. Nevertheless, as noted by De Young and Jang (2016), "there is very little theoretical or empirical research on the impact of minimum liquidity standards on bank liquidity risk or other bank risk-taking behaviors." Liquidity indicators are generally not the main variables of interest, perhaps because Basel I and II banking regulations focused mainly on bank capital.

Empirical evidence is provided for an unbalanced panel of U.S. and European commercial banks over the period 2008–15. New measures of capital and liquidity inspired by Basel III are included beyond the determinants considered in the existing literature. The aim is to examine whether the role of bank capital on lending could be impacted by using risk-weighted or leverage regulatory capital ratios, and whether the role of bank liquidity on lending could be impacted by using liquidity measures inspired by Basel III.

The study is based on a detailed breakdown of bank balance sheets to calculate liquidity indicators. For consistency purposes, balance sheets from U.S. banks and some European banks are converted to IFRS accounting standards.[2] The sample is restricted to listed banks

[2] GAAP accounting permits derivatives subject to netting agreements to be reported on the balance sheet on a fully net basis to measure total assets. IFRS includes fair value derivatives exposure in total assets with very limited netting (i.e., there must be a specific intent to settle the contract on a net basis, or to realize the asset and settle the liability simultaneously). Total derivatives exposure is defined as the summation of positive and

(continued…)

and large private banks for which the relevant information is more frequently and extensively reported in standard databases. In order to identify the consequences of a bank's adaptation to new regulatory standards empirically, we have set the estimation period at 2009, when Basel III regulation measures were set up and discussed, before being gradually and transitionally implemented.[3] The assumption in our paper is that banks are anticipating the necessary improvements of their level of capitalization and changes of their balance sheet structure in order to effectively comply with Basel III capital standards concomitant to liquidity requirements.

The main contributions of this paper to the current literature are twofold: The study assesses the impact of capital and liquidity on bank-lending following the 2008 financial crisis, which has not been investigated until now. The paper also applies new measures of capital and liquidity inspired by the Basel III regulatory framework.

The main results show that small U.S. banks strengthen their financial soundness and loss absorption capacities when expanding both commercial and retail-and-other-credit-activities. Nevertheless, large U.S. banks only strengthen their leverage ratios when granting riskier, illiquid commercial loans. Capital ratios have significant and negative impacts on bank-retail-and-other-lending-growth for large European banks in the context of deleveraging and the "credit crunch" in Europe during the post-2008 financial crisis. Liquidity ratios have positive, yet perverse, effects on bank-lending-growth. U.S. banks probably prepare for unexpected liquidity disruptions that could potentially trigger major problems by holding buffer stocks of liquid assets when expanding their risky, illiquid commercial-lending-activities. In the context of credit rationing over the period 2008–15, these results emphasize the inability of large European banks to reduce their commercial loans, but their ability to curtail their retail-and-other-lending-activities amid pressures to shrink their assets when holding buffer stocks of liquid assets. Moreover, large U.S. banks benefit from broader access to external funding, and allocate less stable funding when expanding their semiliquid retail-and-other-lending-activities. However, small U.S. banks expand their risky and illiquid commercial-lending-activities while relying more on stable core deposit funding sources.

The remainder of this paper is organized as follows: Section II briefly describes the data. Section III presents stylized facts on bank-lending, capital, and liquidity following the 2008 financial crisis in the United States and Europe. Section IV reviews the existing literature on the impacts of capital and liquidity on bank-lending, as well as on the hypotheses hereby being tested. Section V describes the empirical strategy and variables considered in the analysis. Results and robustness checks are presented in Sections VI and VII. Section VIII concludes.

---

negative fair value derivatives transactions, including interest, currency, equity, OTC, hedge, and trading derivatives.

[3] Discussions on the Basel III accords began in 2009, and were adopted by law in European Union countries in 2011. Additional capital adequacy rules began to be enforced under national jurisdictions in 2013. The liquidity coverage ratio and net stable funding ratio began being enforced under national jurisdictions in 2014 and 2015, respectively. Banks would have to comply with all Basel III regulatory requirements considering maximum thresholds by 2019.

(continued…)

II. DATA

The sample includes commercial banks from 23 countries[4] over the period 2008–15. The study focuses on U.S. and European banks, whose data are available in standard databases, thereby guaranteeing a sample of banks that represent the banking systems of their corresponding countries.

The analysis is based on annual, consolidated financial statements that were extracted from S&P Global Market Intelligence and Bloomberg. Macroeconomic indicators are calculated using data from DataStream and the IMF World Economic Outlook Database.

From 2008 to 2015, 1341 commercial banks were identified (1040 in the United States and 301 in Europe). The calculation of liquidity indicators is limited to banks for which the breakdowns for loans by category and the breakdowns for deposits by maturity were available in S&P Global Market Intelligence or Bloomberg. A bank is also deleted if its regulatory capital ratios are lower than the regulatory minimum requirement.[5] Such a bank is likely to behave very differently from complying banks when experiencing close regulatory scrutiny or facing constraints on its activities. The final sample consists of 1058 commercial banks (789 in the United States and 269 in Europe). Table 1 presents the distribution of banks by country and the representativeness of the sample. The aggregate amount of loans granted by banks included in the final sample is compared to the aggregate amount of loans in the whole banking system.[6] Over the 2008–15 period, the final sample accounts, on average, for 81 percent of total loans from U.S. commercial banks, as reported by the Federal Deposit Insurance Corporation (FDIC), and, on average, for 58 percent of total loans from European commercial banks, as reported by central banks (varying between 6 percent in the Slovak Republic and 84 percent in Belgium).

[4] Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

[5] Regulators set the minimum requirement at 8 percent for the ratio of total regulatory capital to total risk-weighted assets, except in Cyprus, where it is equal to 10 percent, and the United Kingdom, where it can be considered equal to 9 percent, following Jokipii and Milne (2008). Regarding the ratio of Tier 1 capital to total risk-weighted assets, the minimum requirement is at 4 percent in all countries before 2013, 4.5 percent in 2013, 5.5 percent in 2014, and 6 percent in 2015, following the Basel III phase in arrangements (BIS, 2015). Regarding the ratios of Tier 1 and Core Tier 1 capital to total assets, the minimum requirement is at 3 percent in each country following the "Basel III leverage ratio framework and disclosure requirements" (BIS, 2014a).

[6] To deal with the issue of data comparability, we consider a bank's aggregate total loans instead of total assets. In this paper, the financial statements of U.S. banks are harmonized with IFRS accounting standards. These adjustments are particularly significant when comparing total assets under IFRS to GAAP accounting standards. Under GAAP accounting standards, the net value of derivatives is reported on the balance sheet, as opposed to reporting gross market value under IFRS accounting standards. Aggregate data published by national statistical offices are computed using publicly available data from individual banks generated by considering the accounting standards that prevail under their jurisdictions. Accordingly, it is preferable to consider aggregate total loans rather than total aggregate assets, in order to have a consistent basis on which to compare United States and European banks.

Table 1. Distribution of U.S. and European Commercial Banks

	Banks available in SNL Financials	Banks included in the final sample	Total loans of banks in final sample / total loans of the banking system (%)
Austria	18	15	62
Belgium	10	6	84
Cyprus	4	4	69
Denmark	25	23	81
Finland	3	3	29
France	8	5	62
Germany	63	52	44
Greece	5	4	64
Iceland	3	3	76
Ireland	4	4	60
Italy	28	24	70
Luxembourg	3	3	7
Malta	3	3	31
Netherlands	9	8	64
Norway	27	26	43
Portugal	6	6	67
Slovakia	2	2	6
Slovenia	3	3	46
Spain	17	17	71
Sweden	7	7	66
Switzerland	30	29	78
United Kingdom	23	22	85
United States	1040	789	81

Source: S&P Global Market Intelligence, Bloomberg, European Central Bank, Bank of England, National Bank of Switzerland, Sveriges Riskbank, Denmark National Bank, Central Bank of Iceland, Norges Bank, Federal Reserve Bank. To deal with the issue of sample representativeness, the aggregate total loans of banks included in the final sample is compared to aggregate total loans of the whole banking system. This table reports the average values of this ratio by country for the period 2008–15.

III. STYLIZED FACTS

Figure 1 graphs the annual growth rates of commercial loans versus retail-and-other-loans. It also shows regulatory capital ratios and liquidity ratios, inspired by Basel III, separately for U.S. and European banks following the 2008 financial crisis.

Fact 1. U.S. banks experienced a drop in lending-growth over the period 2008–11. Recovery in credit activities started in 2011, but it is much stronger for commercial loans than retail-and-other-loans. European banks have experienced continuous drops in lending-growth and even a credit crunch since 2014.

The growth rate of commercial loans decreases for U.S. banks over the period 2008–10 (12.8, 3.6, and 0.4 percent, for the respective years), and recovers starting in 2011, following an upward trend of up to 11.8 percent in 2015. Similarly, the growth rate of retail-and-other-loans is falls over the period 2008–11 (14.9, 10, 3.4, and 1.6 percent, for the respective years). The growth rate begins recovering in 2012, following an upward trend of up to 8.9 percent in 2015.

The growth rates of commercial loans and retail-and-other-loans follow continuous downward trends for European banks over the period 2008–15. Growth rates of commercial loans (-9.6 percent, for the respective years) and retail-and-other-loans (-9.6 and -6.1 percent, for the respective years) have been turning negative since 2014.

Fact 2. European banks have increased their capital ratios more significantly than U.S. banks following the 2008 financial crisis. However, U.S. banks exhibit much higher capital ratios, especially leverage ratios, compared to European banks.

Both the risk-weighted capital ratios and leverage ratios of European banks followed upward trends during 2008–15. Total risk-weighted capital ratio increased from 13.5 to 17.9 percent, and the Tier 1 capital ratio increased from 10.7 to 15.8 percent in the same period. The Tier 1 leverage ratio increased from 6.2 to 7.3 percent, and the Core Tier 1 leverage ratio increased from 6.0 to 7.0 percent from 2008 to 2015.

The Tier 1 leverage ratio of U.S. banks has also increased from 10.2 percent in 2008 to 10.4 percent in 2015. Similarly, the Core Tier 1 leverage ratio increased from 9.6 percent in 2008 to 10.1 percent in 2015. Finally, U.S. banks have slightly increased their regulatory risk-weighted capital ratio from 15.5 percent in 2008 to 16.1 percent in 2015, with a peak of 17.0 percent in 2012. The Tier 1 capital ratio of U.S. banks followed the same slight upward trend, increasing from 14.3 percent in 2008 to 14.8 percent in 2015, peaking at 15.6 percent in 2012.

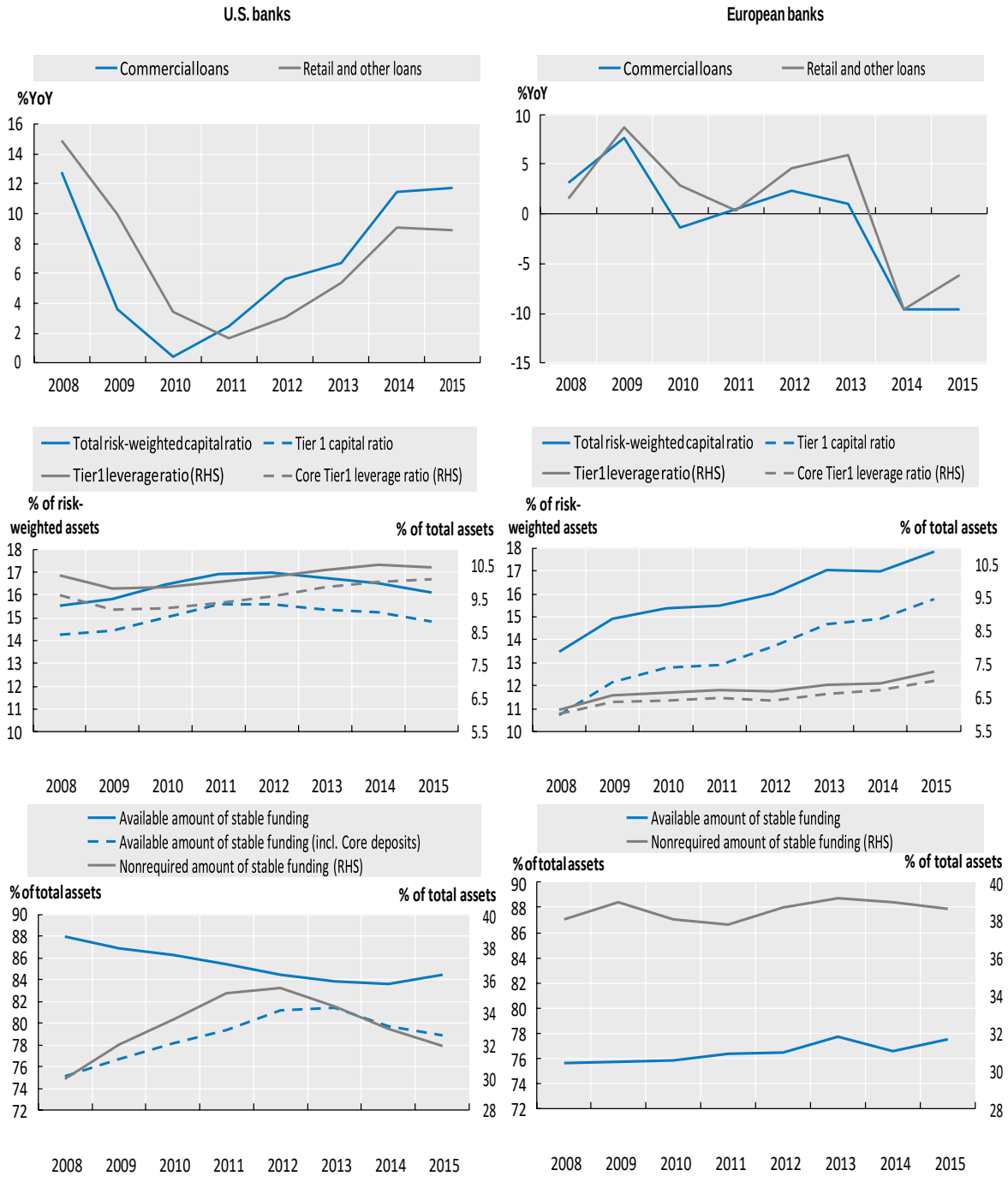
Fact 3. U.S. banks hold more stable funding (defined as the available amount of stable funding in Basel III) than European banks. However, European banks hold more liquid assets (defined as nonrequired amounts of stable funding in Basel III[7]) than U.S. banks.

Trends in stable funding and liquid assets are relatively flat over the period 2008–15 for European banks. However, U.S. banks increase their stocks of liquid assets from 29.9 percent in 2008 to 35.5 percent in 2012. Since 2013, the stock of liquid assets in U.S. banks follows a downward trend that falls to 32.0 percent in 2015. There are two approaches to assess the stability of the funding of U.S. banks. One is based on Basel III, the other, on the importance of Core deposits[8] (Harvey and Spong, 2001; Saunders and Cornett, 2006). These deposits are derived from a bank's regular customer base and are therefore typically the most stable and least costly sources of funding for banks (Harvey and Spong, 2001). The stability of funding measures inspired by Basel III follows a downward trend from 87.8 percent in 2008 to 84.4 percent in 2015. After having seen a continuous increase in stable funding (when considering the concept of Core deposits) from 75.1 percent in 2008 to 81.5 percent in 2013, the measure began to decline, and fell back to 78.9 percent in 2015.

[7] We provide precise definitions of the "available amount of stable funding" and the "nonrequired amount of stable funding" in Section V.B.

[8] Core deposit is defined as the sum of deposits lower than US$100,000, regardless of maturity.

Figure 1. Lending-growth, Capital Ratios, and Liquidity Indicators for U.S. and European Commercial Banks During 2008–15



Note: Total commercial loans in current USD: loans to commercial and industrial entities + commercial real estate loans + construction loans + loans to agriculture + loans to money market funds. Total retail-and-other-loans in current USD: credit card loans + installment loans + residential mortgage loans + loans to municipalities and governments + other loans. Total risk-weighted capital ratio: (Tier 1 capital + Tier 2 capital)/total risk-weighted assets. T1 capital ratio: Tier 1 capital/total risk-weighted assets. T1 leverage ratio: Tier 1 capital/total assets. Core Tier 1 leverage ratio: Core Tier 1 capital/total assets. Nonrequired amount of stable funding: nonrequired amount of stable funding (based on Basel III definition)/total assets. Available amount of stable funding: available amount of stable funding (based on Basel III definition)/total assets. Available amount of stable funding (including Core deposits) for U.S. banks: available amount of stable funding (Core deposits being considered as stable)/total assets.

IV. Related Literature

There is a large body of theoretical and empirical literature about the determinants of bank-lending that focuses on the impacts of capital and liquidity.

A. Empirical Evidence for the Effect of Capital on Bank-Lending

The implementation of the Basel accords (Basel I and II) gave rise to a large body of literature focusing on the consequences of new capital rules on bank behavior and, in particular, on the relationship between bank capital and lending behavior. The empirical literature on the role of bank capital on loan supply can be divided in two main streams.

The first body of literature focuses on the impact of the Basel I accord (implemented around the world at the beginning of the 1990s) and studies the link between the effect of loan growth and capital ratios on the macroeconomy. A large portion of this literature examines whether the sluggish recovery of the U.S. economy from the 1990–91 recession was caused by newly introduced bank capital regulations (i.e., adoption of Basel I), which (may have) hampered banks' lending activities and, consequently, acted as a headwind to economic growth. Bernanke and Lown (1991) set a model linking bank-lending-growth to bank capital ratios and employment. They found that bank-lending-growth at individual banks between 1990: Q2 and 1991: Q1 was positively linked to initial capital ratios. However, the impact of the economic environment was more notable than the impact of capital on lending. This result may be explained by the fact that Bernanke and Lown's study was based on data ending in the first quarter of 1991, before the credit crunch took place (Berrospide and Edge, 2010). Berger and Udell (1994) provided some evidence for the reallocation of bank credit from loans to securities in the early 1990s using data on virtually all U.S. banks from 1979 to 1992. One of these prescriptions was the Basel accord on risk-based capital, which mandates that international banks operating in the major industrialized nations hold capital in proportion to their perceived credit risks. Because capital is more expensive to raise than insured deposits, risk-based capital may be viewed as a regulatory tax that is higher on assets in categories that are assigned higher risk weights. Therefore, it we can expect the implementation of risk-based capital to encourage substitution out of assets in the 100 percent risk category, such as commercial loans, and into assets in the 0 percent risk category, such as treasury securities. Thus, the allocation of credit away from commercial loans may have caused a credit crunch, which the authors define as a significant reduction in the supply of credit available to commercial borrowers. Consistent with these expectations, U.S. banks did reduce their commercial loans and increase their holdings of treasuries in the early 1990s. Peek and Rosengren (1997, 2000) investigate the role of capital ratios for lending activity, focusing on Japanese banks in the United States (1997), and for real activity in the United States. Their findings suggest that binding risk-based capital requirements associated with the Japanese stock market shortfall resulted in a decrease in lending by Japanese banks in the United States that was both economically and statistically significant.

From their discussion, we derive the first hypothesis as follows:

H1.1. Under deteriorated economic conditions and the credit crunch, higher capital ratios may be associated with lower lending.

The second body of literature on the role of bank capital in lending was developed in the first half of the 2000s, with a focus on the magnitude of the effect of bank capital ratios on bank-lending-growth (Kishan and Opiela, 2000; Gambacorta and Mistrulli, 2004; Berrospide and Edge, 2010; Beatty and Liao, 2011; Carlson et al., 2013; Bridges et al., 2014; Labonne and Lame 2014; Olszak et al., 2014; Kosak et al., 2015). These authors analyze the relative impacts of different types of capital ratios, such as risk-weighted capital and leverage ratios. Empirical investigations provide mixed results. Either capital ratio is not significant in the determination of bank-lending or, when significant, has a positive impact on bank-lending. The differences in the results across papers may be explained by the heterogeneity of the samples considered (e.g., publicly traded banks; commercial banks; bank holding companies; and French, British, European, U.S., or Japanese banks), as well as by the different estimation methods employed.

From their discussion, we derive an alternative version of the first hypothesis as follows:

H1.2. Higher capital allows banks to absorb greater risk and enhances their ability to originate more credit.

B. Empirical Evidence for the Effect of Liquidity on Bank-Lending

Alongside bank capital, liquidity variables are among the most widely used when studying the determinants of bank-lending (Alper et al., 2012). Previous empirical studies used assets and liability ratios to control for the distinct effects of the liquidity of assets and stability of funding on bank-lending (Alfaro et al., 2003; Gambacorta and Mistrulli, 2004; Berrospide and Edge, 2010; Cornett et al., 2011; Bridges et al., 2014; Allen and Paligovora, 2015), rather than liquidity risk ratios (i.e., measuring liquidity mismatches between assets and liabilities). The main empirical findings suggest that when liquidity variables are significant, they have positive, significant impacts on bank-lending.

From their discussion, we derive the second hypothesis as follows:

H2.1. Banks with stable funding sources and buffer stocks of liquid assets can originate more credit.

However, alternative views would emerge regarding the impact of liquidity on bank-lending following the 2008 financial crisis and the implementation of more stringent regulatory liquidity requirements. Under deteriorated economic conditions and the credit crunch, more stringent liquidity requirements of assets may enhance a bank's ability to reduce its lending activities amid pressures to shrink its assets when holding a buffer stock of liquid assets. In the context of easy monetary policies, and nearly zero interest rates on public government bonds, loan spreads are weaker with higher risk premiums (Berger and Bouwman, 2009). Therefore, banks may prefer reducing their low-yield, risky, and illiquid credit activities when holding liquidity buffers of risk-free, low-yield government bond securities.

Besides, banks would reallocate their stable funding to other activities—presumably investing in more liquid assets—rather than lending to the private sector. This argument is of even greater importance because in the wake of the 2008 financial crisis which has caused

banks to face tighter conditions when accessing private sector funding sources or securitizing their loans. Additionally, banks have been/are facing stronger market pressures from long-term debt holders, who may be concerned about not getting their money back.

From their discussion, we derive an alternative version of the second hypothesis as follows:

H2.2. Higher liquid assets or stable funding ratios may be associated with lower lending.

V. Empirical Strategy and Definitions of Variables

A. Model and Regression Framework

The empirical specification is designed to analyze the impact of capital and liquidity on bank-lending following the 2008 financial crisis, using new measures inspired by the Basel III regulatory framework, moving beyond the determinants considered in the existing literature. The study uses annual panel data, which involves pooling 1058 U.S. and European commercial banks over the period 2008–15 to estimate a static panel regression model.[9] This model assumes that bank-lending behavior today is explained by bank-specific and macroeconomic variables. Bank-specific variables are lagged once (t-1) to mitigate possible endogeneity problems.[10] The inclusion of macroeconomic variables allows to control for demand effects (Carlson et al., 2013). Some of them also lag once (t-1), following Brei et al. (2013). The model specification is outlined as follows:

$$\Delta \mathrm{LO}_{i,t} = \alpha_i + \sum_{j=1}^{J} \beta_j X_{ji,t-1} + \sum_{k=1}^{k} \beta_k X_{ki,t} + \varepsilon_{i,t} \quad (1),$$

where ΔLO_{it} denotes the lending-growth of bank *i* at time *t*, measured as year-on-year change in loans expressed in current U.S. dollars.[11] A model in growth rates has been selected because variables in levels are typically integrated of order one (as confirmed by the Im-Pesaran-Shin test for cross sectional variables and a standard Dickey Fuller test for the time series). This is also the approach used by Kashyap and Stein (1995) to mitigate spurious correlation. X_{ji} and X_{ki} are respectively the j^{th} and k^{th} bank-specific or macroeconomic determinants of bank-lending identified in the existing literature. An OLS panel estimator with bank cross section fixed effects is employed.[12] The choice of using a fixed-effects

[9] Most empirical studies focusing on the determinants of bank-lending use dynamic panel regression models. Serial correlation in the panel data model has been tested using the Wooldridge test with the null hypothesis of "no first-order autocorrelation." As discussed by Baltagi (2001) and Woolridge (2002), if there is serial correlation in the idiosyncratic error term, estimators other than the standard OLS panel estimator will produce more efficient estimates. This test performs well when considering a sample with a large number of cross sectional observations over a relatively short period, which corresponds to the structure of the sample used in this paper. The null hypothesis of "no first-order autocorrelation" cannot be rejected. Therefore, a static panel data model is estimated in this paper.

[10] Portfolio changes take time to occur and often reflect decisions based on historical experience. From a risk management perspective, the purpose is to outline how previous factors accurately reflect bank decision inputs to determine their current lending profiles.

[11] The annual growth rate of loans expressed in current U.S. dollars is used instead of the annual growth rate of loans over assets. Indeed, a bank may expand its activities on all fronts, but somewhat less aggressively in the area of loans. Subsequently, using the annual growth rate of loans over assets may lead to incorrect interpretations as a lending reduction.

[12] Following Brei et al. (2013), time fixed effects are excluded from the model when controlling for demand effects through the inclusion of macroeconomic variables.

estimation is based on the view that the sample of banks is not being drawn randomly from the population of banks. Rather, the data cover the major banking groups, suggesting that the random effects estimator would not be appropriate, as confirmed by the Haussmann test. Standard errors are robust from heteroskedasticity. The quality of the regression results is assessed through the Fisher test with adjusted r-square. All variables are winsorized at the 1st and 99th percentile levels to reduce the effects of outliers.

B. Definitions of Variables

The Dependent Variable

The dependent variable is alternately the annual growth rate of commercial loans (including loans to commercial and industrial entities, commercial real estate loans, construction loans, loans to agriculture, and loans to money market funds), and of retail-and-other-loans (credit card loans, installment loans, residential mortgage loans, and loans to municipalities and governments), both expressed in current U.S. dollars.

The distinction between commercial, retail, and other loans points to a better identification of the determinants in bank-lending (Alfaro et al., 2003). Depending on the type of loan granted, bank risk exposure may differ. Higher risk weights are assigned to business loans compared to consumer and other loans. In addition, Berger and Bouwman (2009) have also classified consumer and other loans as semiliquid assets, and commercial loans as totally illiquid assets.[13] It is even expected that banks may better strengthen their financial soundness when granting riskier and more illiquid loans. Results may differ when considering various definitions of capital and liquidity ratios, as banks might be managing the various components of their balance sheets and regulatory capitals differently.

Bank-Specific Explanatory Variables

The effect of bank capital on bank-lending has been widely debated since the 1988 Basel accord (Bernanke and Lown, 1991; Berger and Udell, 1994; Peek and Rosengren, 1997, 2000; Kishan and Opiela, 2000; Gambacorta and Mistrulli, 2004; Berrospide and Edge, 2010; Beatty and Liao, 2011; Carlson et al., 2013; Bridges et al., 2014; Labonne and Lame 2014; Olszak et al., 2014; Kosak et al., 2015). Although some previous studies confirm that regulatory capital ratios behave similarly to equity ratio (Craig et al., 2006), Gambacorta and Marques-Ibanez (2011) and Chernykh and Cole (2015) show that regulatory capital ratios may be more accurate in measuring solvency. In this paper, four capital ratios are considered based on Basel regulatory standards (BIS, 2011, 2014a). Since the 2008 financial crisis, the Basel Committee has suggested tightening capital requirements and implementing a simple leverage ratio, in addition to the risk-weighted capital ratio.[14] The total regulatory capital ratio is defined as the ratio of Tier 1 and Tier 2 capital to risk-weighted assets (t12k_rwa).

---

[13] Commercial loans typically cannot be sold quickly without incurring major losses. Consumer loans and residential mortgages are generally relatively easy to securitize. Furthermore, loans to governments are likely to be comparatively easy to sell, or otherwise dispose of, because the counterparties are relatively large and informationally transparent.

[14] Following the 2008 financial crisis, many researchers (e.g., Elshahat et al., 2012; Atkinson et al., 2013), found that among the post-problematic issues presented by the Basel framework was the complexity of the risk-weight

(continued…)

Under the Basel III regulatory framework, additional capital requirements have been introduced regarding the quality of the capital base. Tier 1 capital aims at better quality capital, and it is expected to lead banks toward managing the components of their regulatory capital differently. For deeper insight, Tier 1 capital to risk-weighted assets (t1k_rwa) is considered an alternative measure. A bank's leverage ratio is measured as Tier 1 capital to total assets (t1k_ta). Because the Basel Committee has yet to finalize the definition of the bank leverage ratio, and considers an alternative, more restricted definition of Tier 1 capital, the Tier 1 ratio of common equity (also known as Core Tier 1 capital) to total assets (ct1k_ta) is used. Since the 2008 financial crisis, banks have been constrained in improving their capital ratios, which have largely deteriorated due to large impairments and losses. As discussed in Section IV, the impact of capital ratio on bank-lending-growth is ambiguous.

Liquidity is considered an important determinant of bank-lending in the existing literature (Alper et al., 2012). Studies usually use asset and liability ratios rather than liquidity risk ratios (i.e., measuring liquidity mismatches between assets and liabilities) to focus on the distinct effects of the liquidity of assets and the stability of funding on bank-lending. This paper focuses on new measures of liquidity inspired by the Basel III regulatory framework. Following the 2008 financial crisis, the Basel Committee has suggested defining more accurate measures of bank liquidity. In addition to information provided by accounting data on the liquidity profile of banks, the information on the cash value of assets that could be monetized, and on the availability of market funding, is also considered to determine the liquidity of bank assets and liabilities. The implementation of the net stable funding ratio (NSFR[15]) is intended to encourage banks to maintain stable funding profiles in relation to the composition of their assets and off-balance sheet (OBS) activities. The main purpose is to reduce the likelihood of disruptions to a bank's regular sources of funding, which would likely erode its liquidity position, increase the risk of its failure, and potentially lead to broader systemic stress.

Based on these Basel III liquidity regulatory standards, the asset liquidity measure is the ratio of the nonrequired amount of stable funding to total assets (nrasf_ta). The nonrequired amount of stable funding is the amount of an asset that could be monetized through sale, or used as collateral in secured borrowing on an extended basis, under a liquidity stress scenario over a one-year time horizon. The stable funding measure is the ratio of the available amount of stable funding to total assets (aasf_ta). The available amount of stable funding is the total amount of an institution's capital, market funding, and term deposits with effective maturities of one year or greater, and a portion of stable demand deposits with maturities of less than one year that would be expected to remain within the institution. Nevertheless, Harvey and Spong (2001) and Saunders and Cornett (2006) emphasize the importance of Core deposits

---

optimization performed by large banks that are using internal models to assess the riskiness of their assets. To resolve it, the Basel Committee decided to implement binding leverage constraints in addition to risk-weighted capital requirements.

[15] Per the Bank of International Settlements (BIS 2014b), NSFR is defined as the amount of available stable funding relative to the amount of required stable funding. This ratio should be equal to at least 100 percent on an ongoing basis. "Available stable funding" is defined as the portion of capital and liabilities expected to be reliable over the time horizon considered by the NSFR, which extends to one year. The amount of such stable funding required of a specific institution is a function of the liquidity characteristics and residual maturities of the various assets held by that institution, as well as those of its OBS exposures.

for U.S. banks. Thus, it might be relevant to adopt an alternative definition of stable deposits in the available amount of stable funding by considering Core deposits for U.S. banks (aasf_cd_ta). To calculate the nonrequired amount of stable funding, and the available amount of stable funding, a specific nonrequired stable funding factor is assigned to each asset, and a specific available stable funding factor is assigned to each liability (Table 2). For the available amount of stable funding considering Core deposits for U.S. banks, the 0.7 weight for demand and saving deposits is changed to 1. A weight of zero is assigned to noncore deposits. As discussed in Section IV, the impact of the liquidity of assets and stability of funding on bank-lending-growth is ambiguous.

Table 2. Balance Sheet Weights Used to Calculate Basel-III-Based Liquidity Ratios

Balance sheet items	Factors	Balance sheet items	Factors
Nonrequired stable funding		**Available stable funding**	
Cash and near cash items	1	**Demand & saving deposits**	0.7
Trading securities	1	*Core deposits*	*1*
Derivative assets	0.1	**Time deposits**	1
Consumer loans	0.25	*Non-Core deposits*	*0*
Commercial loans	0	**Short-term borrowings**	0
Other loans	0	**Long-term borrowings**	1
Intangible assets	0	**Derivative liabilities**	0
Fixed assets	0	**Other liabilities**	1
Other assets	0	**Subordinated debentures**	1
		Total equity	1

The influence of credit risk is considered in the determination of bank-lending-behavior. Credit risk arises when a bank's customers fail to meet their obligations. An increase in credit risk is expected to put pressure on the bank's capital and decrease the bank's desire to lend, which would have a negative association with the bank's lending-growth. Regarding nonperforming loans, previous findings support the fact that banks are currently granting fewer loans in the face of increasing credit risks (Stiglitz and Weiss, 1981; Keeton, 1999; Berrospide and Edge, 2010; Alhassan et al., 2013; Panetta, 2013; Cucinelli, 2015). In this paper, the ratio of nonperforming loans to total gross loans (npl_tlo) is used as a proxy of credit risk.

Bank risk appetite is also considered an important determinant of bank-lending-behavior. The shift in long-term interest rates is the trigger of the change in the risk appetite of banks, and is the underlying reason as to why banks substitute government loans and securities for loans to the private sector on their balance sheets (Peersman, 2012). A reverse causality is not very plausible, given the fact that bond yields should rise when banks start selling government securities. In sum, low risk-free rates make government securities less attractive, leading banks to search for yields, thereby increasing the supply of riskier loans to the private sector. Conversely, higher government bond yields increase the cost opportunities for banks to issue loans, resulting in smaller supplies of new loans. Therefore, a positive relationship is expected between bank risk appetite and lending-growth. The risk-adjusted return on assets is used as a proxy of bank risk appetite (Setiyono et al., 2014). It is calculated as the ratio of

return on assets to its standard deviation, based on observations from the previous three years (roa_sdroa). All else being equal, higher values of standard deviation of return on assets imply greater bank risk appetite and lower values for risk-adjusted returns on assets.

Credit channel models of the monetary transmission mechanism argue that a bank's cost of funding has a direct effect on bank-lending (Bernanke and Blinder, 1989; Bernanke and Gertler, 1989, 1995; Kashyap and Stein, 1995). An increase in bank funding costs, regardless of whether they were generated by increases in the riskiness of a bank, or by restrictive monetary policy, will be inherited by bank customers through higher loan rates. Higher borrowing costs will reduce the investment and consumption demands of bank dependent borrowers and, through economic interactions, ultimately lead to a magnified reduction in final loan demand. Moreover, one may argue that higher funding costs are likely to weaken a bank's competitiveness and its ability to increase lending. Therefore, a negative relationship is expected between bank cost of funding and lending-growth. Bank cost of funding is measured by the ratio of net interest expenses to total deposits and marketable debt (cost_fund).

The impact of profitability on bank-lending-growth is ambiguous (Laidroo, 2014). Higher profitability encourages banks to increase lending. However, if the banking market is highly competitive, lower lending margins could lead to higher lending. Profitability is measured by the return on equity (roe), reflecting the ability of the bank to use its own funds to generate profits.

Bank size is considered an important determinant of bank-lending decisions in the existing literature (Berger and Udell, 2006; Uchida et al., 2008). Berger and Udell (2006) find that large, complex banks tend to lend few loans to small-scale firms. Stein (2002) explains that small banks have comparative advantages in producing soft information. Thus, a negative relationship is expected between bank size and lending-growth. However, when large, complex banks are able to process soft information about small-scale firms through technical expertise and scale economies (Boyd and Runkhle, 1992), there is a positive relationship between bank size and lending-growth. Bank size is measured by the natural logarithm of total assets (ln_ta).

As noted by Brei et al. (2013), it is also important to control for mergers and acquisitions, as well as for potential financial statement reporting changes that introduce discontinuities in certain bank positions. Doing so excludes a spurious burst of credit growth that merely reflects consolidations between banks or financial statement reporting changes. Following Lepetit et al. (2012), we use a dummy variable to capture such effects. It equals one if the annual growth rate of total assets is greater than 35 percent, and zero otherwise (DUM_MA).

Macroeconomic Indicators as Determinants of Individual Bank-Lending

In addition to bank-specific characteristics, it is also very important to account for macroeconomic conditions and credit demand effects by using country-level time series when studying the determinants of bank-lending-supply (Ehrmann et al., 2003; Gambacorta, 2005; Carlson et al., 2013; Brei et al., 2013; Berrospide and Herrerias, 2015).

The level of economic activity is included as a potential determinant of individual bank-lending-growth. The macroeconomic environment is likely to affect bank activities and investment decisions (Chen et al., 2010; Pana et al., 2010). For instance, the demand for differentiated financial products is higher during economic booms, and might improve a bank's ability to expand its loan portfolio at a higher rate. Similarly, economic downturns are compounded by the reduction in bank credit supply that is, itself, partially worsened by the fall in demand for credit. This implies a procyclical relationship between economic growth and bank-lending (Talavera et al., 2006; Dagher et al., 2016; Pruteanu-Podpiera, 2007; Ladime et al., 2013), which is measured as the annual growth rate of nominal gross domestic product (ngdp_gwt). This variable is expected to have a positive impact on bank-lending-growth.

Bank-lending-behavior in response to monetary policy from the country's central bank (Ehrmann et al., 2003; Abdkarim et al. 2007; Chami et al., 2009; Brei at al., 2013) is captured by using two indicators. The change in the three-month interbank rate (3m_itbnk_c) is used to account for changes in the conventional monetary policy via interest rate. This variable is expected to have a negative relationship with bank-lending-growth. Central banks also took unconventional monetary policy measures following the 2008 financial crisis (Borio and Disyatat, 2010; Wu, 2015). To disentangle the effects of such measures on bank-lending from those determined by changes in the policy rate, a proxy of unconventional policy measures is added to the set of regressors, which is calculated as the annual growth rate of the ratio of the central bank's total assets to GDP (cb_gdp_gwt). This variable is expected to positively influence bank-lending-growth.[16]

The impacts of major evolutions in the regulatory framework over the period 2008–15 (the gradual and transitional implementation of Basel III) are captured through a Basel III degree-of-implementation index by country over time developed by Ang et al. (2017). This variable controls for potential heterogeneity in enforcing Basel III regulations across countries. Based mostly on biannual progress reports that have been published since 2011 by the Basel Committee toward the implementation of the Basel III regulatory framework in G20 countries and the European Union, three dummy variables are created to capture partial implementation of Basel III since the 2009 proposal. These variables are (i) the enforcement of Basel III's risk-based capital requirements, (ii) the enforcement of Basel III liquidity coverage ratios, (iii) and the enforcement of Basel III leverage ratios. Each dummy equals one for the year in which a new regulation starts being enforced under a given national jurisdiction. The overall Basel III degree-of-implementation index is the sum of the three dummy variables. This index varies between zero and three (basel3).

VI. EMPIRICAL RESULTS

This section discusses regression results obtained for a sample of 789 U.S. commercial banks and 269 European commercial banks over the period 2008–15. Regressions are run separately for U.S. and European banks, as they might be relevant for adopting an alternative definition

[16] Following Brei et al (2013), who have experimented with various macroeconomic variables, the annual growth rate of nominal GDP and the change in the three-month interbank rate are lagged once (t-1).

of stable deposits in the available amount of stable funding by considering Core deposits for U.S. banks. In addition, the year-on-year changes in commercial loans or in retail-and-other-loans, as well as several regulatory capital and liquidity indicators, are used alternately. The aim is to examine whether the results differ when considering different types of loans, and various definitions of regulatory capital and liquidity ratios, since banks might be managing the various components of their balance sheets and regulatory capitals differently.

Tables 3 and 4 show the correlation coefficients among all explanatory variables, and some descriptive statistics.

A. Main Determinants of Bank-Lending for U.S. and European Banks

Tables 5 and 6 report regression results. In focusing on capital ratios, we find that risk-weighted capital ratios and leverage ratios have significant and positive impacts on U.S. bank-lending-growth for both specifications of the dependent variable. Capital ratios are not significant in the determination of European bank-commercial-lending-growth. However, the Tier 1 and Tier 2 risk-weighted capital ratio and Tier 1 leverage ratios have significant and negative impacts on European bank-retail-and-other-lending-growth.

These results suggest that capitalization plays a major role in encouraging U.S. bank-lending-growth over the post-2008 financial crisis period. These results emphasize the cautious behavior of U.S. banks when facing higher risk exposure. They strengthen their financial soundness and their loss absorption capacities when expanding credit activities. The insignificant effect of capital ratios on European commercial-bank-lending-growth may be explained by the emergence of zombie lending, considering the deteriorated economic conditions and accommodative monetary policy over the post-2008 financial crisis period. In this context, less capitalized banks react to the easing of monetary conditions by increasing their exposure to zombie firms, evergreening loans and hoping that economic recovery (or their governments) will bail them (and their zombie firm borrowers) out.[17] Nevertheless, European banks are operating at levels of capitalization sufficiently high enough to prevent doubts about their financial soundness. In this context, capitalization does not determine bank-lending-behavior any longer.[18] Besides, the negative impacts of the Tier 1 and Tier 2 risk-weighted capital ratios, and Tier 1 leverage ratios, on European bank-retail-and-other-lending-growth may be explained in the context of deleveraging (Atkinson et al., 2012) and the credit crunch in Europe (Acharya at al., 2017) over the post-2008 financial crisis period. European banks have massively increased their capital ratios, but decreased their lending (Figure 1) throughout 2008–15. Because capital is more expensive to raise than external funding, increase in capital may be viewed as a regulatory tax that is higher on assets in categories that are assigned higher risk weights, or when expanding bank balance sheets via the expansion of credit activities. This argument is particularly relevant in a very low interest-

[17] Acharya et al. (2015) show that, while not being less healthy before the outbreak of the European sovereign debt crisis, firms that were very dependent on banks located in countries that were severely affected by the sovereign debt crisis (GIIPS banks) became financially constrained during said crisis. This was because GIIPS banks were weakly capitalized and decreased lending to the private sector.

[18] When considering the capitalization levels of European banks in the sample (Table 4), one may note that they are well-capitalized, the average risk-weighted capital ratio (15.9 percent) and Tier 1 leverage ratio (6.8 percent) being well above the regulatory minimum over the period 2008–15.

rate environment, such as the period following the 2008 financial crisis, with easy monetary policies and nearly zero interest rates on public government bonds. In this context, loan spreads on retail-and-other semiliquid loans are weaker with higher risk premiums (Berger and Bouwman, 2009). Therefore, one would expect more stringent capital adequacy rules to encourage substitution out of retail-and-other-loan assets, and into risk-free, more liquid government bond securities.

Regarding liquidity ratios, the ratio of the nonrequired amount of stable funding to total assets has a significant and positive impact on U.S. and European bank-commercial-lending-growth. This suggests that U.S. banks are holding buffer stocks of liquid assets when expanding their risky and illiquid commercial-lending-activities. They probably anticipate unexpected liquidity disruptions of securitization markets that would prevent them from selling loans quickly without incurring major losses. Indeed, these assets can be liquidated to avoid any lack of cash, or to fund new profitable loan investments when banks are facing tighter market conditions on raising funding. During the credit rationing over the period 2008–15, these results emphasize the inability of European banks to reduce commercial loans amid pressures to shrink their assets when holding buffer stocks of liquid assets. These assets may be viewed as security buffers that enhance bank risk absorption capacities—as these assets can be liquidated to avoid any lack of cash—when holding riskier, illiquid assets. Nevertheless, the ratio of the nonrequired amount of stable funding to total assets has a significant, negative impact on European bank-retail-and-other-lending-growth.[19] These findings suggest that European banks are better able to reduce their retail-and-other-lending-activities amid pressures to shrink their assets when holding buffer stocks of liquid assets. This argument is particularly relevant in a very low interest-rate environment, such as the period following the 2008 financial crisis, with easy monetary policies and nearly zero interest rates on public government bonds. In such a case, loan spreads and risk premiums on retail-and-other-semiliquid-loans are weaker than on commercial, more illiquid loans (Berger and Bouwman, 2009). Therefore, European banks may prefer reducing their low-yield, risky, semiliquid loans when holding liquidity buffers of risk-free, low-yield government bond securities.

Besides, the ratio of the available amount of stable funding to total assets is not significant in the determination of U.S. and European bank-lending-growth.[20] However, the ratio of the available amount of stable funding to total assets, which focuses more closely on Core deposits for U.S. banks, has a significant and negative impact on U.S. bank-retail-and-other-lending-growth. According to Berger and Bouwman (2009), banks are facing much lower liquidity risks by investing in semiliquid retail-and-other-loans than in totally illiquid commercial loans. To mitigate liquidity risk exposure, banks need to allocate more stable funding when investing in illiquid commercial loans than in semiliquid retail-and-other-loans. These findings suggest that more stable funding sources tend to weaken U.S. banks'

[19] This variable has a significant, negative impact on U.S. bank-retail-and-other-lending-growth, but only when considering models including risk-weighted capital ratios. This impact is weakly significant at the 10 percent level. These results are not commented on, as they are not very clear-cut, regardless of model specification.
[20] This variable has a significant, negative impact on U.S. bank-commercial-lending-growth, but only when considering three versions of the model over four. This impact is weakly significant at the 10 percent level. These results are not commented on, as they are not very clear-cut, regardless of model specification.

willingness to expand their semiliquid retail-and-other-lending-activities. These results emphasize the necessity to clarify further what types of liquid liabilities should be considered as stable for a deeper regulatory definition of the notion of Core or stable deposits. The insignificant effect of the ratio of available amount of stable funding to total assets on European bank-lending-growth underlines the importance of funding structure as a driver of bank-lending-behavior. Following the post-2008 financial crisis, wholesale funding is increasingly difficult to access because of rising funding costs, and also to roll over, due to debtholders' concerns over banks' financial soundness. Besides, households' economic situations have deteriorated as their saving capacities. Therefore, the bank deposit base is more difficult to expand. When accounting for deleveraging and the credit crunch, these results emphasize the necessity to clarify further what types of liabilities should be considered stable for a deeper regulatory definition of the notion of stable funding. In addition, regulators need to determine what types of regulations should be implemented and enforced in order to strengthen banks' core functions as credit providers.

Table 3. Correlations Among the Main Explanatory Variables

U.S. Commercial Banks

	t12k_rwa	t1k_rwa	t1k_ta	ct1k_ta	nrasf_ta	aasf_ta	aasf_cd_ta	npl_tlo	roa_sdroa	cost_fund	roe	ln_ta	dum_ma	ngdp_gwt	3m_itbnk_c	cb_gdp_gwt	basel3
t12k_rwa	1																
t1k_rwa	0.99	1															
t1k_ta	0.79	0.80	1														
ct1k_ta	0.76	0.78	0.94	1													
nrasf_ta	0.43	0.43	0.06	0.09	1												
aasf_ta	0.03	0.03	0.08	0.10	-0.10	1											
aasf_cd_ta	0.02	0.03	0.03	0.03	0.06	-0.1598	1										
npl_tlo	-0.01	-0.05	-0.08	-0.09	-0.05	0.08	-0.05	1									
roa_sdroa	0.03	0.04	0.01	0.03	0.15	-0.06	0.05	-0.26	1								
cost_fund	-0.06	-0.06	-0.07	-0.07	-0.16	0.36	-0.14	0.11	-0.20	1							
roe	0.04	0.06	0.03	0.02	0.11	-0.11	0.07	-0.44	0.33	-0.26	1						
ln_ta	0.03	0.03	0.11	0.11	-0.07	0.02	-0.07	-0.08	-0.04	0.01	-0.04	1					
dum_ma	-0.17	-0.19	-0.21	-0.29	-0.03	-0.22	-0.10	-0.09	0.11	-0.14	0.18	-0.04	1				
ngdp_gwt	0.06	0.06	0.04	0.05	0.07	-0.13	0.07	-0.01	0.13	-0.54	0.20	-0.07	0.04	1			
3m_itbnk_c	0.08	0.07	0.03	0.04	0.11	-0.17	0.10	0.05	0.13	-0.75	0.20	-0.12	0.06	0.85	1		
cb_gdp_gwt	-0.04	-0.04	-0.04	-0.05	-0.04	0.09	-0.05	0.07	-0.12	0.39	-0.19	0.04	-0.04	-0.92	-0.67	1	
basel3	-0.01	-0.01	0.05	0.07	-0.04	-0.09	0.01	-0.19	0.16	-0.43	0.15	-0.03	0.07	0.29	0.37	-0.36	1

European Commercial Banks

	t12k_rwa	t1k_rwa	t1k_ta	ct1k_ta	nrasf_ta	aasf_ta	npl_tlo	roa_sdroa	cost_fund	roe	ln_ta	dum_ma	ngdp_gwt	3m_itbnk_c	cb_gdp_gwt	basel3
t12k_rwa	1															
t1k_rwa	0.90	1														
t1k_ta	0.27	0.40	1													
ct1k_ta	0.31	0.42	0.98	1												
nrasf_ta	0.25	0.19	-0.10	-0.05	1											
aasf_ta	-0.02	0.00	0.18	0.15	-0.16	1										
npl_tlo	-0.17	-0.18	0.16	0.14	-0.05	0.0906	1									
roa_sdroa	0.05	0.05	0.05	0.07	-0.02	0.11	-0.19	1								
cost_fund	-0.11	-0.20	-0.09	-0.10	-0.05	0.04	-0.02	-0.15	1							
roe	0.12	0.15	0.09	0.11	-0.02	0.01	-0.35	0.15	-0.13	1						
ln_ta	0.00	0.02	0.01	0.02	0.02	0.00	0.01	0.02	-0.01	0.05	1					
dum_ma	-0.06	-0.11	-0.52	-0.48	0.03	-0.40	-0.08	-0.08	-0.04	-0.01	-0.03	1				
ngdp_gwt	0.13	0.10	0.05	0.05	0.02	0.03	-0.09	0.07	0.11	0.12	-0.04	-0.15	1			
3m_itbnk_c	0.02	0.04	0.00	0.00	-0.02	0.03	-0.03	0.05	0.02	-0.03	-0.04	-0.01	0.66	1		
cb_gdp_gwt	-0.09	-0.11	-0.09	-0.07	-0.01	-0.03	-0.13	0.03	0.23	-0.01	0.07	0.04	0.14	0.27	1	
basel3	0.18	0.23	0.10	0.08	-0.03	0.07	-0.02	0.05	-0.22	0.08	-0.07	-0.06	0.09	0.14	-0.02	1

Note: All variables are expressed in percentages, except LN_TA, DUM_MA and BASEL3. T12K_RWA: (Tier 1 capital + Tier 2 capital)/total risk-weighted assets. T1K_RWA: Tier 1 capital/total risk-weighted assets. T1K_TA: Tier 1 capital/total assets. CT1K_TA: Core Tier 1 capital/total assets. NRASF_TA: nonrequired amount of stable funding (based on Basel III definition)/total assets. AASF_TA: available amount of stable funding (based on Basel III definition)/total assets. AASF_CD_TA: available amount of stable funding (Core deposits being considered stable)/total assets. NPL_TLO: nonperforming loans/(commercial loans + consumer loans + other loans). ROA_SDROA: return on assets/three-year standard deviation of ROA. COST_FUND: net interest expenses/(total deposits + marketable debt securities). ROE: net income/total equity; LN_TA: natural logarithm of total assets. NGDP_GWT: annual growth rate of nominal GDP. DUM_MA: dummy variable equals 1 if growth rate of total assets exceeds 35 percent, and 0 otherwise. 3M_ITBNK_C: change in the three-month interbank rate. CB_GDP_GWT: annual growth rate of central bank assets to GDP. BASEL3: indicator of implementation degree of Basel III capital and liquidity regulations by national jurisdiction varying between 0 and 3.

Among the other determinants of bank-lending identified in the existing literature, credit risk, bank size, cost of funding, nominal GDP growth rate, change in three-month interbank rate, and the annual growth rate of the ratio of a central bank's total assets to GDP are the most significant variables.

Bank credit risk has a significant and negative impact on European and U.S. bank-commercial and retail-and-other-lending-growth. Bank credit risk also has a significant, negative impact on European bank-commercial-lending-growth. These results are consistent with findings from the previous literature regarding the impact of credit risk on lending (Berrospide and Edge, 2010; Alhassan et al., 2013; Panetta, 2013; Cucinelli, 2015). An increase in credit risk puts pressure on a bank's capital that tends to weaken its desire to increase or, conversely, boost its ability to curtail the number of risky and illiquid loans.

Bank size has a significant, negative impact on U.S. and European bank-commercial and retail-and-other-lending-growth. This suggests that small U.S. banks tend to grant more loans. Consistent with Stein (2002), small banks have comparative advantages in producing soft information, given their large customer bases, which help them to expand their credit activities. Regarding European banks, these findings suggest that large banks are better able to reduce their credit activities amid pressures in order to shrink their assets. Indeed, large banks are more involved than small banks in securitization lending and market activities, lending activities not being their core businesses.

Bank cost of funding has a significant and positive impact on European bank-commercial-lending-growth. In the context of credit rationing over the period 2008–15, these results emphasize the inability of European banks to reduce their commercial loans amid pressures to shrink their assets when facing higher costs of funding. The 2008 funding liquidity crisis significantly contributed to bank funding pressures and higher funding costs. Increased funding cost is likely to have introduced a procyclical bias in financial intermediation (ECB, 2016).

Besides, the nominal GDP growth rate has a significant and negative impact on U.S. bank-commercial and retail-and-other-lending-growth. Under deteriorated economic conditions—the economic downturn has been less pronounced in the United States than in Europe over the period 2008–15[21]—U.S. banks prefer expanding their credit activities with higher rates of returns compared to other types of assets with lower yields. By contrast, the nominal GDP growth rate has a significant, positive impact on European bank-commercial-lending-growth. This result emphasizes the very procyclical behavior of European banks in decreasing their risky, illiquid commercial-lending-activities following the 2008 financial crisis.

In addition, the three-month interbank rate has an unexpected significant, positive impact on U.S. bank-commercial and retail-and-other-lending-growth. This result suggests that conventional monetary policies, which consisted in lowering interest rates following the 2008

[21] Over the period 2008–15, the average nominal GDP growth rate in the United States was 2.81 percent. For the European countries, however, the average nominal GDP growth rate was relatively low at 1.94 percent. Some countries exhibit high levels of economic growth with a maximum rate of 13.7 percent. However, several countries face severe economic recessions, with a minimum nominal GDP growth rate at -9.6 percent.

financial crisis, tended to hamper U.S. bank-lending-growth. A low interest rate environment and highly competitive banking market could lead to decreases in banks' interest margins, weakening their willingness to expand credit activities.

Finally, the annual growth rate of the ratio of central bank's total assets has a significant, positive impact on U.S. bank-commercial and retail-and-other-lending-growth. These results suggest that, following the 2008 financial crisis, unconventional monetary policies, which consist of injecting liquidity into the banking system via the increase in size of the central bank's balance sheet, tend to boost U.S. banks credit activities.

B. Impacts of Size and Access to Financial Markets on Bank-Lending

The ability of banks to access financial markets is presumably different depending on their sizes. A large bank might benefit from a reputational advantage that may give it broader access to debt and equity markets. Small banks face higher costs of raising equity due to greater asymmetric information problems. Accordingly, changes in loan-supply responses to capital requirements are much stronger for small banks than for large ones (Aiyar et al., 2016). Moreover, large and small banks might have different scopes of activities, as well as contrasting business models. Small banks are more focused on lending activities and deposit taking than large banks, which are largely involved in trading and wholesale funding activities.[22] This is likely to affect a bank's ability to manage liquidity positions, different components of regulatory capital, and willingness to lend. Following the literature, a bank is considered small if its total assets are below US$1 billion. Therefore, regressions are run separately for large and small banks, still distinguishing between European and U.S. banks. Regression results are shown in Tables 7 to 9.[23]

Capital ratios—both risk-weighted and simple leverage—have significant and positive impacts on small U.S. banks' bank-lending-growth for both specifications of the dependent variable. Only leverage ratios have significant and positive impacts on large U.S. bank-commercial-lending-growth. These results suggest that small U.S. banks, even if they are well capitalized, do not benefit from reputational advantages, and must signal their strong financial soundness. This idea is reinforced by the fact that small U.S. banks have been widely affected by the 2008 financial crisis.[24] Because they face higher costs of raising equity, capitalization particularly matters for small U.S. banks, as it improves ability to grant

[22] The data show that small banks, both in Europe and the United States, are, on average, more focused on traditional intermediation activities than large banks. The average share of loans in total assets is 66.8 percent on the whole sample of banks, and 66.5 percent for large U.S. banks, 68.1 percent for small U.S. banks, 63.6 percent for large European banks, and 69.0 percent for small European banks. By type of loans granted, the average share of commercial loans in total assets is 41.4 percent on the whole sample of banks, corresponding to 45.4 percent for large U.S. banks, 43.6 percent for small U.S. banks, 31.6 percent for large European banks, and 31.9 percent for small European banks. The average share of retail-and-other-loans in total assets is 25.3 percent on the whole sample of banks, corresponding to 21.2 percent for large U.S. banks, 24.7 percent for small U.S. banks, 31.2 percent for large European banks, and 37.5 percent for small European banks. The average share of deposits in total assets is 74.4 percent on the whole sample of banks, corresponding to 77.4 percent for large U.S. banks, 81.5 percent for small U.S. banks, 53.0 percent for large European banks, and 70.2 percent for small European banks.

[23] Only the results obtained for the variables of interest are reported. Detailed results are available upon request.

[24] Descriptive statistics show that small U.S. banks exhibit lower ROE (3.0 percent), and are facing higher levels of nonperforming loans (3.1 percent) than large U.S. banks (5.9 and 2.6 percent, respectively).

risky and more illiquid loans. Besides, large U.S. banks are more involved in securitization lending than small banks. Therefore, when investing in illiquid commercial loans, large U.S. banks strengthen their financial soundness and loss absorption capacity. They probably anticipate for unexpected liquidity disruptions on securitization markets that would prevent them from selling loans quickly, without incurring major losses. Regarding European banks, capital ratios—both risk-weighted and simple leverage—have significant and negative impacts on large bank-retail-and-other-lending-growth. These results may be explained in the context of deleveraging and the credit crunch in Europe over the post-2008 financial crisis period. An increase in capital may be viewed as a regulatory tax that is higher on assets in categories that are assigned higher risk weights, or when expanding bank balance sheets via the expansion of credit activities. Large European banks are more involved in trading, rather than in credit activities—especially retail lending activities—compared to small European banks.[25] Therefore, we expect the enforcement of more stringent capital adequacy rules to encourage large banks to substitute out of retail-and-other-loan assets into risk-free, more liquid government bond securities.

Regarding liquidity ratios, the ratio of the nonrequired amount of stable funding to total assets has a significant, positive impact on commercial-lending-growth for U.S. banks, regardless of size.[26] These results suggest that, when expanding their commercial-lending, U.S. banks—regardless of size—face unexpected liquidity disruptions by holding buffer stocks of liquid assets. Besides, the ratio of the nonrequired amount of stable funding to total assets has a significant and positive impact on commercial-lending-growth for large European banks. These results emphasize large European banks' inability to reduce commercial loans amid pressures to shrink their assets when holding buffer stocks of liquid assets. This finding suggests that large European banks are taking advantage of their extensive market activities. They build up strong buffer stocks of marketable liquid assets to enhance their risk absorption capacities—as these assets can be liquidated to avoid any lack of cash—when holding riskier, illiquid loans. Nevertheless, the ratio of the nonrequired amount of stable funding to total assets has a significant and negative impact on large European bank-retail-and-other-lending-growth. This finding suggests that large European banks are taking advantage of their extensive market activities to hold buffer stocks of marketable liquid assets to help them reduce their retail-and-other-lending-activities amid pressures to shrink their assets. This argument is particularly relevant in a very low interest-rate environment, such as the period following the 2008 financial crisis, with easy monetary policies and nearly zero interest rates on public government bonds. In this context, loan spreads and risk premiums on retail-and-other-semiliquid-loans are weaker than on commercial, more illiquid loans (Berger and Bouwman, 2009). Therefore, large European banks may prefer holding liquidity buffers of risk-free, low-yield government bond securities rather than low-yield, risky, semiliquid loans.

[25] For further details, see footnote 22.

[26] This variable has a significant and negative impact on small U.S. bank-retail-and-other-lending-growth, but only when considering models that include risk-weighted capital ratios. This impact is weakly significant at the 10 or 5 percent levels. These results are not commented on, as they are not very clear-cut, regardless of model specification.

Consistent with previous results, the ratio of the available amount of stable funding to total assets is not significant in the determination of U.S. and European bank-lending-growth, regardless of size. The ratio of the available amount of stable funding that focuses more closely on Core deposits for U.S. banks has a significant and negative impact on large U.S. bank-retail-lending-growth. These findings suggest that more stable funding sources tend to weaken large U.S. banks' willingness to expand their semiliquid retail-and-other-lending activities. Large banks might underestimate their funding liquidity risks due to their broader access to external funding. Consequently, they allocate less stable funding when investing in semiliquid retail-and-other-loans. Besides, the ratio of the available amount of stable funding that focuses more closely on Core deposits for U.S. banks has a significant and positive impact on small U.S. bank-commercial-lending-growth. These results are consistent with findings from previous studies, which show that banks that derived a greater share of their funding from so-called Core deposits were more likely to extend credit following the 2008 financial crisis.[27] These results emphasize the importance for small U.S. banks to rely on stable Core-deposit funding sources to expand their risky and illiquid commercial-lending-activities. Small banks anticipate for unexpected liquidity disruptions that could potentially trigger major problems due to their difficulties in raising external market funding. Consequently, they hold strong security buffers of stable funding sources when expanding their illiquid credit activities.

VII. ROBUSTNESS CHECKS

Several robustness checks are performed separately on U.S. and European banks. Regressions are run separately for two groups: large and small banks. The results are reported in Appendix I.[28]

Previous empirical studies on the determinants of bank-lending-growth highlight potential endogeneity issues with capital and liquidity ratios and, more specifically, with most of the bank-level indicators. To address such issues, all bank-level explanatory variables, which are presumably endogenous in the existing literature, are replaced by the one-year lagged value. The model is estimated using the generalized method of moments (GMM) as a robustness check. Considering this estimation method has two advantages. It is robust to the distribution of errors, and is considered more efficient than two-stage least squares (2SLS) regression because it accounts for the heteroscedasticity of errors (Hall, 2005). After checking, the one-year lagged values of the presumably endogenous variables are not weak instruments. However, more lags of these variables are not introduced in the regressions, as they are weak instruments. Following Brei et al. (2013), cross section fixed effects are included in the model, but time fixed effects are excluded from the model when controlling for demand effects through the inclusion of country-level time series. Results are presented in Tables A1.1a, A1.1b, and A1.1c. Most of the results are consistent with those obtained using a standard OLS estimator, however some of them are weakened. Capital ratios have become not significant for large U.S. banks in the determination of commercial-lending-growth, and for small U.S. banks in the determination of retail-and-other-lending-growth. The negative impact of the capital ratio has been weakened for large European banks in the determination

[27] See Kupiec et al. (2017), Ivashina and Scharfstein (2010), or Cornett et al. (2011).
[28] Only the results obtained for the variables of interest are reported. Detailed results are available upon request.

of retail-and-other-lending-growth. Finally, the ratio of the available amount of stable funding that focuses more closely on Core deposits for U.S. banks has become significant, with a negative impact on large U.S. bank-commercial-lending-growth. These results further confirm that large U.S. banks might underestimate their funding liquidity risks due to broader access to external funding. Consequently, they allocate less stable funding when investing in illiquid commercial loans.

The robustness of the results is checked through an alternative definition of the dependent variable that considers the ratio of retail loans to total assets.[29] Main conclusions are consistent with those previously obtained when including other loans in addition to retail lending.

Further robustness checks are performed by including banks with regulatory capital ratios (either total risk-weighted capital ratios or simple leverage ratios) below the minimum requirements. The number of observations increase in proportion to the size of the large bank subsample when considering leverage ratios.[30] The main conclusions are consistent with those previously obtained.

To determine the robustness of results on liquidity ratios inspired by Basel III, the 0.25 weight for consumer loans is changed. Two weights are alternately considered to determine whether the results can be affected by the extent of loans considered liquid. The first weight, 0.15 (nradf015_ta), is the minimum weight set by the BCBS for liquid loans. The second, 0.5 (nradf05_ta), is the maximum weight set for liquid loans. In addition, the 0.7 weight for demand and saving deposits is changed. Two weights are alternately considered to determine whether the results can be affected by the extent of deposits considered stable. The first weight, 0.5 (aasf05_ta), is the minimum weight set for stable demand and saving deposits. The second, 0.9 (aasf09_ta), is the maximum weight set for stable demand and saving deposits (BIS, 2014b). The results are presented in Tables A1.2a, A1.2b, A1.2c, and A1.2d. The main conclusions are consistent with those previously obtained with the nraf_ta and aasf_ta variables.

Following the 2008 financial crisis, most regulatory authorities have been emphasizing the determining role of systemically important financial institutions. In November 2011, the Financial Stability Board (FSB) published an integrated set of policy measures to address the systemic and moral-hazard risks associated with Global Systemically Important Financial Institutions (G-SIFIs). In that publication, the FSB identified an initial group of 29 international banks as G-SIFIs. This list is updated every year and currently includes 30 banking groups (the last update having been in November 2016). Additionally, the Federal Reserve qualifies a bank as significant if it holds US$50 billion or more in total consolidated assets (FED, 2011).[31] Using these criteria, regressions are run separately for U.S. and European banks on two subgroups: (i) very large (i.e., significant) banks with total assets above US$50 billion (all G-SIFIs included in the sample are staying in this group), and (ii)

[29] Results are available upon request.
[30] Results are available upon request.
[31] The term “significant” is used in the credit exposure reporting provisions of the Dodd-Frank Act, which apply to bank holding companies and foreign banks that are treated as bank-holding companies, and that manage US$50 billion or more in assets.

other large banks with total assets below US$50 billion and above US$1 billion. Because the subsamples of very large U.S. or European banks both include relatively low numbers of banks, the results for very large banks might not be as reliable as those for other large banks. Regression results are shown in Tables A1.3a, A1.3b, and A1.3c. The main conclusions are consistent with those previously obtained when pooling all large banks with total assets above US$1 billion. Nevertheless, the ratio of the available amount of stable funding that focus more closely on Core deposits for U.S. banks has a significant and negative impact on bank-retail-lending-growth only for other large U.S. banks.

Descriptive statistics show that the sample of European banks includes mainly large banks with average total assets of US$160 billion and median total assets of US$20 billion. The large size of banks in Europe relate to a highly concentrated banking market structure (ECB, 2014). Thus, we use an alternative definition of bank size for European banks. A bank is considered small if its total assets are below US$20 billion (i.e., the median of total assets of European banks included in the sample). Table A1.4 shows the regression results. Main conclusions are consistent with those previously obtained when including an alternative criterion to separate banks by size. Focusing on capital ratios, results remain unchanged compared to those previously obtained when considering a different threshold to separate European banks by size. Regarding liquidity ratios, the ratio of the nonrequired amount of stable funding to total assets has become significant, with a positive impact on small European bank-commercial-lending-growth. These results emphasize the inability of small European banks to reduce their commercial loans amid pressures to shrink their assets when holding buffer stocks of liquid assets. The results also emphasize the cautious behavior displayed by small European banks when unable to reduce risk exposure to riskier, illiquid loans. They hold strong security buffers of liquid assets to enhance their risk absorption capacities when holding riskier, illiquid assets.

VIII. CONCLUDING REMARKS

Our study analyses the impact of new capital and liquidity measures implemented under the Basel III regulatory framework on US and European banks' lending. The main results are as follows:

Small U.S. banks strengthen their capital base and loss absorption capacity when expanding both commercial and retail-and-other-credit-activities. Nevertheless, large U.S. banks only strengthen their leverage ratios when granting riskier, illiquid commercial loans. Capital ratios have significant and negative impacts on bank-retail-and-other-lending-growth for large European banks. In the context of deleveraging and the credit crunch in Europe over the post-2008 financial crisis period, more stringent capital adequacy rules encourage substitution out of retail-and-other-loan assets, and into risk-free, more liquid government bond securities.

One additional finding of this study is that liquidity indicators have positive, yet perverse, effects on bank-lending-growth. Indeed, the ratio of the nonrequired amount of stable funding to total assets has a significant, positive impact on commercial-lending-growth for U.S. banks, regardless of size. U.S. banks probably anticipate and pre-empt unexpected liquidity disruptions that could potentially trigger major problems by holding buffer stocks of liquid

assets when expanding their risky, illiquid credit activities. For large European banks, the ratio of the nonrequired amount of stable funding to total assets has a positive impact on commercial-lending-growth, but a negative effect on retail-lending-growth. Given the credit rationing over the period 2008–15, these results emphasize the inability of large European banks to reduce their commercial loans, but their ability to curtail their retail-and-other-lending-activities amid pressures to shrink their assets when holding buffer stocks of liquid assets.

Finally, the ratio of the available amount of stable funding to total assets is not significant in determining European bank-lending-growth regardless of size. However, the ratio of the available amount of stable funding that focuses more closely on Core deposits for U.S. banks has a significant and negative impact on retail-lending-growth for large U.S banks. However, this variable has a significant and positive impact on commercial-lending-growth for small U.S banks. Large U.S. banks might benefit from broader access to external funding to allocate less stable funding when expanding their semiliquid retail-and-other-lending activities. However, small U.S. banks expand their risky and illiquid commercial-lending-activities when relying more on stable Core deposit funding sources. The insignificant effect of the ratio of the available amount of stable funding to total assets on European bank-lending-growth underlines the importance of funding structure as a driver of bank-lending-behavior in the context of deleveraging and the credit crunch in Europe during the post-2008 financial crisis.

These findings have certain implications for policy making and bank regulatory frameworks. Depending on the economic context, and a bank's ability to originate credit, the effect of new capital and liquidity regulatory frameworks may differ and eventually be ineffective or even detrimental. Subsequently, implementing capital and liquidity regulatory frameworks applicable to all banks could have counterproductive effects on post-2008 bank-lending-growth. Moreover, the definition and measurement must be further clarified under a global regulatory framework. Regulators need to determine what types of liquid liabilities should be considered stable for a deeper regulatory definition of the notion of stable funding. A key message of this study is that regulators should consider heterogeneous banks' characteristics and behaviors to determine what types of regulations should be implemented and enforced, in order to promote stronger financial stability and strengthen banks' core functions as credit providers.

Table 4. Descriptive Statistics of Explanatory Variables for U.S. and European Commercial Banks, On Average, During 2008–15

			Number of observations		Mean		Median		Standard Deviation		Minimum		Maximum	
Variable name	**Variable description**	**Expected sign**	**U.S. banks**	**European banks**	**U.S. banks**	**European banks**	**U.S. banks**	**European banks**	**U.S. banks**	**European banks**	**U.S. banks**	**European banks**	**U.S. banks**	**European banks**
Endogeneous variables														
L_t	Annual growth rate of commercial loans in current USD		7,751	2,209	6.83	-0.93	5.37	-0.88	19.68	25.22	-48.03	-116.39	91.79	113.21
	Annual growth rate of retail and other loans in current USD		7,751	2,209	6.87	0.88	2.32	0.03	25.98	21.63	-50.96	-76.09	148.65	86.90
Bank-specific characteristics														
t12k_rwa$_{t-1}$	Total risk-weighted capital ratio	+	6,865	2,181	16.40	15.93	15.11	15.00	5.28	5.06	8.01	8.07	49.55	50.93
t1k_rwa$_{t-1}$	Tier 1 risk-weighted capital ratio	+	6,904	2,181	15.03	13.51	13.68	12.81	5.47	5.10	4.02	4.29	49.92	42.17
t1k_ta$_{t-1}$	Tier 1 capital to total assets ratio	+	7,803	2,138	10.19	6.77	9.61	6.22	3.36	2.94	3.03	3.01	39.73	28.61
ct1k_ta$_{t-1}$	Core Tier 1 capital to total assets ratio	+	7,742	2,064	9.63	6.55	9.04	5.97	3.56	2.90	3.00	3.00	39.73	28.61
nrasf_ta$_{t-1}$	Ratio of non-required amount of stable funding (based on Basel III definition) to total assets	+/-	7,928	2,327	33.22	38.51	31.62	35.04	12.05	14.54	10.47	15.37	69.43	89.13
aasf_ta$_{t-1}$	Ratio of available amount of stable funding (based on Basel III definition) to total assets	+/-	7,143	2,282	85.32	76.51	84.39	78.49	6.97	11.48	70.05	40.15	99.90	97.58
aasf_cd_ta$_{t-1}$	Ratio of available amount of stable funding (Core deposits for U.S. banks being considered as stable) to total assets	+/-	7,928	-	78.86	-	83.50	-	17.20	-	11.67	-	96.37	-
npl_tlo$_{t-1}$	Non-performing loans to total loans ratio	-	7,324	2,053	2.92	7.16	2.06	4.05	2.75	8.32	0.00	0.05	15.68	45.67
roa_sdroa$_{t-1}$	Return on assets (i.e., ROA) to 3-year rolling standard deviation of ROA	+	7,710	2,197	7.00	6.99	2.91	2.41	12.33	15.37	-3.42	-2.71	75.62	103.34
cost_fund$_{t-1}$	Ratio of net-interest expenses to the sum of total deposits and marketable debt securities	-	7,907	2,318	1.13	2.19	0.89	1.89	0.81	1.46	0.11	0.15	3.49	8.27
roe$_{t-1}$	Return on equity ratio	+/-	7,776	2,250	3.96	2.53	6.16	4.87	10.07	12.72	-59.05	-98.53	26.79	26.52
ln_ta$_{t-1}$	Logarithm of total assets	+/-	7,928	2,327	6.52	10.12	6.21	9.90	1.65	1.95	2.74	4.39	15.41	15.05
dum_ma$_{t-1}$	Dummy variable equals to 1 if growth in total assets exceeds 35%, and 0 otherwise	+/-	8,320	2,408	0.10	0.06	0.00	0.00	0.29	0.24	0.00	0.00	1.00	1.00
Macroeconomic controls														
ngdp_gwt$_{t-1}$	Annual growth rate of nominal GDP	+	8,320	2,408	2.81	1.94	3.70	2.25	1.98	3.23	-2.04	-9.60	4.20	13.74
3m_itbnk_c$_{t-1}$	Change in the 3-month interbank rate	-	8,320	2,408	-0.62	-0.54	-0.09	-0.23	0.98	1.17	-2.39	-4.54	0.10	1.53
cb_gdp_gwt$_t$	Annual growth rate of central bank assets to GDP	+	8,320	2,408	20.53	13.22	16.64	10.46	25.14	25.33	-2.39	-43.87	83.57	141.66
basel3$_t$	Indicator of gradual implementation of Basel III capital and liquidity regulations by national juridictions varying between 0 and 3	+/-	8,320	2,408	1.38	0.57	1.00	0.00	0.70	1.06	1.00	0.00	3.00	3.00

Source: S&P Global Market Intelligence, Bloomberg, Datastream and IMF World Economic Outlook Database (2008–2015). All variables are expressed in percentage, except L, LN_TA, DUM_MA, and BASEL3. All variables are winsorized at the 1st and 99th percentile levels to reduce the effects of outliers.

Table 5. Determinants of Commercial vs. Retail-and-Other-Loans for U.S. Banks During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[1']	[2']	[3']	[4']	[5']	[6']	[7']	[8']
	Commercial loans								Retail and other loans							
t12k_rwa	0.487***	-	-	-	0.498***	-	-	-	0.580**	-	-	-	0.570**	-	-	-
	(3.43)				(3.67)				(2.36)				(2.43)			
t1k_rwa	-	0.470***	-	-	-	0.485***	-	-	-	0.663***	-	-	-	0.655***	-	-
		(3.19)				(3.48)				(2.75)				(2.86)		
t1k_ta	-	-	1.054***	-	-	-	1.123***	-	-	-	0.974***	-	-	-	0.964***	-
			(5.31)				(5.86)				(3.03)				(3.17)	
ct1k_ta	-	-	-	1.128***	-	-	-	1.165***	-	-	-	0.810**	-	-	-	0.773**
				(5.83)				(6.23)				(2.51)				(2.58)
nrasf_ta	0.670***	0.670***	0.765***	0.773***	0.704***	0.707***	0.801***	0.811***	-0.185*	-0.196*	-0.045	-0.046	-0.196*	-0.201**	-0.03	-0.038
	(10.78)	(10.77)	(13.21)	(13.20)	(11.64)	(11.43)	(14.32)	(14.33)	(-1.73)	(-1.86)	(-0.48)	(-0.48)	(-1.96)	(-2.02)	(-0.33)	(-0.42)
aasf_ta	-0.109	-0.116*	-0.107*	-0.120*	-	-	-	-	-0.003	-0.003	0.029	0.026	-	-	-	-
	(-1.60)	(-1.72)	(-1.71)	(-1.90)					(-0.03)	(-0.03)	(0.31)	(0.28)				
aasf_cd_ta	-	-	-	-	0.032	0.032	0.038	0.038	-	-	-	-	-0.074*	-0.073*	-0.072**	-0.075**
					(1.28)	(1.28)	(1.63)	(1.64)					(-1.86)	(-1.84)	(-1.99)	(-2.06)
npl_tlo	-1.501***	-1.481***	-1.453***	-1.420***	-1.490***	-1.481***	-1.453***	-1.441***	-1.063***	-1.071***	-1.152***	-1.168*** (-	-1.059***	-1.075***	-1.077***	-1.078*** (-
	(-9.64)	(-9.70)	(-10.27)	(-9.81)	(-10.89)	(-11.06)	(-11.38)	(-10.95)	3.84)	(-3.96)	(-4.59)	(-4.48)	3.84)	(-3.98)	(-4.25)	(-4.09)
roa_sdroa	0.049*	0.049*	0.052**	0.048*	0.046*	0.045*	0.044*	0.04	-0.002	-0.002	-0.006	-0.01	-0.01	-0.012	-0.013	-0.016
	(1.91)	(1.90)	(2.07)	(1.89)	(1.66)	(1.65)	(1.69)	(1.53)	(-0.01)	(-0.06)	(-0.18)	(-0.29)	(-0.30)	(-0.35)	(-0.40)	(-0.51)
cost_fund	0.805	0.784	0.897	0.873	0.946	0.884	1.169	1.151	0.248	0.317	-0.247	-0.412	-1.335	-1.216	-1.734	-1.997
	(0.61)	(0.59)	(0.73)	(0.69)	(0.80)	(0.76)	(1.07)	(1.03)	(0.13)	(0.17)	(-0.14)	(-0.23)	(-0.75)	(-0.68)	(-1.05)	(-1.18)
roe	0.054*	0.054*	0.025	0.018	0.063**	0.059**	0.031	0.027	0.047	0.059	0.056	0.067	0.063	0.074	0.065	0.077
	(1.87)	(1.86)	(0.93)	(0.61)	(2.51)	(2.36)	(1.28)	(1.02)	(0.84)	(1.11)	(1.18)	(1.31)	(1.19)	(1.45)	(1.39)	(1.51)
ln_ta	-16.57***	-16.79***	-15.10***	-14.80***	-16.04***	-16.21***	-14.61***	-14.32***	-16.65***	-16.40***	-14.86***	-15.18*** (-	-16.26***	-15.84***	-14.38***	-14.93*** (-
	(-9.39)	(-9.70)	(-9.25)	(-8.78)	(-10.06)	(-10.45)	(-10.00)	(-9.45)	4.37)	(-4.30)	(-4.36)	(-4.35)	4.39)	(-4.26)	(-4.33)	(-4.41)
dum_ma	-0.215	-0.138	0.124	-0.101	-0.13	-0.087	-0.17	-0.382	-2.2	-2.166	-2.225	-2.372	-3.138	-3.112	-2.736	-2.812
	(-0.15)	(-0.10)	(0.09)	(-0.07)	(-0.10)	(-0.07)	(-0.13)	(-0.30)	(-0.77)	(-0.76)	(-0.82)	(-0.86)	(-1.12)	(-1.11)	(-1.04)	(-1.06)
ngdp_gwt	-2.389***	-2.422***	-2.141***	-2.127***	-2.462***	-2.497***	-2.293***	-2.272***	-3.213***	-3.174***	-2.763***	-2.726*** (-	-2.652***	-2.571***	-2.029**	-2.013**
	(-3.63)	(-3.70)	(-3.44)	(-3.35)	(-4.01)	(-4.10)	(-3.95)	(-3.84)	3.23)	(-3.19)	(-2.97)	(-2.87)	(-2.75)	(-2.68)	(-2.29)	(-2.23)
m_itbnk_c	8.529***	8.550***	7.656***	7.557***	8.616***	8.638***	8.023***	7.928***	9.203***	9.102***	7.725***	7.577**	7.141**	6.927**	5.282*	5.196*
	(4.08)	(4.11)	(3.89)	(3.75)	(4.45)	(4.49)	(4.39)	(4.24)	(2.90)	(2.88)	(2.60)	(2.49)	(2.33)	(2.27)	(1.86)	(1.79)
cb_gdp_gwt	0.135***	0.133***	0.116***	0.114***	0.138***	0.137***	0.124***	0.123***	0.201***	0.199***	0.176***	0.175***	0.178***	0.173***	0.149***	0.150***
	(4.57)	(4.54)	(4.14)	(4.04)	(4.95)	(4.94)	(4.69)	(4.58)	(4.43)	(4.40)	(4.22)	(4.11)	(4.06)	(3.97)	(3.76)	(3.71)
basel3	5.418***	5.420***	5.165***	5.033***	5.425***	5.421***	5.249***	5.116***	4.820***	4.752***	4.367***	4.278***	4.100***	3.994***	3.702***	3.643***
	(8.31)	(8.32)	(8.13)	(7.69)	(8.86)	(8.88)	(8.84)	(8.40)	(4.53)	(4.47)	(4.33)	(4.11)	(4.06)	(3.96)	(3.90)	(3.73)
c	99.70***	102.8***	83.52***	82.35***	81.71***	83.77***	65.21***	63.22***	120.3***	118.4***	99.67***	104.4***	123.3***	119.7***	102.8***	109.5***
	(7.22)	(7.61)	(6.51)	(6.33)	(6.99)	(7.39)	(6.00)	(5.64)	(4.37)	(4.34)	(4.02)	(4.18)	(4.69)	(4.57)	(4.35)	(4.58)
r2	0.221	0.223	0.220	0.215	0.224	0.225	0.225	0.219	0.054	0.057	0.061	0.058	0.052	0.055	0.059	0.055
F	68.020	68.860	72.270	68.720	73.890	75.120	78.890	75.310	11.780	12.620	14.480	13.470	12.620	13.380	15.010	14.080
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	5130	5130	5669	5618	5130	5130	5669	5618	5130	5130	5669	5618	5130	5130	5669	5618

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses.

Table 6. Determinants of Commercial vs. Retail-and-Other-Loans for European Banks During 2008–15

	[1]	[2]	[3]	[4]	[1']	[2']	[3']	[4']
	Commercial loans				Retail and other loans			
t12k_rwa	-0.351 (-0.95)	-	-	-	-0.636*** (-3.00)	-	-	-
t1k_rwa	-	-0.269 (-0.62)	-	-	-	-0.407 (-1.58)	-	-
t1k_ta	-	-	0.347 (0.59)	-	-	-	-1.135*** (-2.74)	-
ct1k_ta	-	-	-	0.392 (0.76)	-	-	-	-0.667 (-1.56)
nrasf_ta	0.985*** (4.41)	0.985*** (4.32)	0.963*** (4.00)	0.925*** (3.86)	-0.299* (-1.67)	-0.310* (-1.68)	-0.440** (-2.49)	-0.418** (-2.31)
aasf_ta	-0.08 (-0.78)	-0.084 (-0.82)	-0.195* (-1.82)	-0.177 (-1.50)	0.051 (0.53)	0.036 (0.38)	-0.004 (-0.04)	-0.001 (-0.01)
npl_tlo	-0.474** (-2.57)	-0.478** (-2.59)	-0.458** (-2.45)	-0.389** (-2.12)	-0.214 (-1.20)	-0.218 (-1.22)	-0.19 (-1.07)	-0.187 (-1.03)
roa_sdroa	-0.033 (-0.58)	-0.032 (-0.56)	-0.053 (-0.93)	-0.053 (-0.92)	0.0731* (1.92)	0.0737* (1.93)	0.0767** (2.01)	0.0740* (1.94)
cost_fund	1.548*** (3.13)	1.537*** (2.88)	1.989*** (3.78)	1.845*** (3.37)	0.804 (1.55)	0.869 (1.62)	0.63 (1.23)	0.409 (0.78)
roe	0.045 (0.75)	0.041 (0.69)	0.053 (0.85)	0.069 (1.01)	0.011 (0.27)	0.003 (0.08)	0.044 (1.10)	0.031 (0.68)
ln_ta	-17.79*** (-3.87)	-17.59*** (-3.73)	-16.01*** (-2.90)	-13.18** (-2.48)	-27.08*** (-7.44)	-26.23*** (-7.12)	-27.60*** (-6.55)	-25.29*** (-5.86)
dum_ma	0.015 (0.00)	0.077 (0.01)	0.193 (0.02)	0.1 (0.01)	4.796 (0.89)	4.87 (0.91)	4.865 (0.84)	5.277 (0.92)
ngdp_gwt	0.780*** (2.90)	0.770*** (2.84)	0.948*** (3.56)	0.945*** (3.62)	-0.331 (-1.42)	-0.348 (-1.47)	-0.256 (-1.10)	-0.193 (-0.82)
m_itbnk_c	0.147 (0.23)	0.173 (0.26)	-0.298 (-0.52)	-0.294 (-0.51)	0.919 (1.46)	0.95 (1.50)	0.638 (1.11)	0.681 (1.14)
cb_gdp_gwt	-0.0599* (-1.87)	-0.0611* (-1.82)	-0.049 (-1.47)	-0.042 (-1.16)	-0.034 (-1.27)	-0.033 (-1.23)	-0.033 (-1.16)	-0.035 (-1.14)
basel3	-3.852*** (-6.28)	-3.842*** (-5.64)	-3.811*** (-6.41)	-4.021*** (-6.81)	-3.654*** (-7.61)	-3.680*** (-7.17)	-3.561*** (-7.13)	-3.713*** (-7.22)
c	155.7*** (3.21)	152.1*** (3.03)	137.3** (2.39)	107.7** (1.99)	295.7*** (7.41)	284.0*** (6.97)	305.3*** (6.76)	275.4*** (5.99)
r2	0.194	0.194	0.199	0.213	0.172	0.169	0.188	0.188
F	14.790	14.860	13.940	13.970	13.720	13.700	12.780	12.050
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	1595	1595	1536	1474	1595	1595	1536	1474

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of European commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses.

Table 7. Determinants of Commercial vs. Retail-and-Other-Loans for Large U.S. Banks During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Commercial loans								
t12k_rwa	0.163 (0.89)	-	-	-	0.192 (0.99)	-	-	-
t1k_rwa	-	0.125 (0.64)	-	-	-	0.166 (0.83)	-	-
t1k_ta	-	-	0.482* (1.73)	-	-	-	0.524* (1.89)	-
ct1k_ta	-	-	-	0.704** (2.41)	-	-	-	0.713** (2.47)
nrasf_ta	0.595*** (5.93)	0.598*** (5.95)	0.661*** (6.85)	0.666*** (6.81)	0.640*** (5.92)	0.641*** (5.95)	0.712*** (7.00)	0.717*** (6.91)
aasf_ta	-0.102 (-1.03)	-0.106 (-1.07)	-0.084 (-0.90)	-0.084 (-0.90)	-	-	-	-
aasf_cd_ta	-	-	-	-	-0.02 (-0.40)	-0.019 (-0.39)	-0.012 (-0.26)	-0.013 (-0.29)
r2	0.304	0.308	0.273	0.262	0.317	0.321	0.283	0.272
F	32.780	34.400	32.100	29.380	37.180	38.920	36.150	32.650
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	1810	1810	1974	1949	1810	1810	1974	1949
Retail and other loans								
t12k_rwa	0.328 (1.03)	-	-	-	0.326 (1.06)	-	-	-
t1k_rwa	-	0.461 (1.46)	-	-	-	0.438 (1.45)	-	-
t1k_ta	-	-	0.862* (1.88)	-	-	-	0.867* (1.95)	-
ct1k_ta	-	-	-	0.652 (1.46)	-	-	-	0.566 (1.30)
nrasf_ta	0.036 (0.25)	0.018 (0.12)	0.091 (0.60)	0.085 (0.56)	0.052 (0.36)	0.036 (0.25)	0.114 (0.78)	0.111 (0.75)
aasf_ta	-0.042 (-0.29)	-0.042 (-0.30)	-0.109 (-0.81)	-0.1 (-0.74)	-	-	-	-
aasf_cd_ta	-	-	-	-	-0.156* (-1.95)	-0.158** (-1.97)	-0.150** (-2.05)	-0.151** (-2.05)
r2	0.087	0.089	0.091	0.088	0.096	0.098	0.104	0.100
F	8.76	8.88	9.65	9.15	8.14	8.22	8.90	8.31
p	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	1810	1810	1974	1949	1810	1810	1974	1949

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. A bank is considered large if its total assets are above US$1 billion.

Table 8. Determinants of Commercial vs. Retail-and-Other-Loans for Small U.S. Banks During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Commercial loans								
t12k_rwa	0.585*** (2.91)	-	-	-	0.586*** (3.17)	-	-	-
t1k_rwa	-	0.566*** (2.71)	-	-	-	0.567*** (3.01)	-	-
t1k_ta	-	-	1.102*** (4.23)	-	-	-	1.174*** (4.78)	-
ct1k_ta	-	-	-	1.110*** (4.27)	-	-	-	1.154*** (4.70)
nrasf_ta	0.723*** (8.70)	0.722*** (8.60)	0.820*** (10.67)	0.832*** (10.67)	0.751*** (9.63)	0.756*** (9.30)	0.850*** (11.83)	0.865*** (11.87)
aasf_ta	-0.121 (-1.24)	-0.13 (-1.33)	-0.124 (-1.40)	-0.137 (-1.55)	-	-	-	-
aasf_cd_ta	-	-	-	-	0.056* (1.85)	0.055* (1.84)	0.066** (2.39)	0.068** (2.45)
r2	0.262	0.267	0.302	0.295	0.266	0.271	0.308	0.301
F	36.480	36.290	40.580	38.570	39.150	39.520	43.960	42.410
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	3320	3320	3695	3669	3320	3320	3695	3669
Retail and other loans								
t12k_rwa	0.819** (2.50)	-	-	-	0.823*** (2.67)	-	-	-
t1k_rwa	-	0.838*** (2.68)	-	-	-	0.851*** (2.91)	-	-
t1k_ta	-	-	0.862** (2.09)	-	-	-	0.862** (2.25)	-
ct1k_ta	-	-	-	0.665 (1.59)	-	-	-	0.639* (1.68)
nrasf_ta	-0.268* (-1.90)	-0.266* (-1.91)	-0.084 (-0.72)	-0.081 (-0.69)	-0.297** (-2.27)	-0.286** (-2.21)	-0.07 (-0.63)	-0.08 (-0.73)
aasf_ta	0.101 (0.72)	0.103 (0.74)	0.234* (1.69)	0.240* (1.73)	-	-	-	-
aasf_cd_ta	-	-	-	-	-0.064 (-1.36)	-0.062 (-1.33)	-0.068 (-1.60)	-0.070* (-1.65)
r2	0.105	0.112	0.121	0.107	0.086	0.092	0.095	0.084
F	8.008	8.780	10.460	9.757	8.684	9.309	10.350	9.831
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	3320	3320	3695	3669	3320	3320	3695	3669

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. A bank is considered small if its total assets are below US$1 billion.

Table 9. Determinants of Commercial vs. Retail-and-Other-Loans for Large vs Small European Banks During 2008–15

	[1]	[2]	[3]	[4]	[1']	[2']	[3']	[4']
	Commercial loans				Retail and other loans			
Large banks								
t12k_rwa	-0.29 (-0.79)	-	-	-	-0.679*** (-3.27)	-	-	-
t1k_rwa	-	-0.187 (-0.43)	-	-	-	-0.426 (-1.58)	-	-
t1k_ta	-	-	0.042 (0.05)	-	-	-	-1.252** (-2.52)	-
ct1k_ta	-	-	-	0.141 (0.18)	-	-	-	-0.896** (-1.98)
nrasf_ta	1.155*** (5.37)	1.153*** (5.12)	1.133*** (4.89)	1.094*** (4.68)	-0.371* (-1.89)	-0.380* (-1.88)	-0.491** (-2.52)	-0.479** (-2.38)
aasf_ta	-0.096 (-0.91)	-0.098 (-0.94)	-0.197* (-1.82)	-0.181 (-1.51)	0.072 (0.74)	0.058 (0.60)	0.023 (0.22)	0.029 (0.25)
r2	0.197	0.198	0.197	0.208	0.193	0.191	0.214	0.221
F	13.820	14.120	12.710	12.730	13.170	13.170	12.380	11.970
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	1507	1507	1448	1386	1507	1507	1448	1386
Small banks								
t12k_rwa	-1.805 (-1.00)	-	-	-	-0.937 (-0.60)	-	-	-
t1k_rwa	-	-1.764 (-0.92)	-	-	-	-1.377 (-1.05)	-	-
t1k_ta	-	-	-0.576 (-0.20)	-	-	-	-2.194 (-1.03)	-
ct1k_ta	-	-	-	-1.536 (-0.52)	-	-	-	-2.248 (-0.87)
nrasf_ta	-0.678 (-0.93)	-0.72 (-0.99)	-0.824 (-0.70)	-0.787 (-0.76)	-0.072 (-0.11)	-0.034 (-0.06)	-0.268 (-0.40)	-0.142 (-0.22)
aasf_ta	-0.932 (-1.16)	-1.142 (-1.35)	-1.031 (-1.24)	-1.061 (-1.33)	-0.889 (-1.12)	-1.021 (-1.28)	-1.086 (-1.29)	-1.033 (-1.24)
r2	0.742	0.639	0.500	0.511	0.417	0.424	0.419	0.418
F	21.320	20.660	22.470	46.430	2082.600	6280.000	3500.200	691.700
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	88	88	88	88	88	88	88	88

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of European commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. A bank is considered large if its total assets are above US$1 billion.

REFERENCES

Abdkarim, M., Mohd Harif, A., and Adziz, A., 2007. "Monetary policy and sectoral bank-lending in Malaysia", Global Economic Review, Vol. 35, pp 303–326.

Acharya, V. V., Eisert,T., Eufinger, C., and Hirsch, C.W., 2015. "Real effects of the sovereign debt crisis in Europe: Evidence from syndicated loans", CEPR Discussion Paper DP10108.

Acharya, V. V., Eisert,T., Eufinger, C., and Hirsch, C.W., 2017. "Whatever it takes: The real effects of unconventional monetary policy", SAFE Working Paper 152.

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, Vol. 82, pp 142–165.

Alfaro, R., Franken, H., Garcia, C., and Jara, A., 2003. "Bank-lending channel and the monetary transition mechanism: The case of Chile", Central Bank of Chile, Working Paper 223.

Alhassan, A.L., Brobbey, F.O., and Aamoah, M.E., 2013. "Does asset quality persist on bank-lending behavior? Empirical evidence from Ghana", Global Journal of Management and Business Research Finance, Vol. 13, pp 1–8.

Allen, J., and Paligovora, T., 2015. "Bank loans for private and public firms in a liquidity crunch", Journal of Financial Stability, Vol. 18, pp 106–116.

Alper, F., Hulagu, T., and Keles, G., 2012. "An empirical study on liquidity and bank-lending", Turkiye Cumhuriyet Merkez Bankasi, Working Paper 12/04.

Ang, G., Röttgers, D., and Burli P., 2017. "The empirics of enabling investment and innovation in renewable energy", OECD Environment Working Papers, No. 123, OECD Publishing, Paris.

Atkinson, P.E., and Blundell-Wignall, A., 2012. "Deleveraging, traditional versus capital markets banking and the urgent need to separate and recapitalize G-SIFI Banks", OECD Financial Market Trends, Vol. 2, pp 69–92.

Atkinson, P.E., Blundell-Wignall, A., and Roulet, C., 2013. "Bank business models and the separation issue", OECD Financial Market Trends, Vol. 2, pp 69–92.

Baltagi, B.H., 2001. "Econometric analysis of panel data", New-York, Editions John Wiley and Sons.

Bank of International Settlements, 2011. "Basel III: A global regulatory framework for more resilient banks and banking systems".

Bank of International Settlements, 2014a. "Basel III: Leverage ratio framework and disclosure requirements".

Bank of International Settlements, 2014b. "Basel III: The net stable funding ratio".

Bank of International Settlements, 2015. “Basel III phase-in arrangements”.

Beatty, A., and Liao, S., 2011. “Do delays in expected loss recognition affect banks’ willingness to lend?”, Journal of Accounting and Economics, Vol. 52, pp 1–20.

Ben Naceur, S., and Kandil, M., 2009. “The impact of capital requirements on banks’ cost of intermediation and performance: The case of Egypt”, Journal of Economics and Business, Vol. 61, pp 70–89.

Berger, A.N., and Bouwman, C.H.S., 2009. “Bank liquidity creation”, Review of Financial Studies, Vol. 22, pp 3779–3837.

Berger, A. N., and Udell, G. E., 1994. “Lines of credit and relationship lending in small firm finance”, Levy Economics Institute, Economics Working Paper 113.

Berger, A.N., and Udell, G.E., 2006. “A more complete framework for SME finance”, Journal of Banking and Finance, Vol. 30, pp 2945–2966.

Bernanke, B., and Blinder, A., 1989. “Credit, money and aggregate demand”, American Economic Review, Vol. 78, pp 435–439.

Bernanke, B., and Gertler, M., 1989. “Agency costs, net worth and business fluctuations”, American Economic Review, Vol. 79, pp 14–31.

Bernanke, B., and Gertler, M., 1995. “Inside the black box: The credit channel of monetary policy transmission”, Journal of Economic Perspectives, Vol. 9, pp 27–48.

Bernanke, B., and Lown, C., 1991. “The capital crunch”, Brookings Papers on Economic Activity, Vol. 2, pp 205–247.

Berrospide, J.M., and Edge, R.M., 2010. “The effects of bank capital on lending: What do we know? And What does it mean?”, International Journal of Central Banking, Vol.6, pp 5–54.

Berrospide, J.M., and Herrerias, R., 2015. “Finance companies in Mexico: Unexpected victims of the global liquidity crunch”, Journal of Financial Stability, Vol. 18, pp 33–54.

Borio, C., and Disyatat, P., 2010. “Unconventional monetary policies: An appraisal”, Manchester School, Vol. 78, pp 53–89.

Brei, M., Gambacorta, L., and Von Peter, G., 2013. “Rescue packages and bank-lending”, Journal of Banking and Finance, Vol. 37, pp 490–505.

Bridges, J., Gregory, D., Nielsen, M., Pezzini, S., Radia, A., and Spaltro, M., 2014. “The impact of capital requirements on bank-lending”, Bank of England, Working Paper 486.

Boyd, H.B., and Runkle, D.E., 1992. “Size and performance of banking firms”, Journal of Monetary Economics, Vol. 31, pp 47–67.

Carlson, M., Shan, H., and Warusawitharana, M., 2013. “Capital ratios and bank-lending: A matched bank approach”, Journal of Financial Intermediation, Vol. 22, pp 663–687.

Chami, R., and Cosimano, T.F., 2009. "Monetary policy with a touch of Basel", Journal of Economics and Business, Vol. 62, pp 161–175.

Chen, Y.K., Shen, C.H., and Kao, L.F., 2010. "Bank liquidity risk and performance", Journal of Financial Regulation, 20.

Chernykh, L., and Cole, R.A., 2015. "How should we measure bank capital adequacy for triggering Prompt Corrective Action? A (simple) proposal", *Journal of Financial Stability*, Vol. 20, pp 131–143.

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, Vol. 101, pp 297–312.

Craig, R.S., Davis, E.P., and Pascual, A.G., 2006. "Sources of procyclicality of East Asian financial systems", Brunel University, Economics and finance discussion paper, Vol. 06, pp 1–58.

Cucinelli, D., 2015. "The impact of non-performing loans on bank-lending behavior: Evidence from the Italian banking sector", Eurasian Journal of Business and Economics, Vol. 8, pp 59–71.

Dagher, J., Dell'Ariccia, G., Laeven, L., Ratnovski, L., and Tong, H., 2016. "Benefits and costs of bank capital", International Monetary Fund, Working Paper 16/04.

De Young, R., and Jang, K.Y., 2016. "Do banks manage their liquidity?", Journal of Banking and Finance, Forthcoming.

Ehrmann, M., Gambacorta, L., Martinez Pagès, J., Sevestre, P., and Worms, A., 2003. "Financial systems and the role of banks in monetary policy", in Angeloni, I., Kashyap, A., Mojon, B. editions, Monetary Policy Transmission in the Euro Area. Cambridge University Press.

Elshahat, A., Parhizgari, A., and Hong, L., 2012. "The information content of the banking regulatory agencies and the depository credit intermediation", Journal of Economics and Business, Vol. 64, pp 90–104.

European Central Bank, 2014. "Banking structure report".

European Central Bank, 2016. "Recent developments in the composition and cost of bank funding in the euro area", ECB Economic Bulletin, Vol. 1, pp 26–45.

Federal Register, 2011. "Proposed rules", Federal Reserve, Vol. 76, pp 7731–7740.

Financial Stability Board, 2016. "2016 list of global systemically important banks (G-SIBs)".

Gambacorta, L., 2005. "Inside the bank-lending channel", European Economic Review, Vol. 49, pp 1737–1759.

Gambacorta, L., and Marquez-Ibanez, D., 2011. “The bank-lending channel: Lessons from the crisis”, Economic Policy, pp 135–182.

Gambacorta, L., and Mistrulli, P.E., 2004. “Does bank capital affect lending behavior?”, Journal of Financial Intermediation, Vol. 13, pp 436–457.

Hall, A.R., 2005. “Generalized method of moments”, Oxford, Oxford University Press..

Harvey, J., and Spong, K., 2001. “The decline in Core deposits: What can banks do?”, Federal Reserve Bank of Kansas City, Working Paper.

Ivashina, V., and Scharfstein, D., 2010. “Bank-lending during the financial crisis of 2008”, Journal of Financial Economics. Vol. 97, pp 319–338.

Jokipii, T., and Milne, A., 2008. “The cyclical behavior of European bank capital buffers”, Journal of Banking and Finance, Vol. 32, pp 1440–1451.

Kashyap, A., and Stein, J., 1995. “The impact of monetary policy on bank balance sheets”, Carnegie Rochester Conference Series on Public Policy, Vol. 42, pp 151–195.

Keeton, W.R., 1999. “Does faster loan growth lead to higher loan losses?”, Federal Reserve Bank of Kansas City Economic Review, pp 57–75.

Kishan, R., and Opiela, T., 2000. “Bank size, bank capital, and the bank-lending channel”, Journal of Money, Credit, and Banking, Vol. 32, pp 121–141.

Košak, M., Li, S., Loncarski, I., and Marinč, M., 2015. “Quality of bank capital and bank-lending behavior during the global financial crisis”, International Review of Financial Analysis, Vol. 37, pp 168–183.

Kupiec, P.H., Lee, Y., and Rosenfeld, C., 2017. “Does bank supervision impact bank loan growth?”, Journal of Financial Stability, Vol. 28, pp 21–48.

Labonne, C., and Lame, G., 2014. “Credit growth and bank capital requirements: Binding or not?”, Banque de France, Working Paper 481.

Ladime, J., Sarpong Kumankoma, E., and Osei, K.A., 2013. “Determinants of bank-lending behavior in Ghana”, Journal of Economics and Sustainable Development, Vol. 4, pp 42–48.

Laidroo, L., 2014. “Lending-growth determinants and cyclicality: Evidence from CEE banks”, Tallinn University of Technology, TUT Economic Research Series, Working Paper 2014/4.

Lepetit, L., Tarazi, A., and Zedek, N., 2012. “Bank Regulatory Capital Adjustment and Ultimate Ownership Structure: Evidence from European Commercial Banks?”, Working Papers hal-00918577, HAL.

Olszak, M., Pipieńb, M., Roszkowskac, S., and Kowalskad, I., 2014. “The effects of capital on bank-lending of EU large banks: The role of procyclicality, income smoothing, regulations and supervision”, University of Warsaw, Faculty of Management, Working Paper 52014.

Pana, E., Park, J., and Query, T., 2010. “The impact of bank mergers on liquidity creation”, Journal of Risk Management and Financial Institutions, Vol. 4, pp 74–96.

Panetta, F., 2013. “Il credito e il finanziamento alle imprese”, Federazione delle banche di Credito Cooperativo Lazio Umbria Sardegna, Intervento del Vice Direttore Generale della Banca d’Italia.

Peek, J., and Rosengren, E., 1997. “The international transmission of financial shocks: The case of Japan”, American Economic Review, Vol. 4, pp 495–505.

Peek, J., and Rosengren, E., 2000. “Collateral damage: Effects of the Japanese banking crisis on real activity in the United States”, American Economic Review, Vol. 1, pp 30–45.

Peersman, G., 2012. “Bank-lending shocks and the Euro Area business cycle”, Working Papers of Faculty of Economics and Business Administration, Ghent University, Belgium 11/766.

Pruteanu-Podpiera, A.M., 2007. “The role of banks in the Czech monetary policy transmission mechanism”, Economics of Transition, Vol. 15, pp 393–428.

Saunders, A., and Cornett, M. M., 2006. “Financial institutions management: A risk management approach”, Working Paper, Boston, McGraw-Hill..

Setiyono, B., and Tarazi, A., 2014. “Does diversity of bank board members affect performance and risk? Evidence from an emerging market”, Working Papers hal-01070988, HAL.

Stein, J., 2002. “Information production and capital allocation: Decentralized versus hierarchical firms”, Journal of Finance, Vol. 57, pp 1891–1921.

Stiglitz, J.E., and Weiss, A., 1981. “Credit rationing in markets with imperfect information”, American Economic Review, Vol. 71, pp 393–410.

Talavera, O., Tsapin, A., and Zholud, O., 2006. “Macroeconomic uncertainty and Bank-lending: The Case of Ukraine”, Economic System, Vol. 36, pp 279–293.

Uchida, H., Udell, G.F., and Watanabe, W., 2008. “Bank size and lending relationships in Japan”, Journal of the Japanese and International Economies, Vol. 22, pp 242–267.

Woolridge, J.M., 2002. “Econometric analysis of cross-section and panel data”, Cambridge MA, MIT Press.

Wu, D., 2015. “The effects of government capital and liquidity support programs on bank lending: Evidence from the syndicated corporate credit market”, Journal of Financial Stability, Vol. 21, pp 13–25.

APPENDIX

Table A1.1a. The Determinants of Large U.S. Banks' Lending Using Generalized Method of Moments During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Commercial loans								
t12k_rwa	0.033 (0.246)	-	-	-	0.153 (0.251)	-	-	-
t1k_rwa	-	0.055 (0.245)	-	-	-	0.17 (0.252)	-	-
t1k_ta	-	-	0.336 (0.473)	-	-	-	0.666 (0.456)	-
ct1k_ta	-	-	-	0.364 (0.478)	-	-	-	0.692 (0.479)
nrasf_ta	0.273 (0.214)	0.275 (0.210)	0.369* (0.192)	0.432** (0.191)	0.495*** (0.177)	0.478*** (0.175)	0.576*** (0.170)	0.596*** (0.174)
aasf_ta	-0.469** (0.228)	-0.454** (0.224)	-0.281 (0.219)	-0.257 (0.212)	-	-	-	-
aasf_cd_ta	-	-	-	-	-0.141* (0.0729)	-0.137* (0.0726)	-0.124 (0.0773)	-0.131* (0.0777)
N	1810	1810	1974	1949	1810	1810	1974	1949
Retail and other loans								
t12k_rwa	0.813** (0.407)	-	-	-	0.895** (0.425)	-	-	-
t1k_rwa	-	0.818* (0.418)	-	-	-	0.855** (0.434)	-	-
t1k_ta	-	-	0.936 (0.650)	-	-	-	0.955 (0.665)	-
ct1k_ta	-	-	-	0.395 (0.635)	-	-	-	0.227 (0.671)
nrasf_ta	-0.209 (0.294)	-0.248 (0.296)	0.04 (0.267)	0.023 (0.270)	-0.004 (0.281)	-0.025 (0.281)	0.195 (0.260)	0.144 (0.268)
aasf_ta	-0.358 (0.303)	-0.362 (0.303)	-0.143 (0.283)	-0.044 (0.279)	-	-	-	-
aasf_cd_ta	-	-	-	-	-0.314** (0.135)	-0.305** (0.134)	-0.304** (0.124)	-0.291** (0.121)
N	1810	1810	1974	1949	1810	1810	1974	1949

Note: This table shows the results of estimating equation (1) using the GMM for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Standard errors of coefficients are reported in parentheses. A bank is considered large if its total assets are above US$1 billion.

Table A1.1b. The Determinants of Small U.S. Banks' Lending Using Generalized Method of Moments During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Commercial loans								
t12k_rwa	0.554 (0.348)	-	-	-	0.374 (0.335)	-	-	-
t1k_rwa	-	0.568* (0.316)	-	-	-	0.425 (0.313)	-	-
t1k_ta	-	-	1.508*** (0.424)	-	-	-	1.169*** (0.420)	-
ct1k_ta	-	-	-	1.446*** (0.428)	-	-	-	1.138*** (0.426)
nrasf_ta	0.678*** (0.157)	0.699*** (0.151)	0.843*** (0.142)	0.852*** (0.147)	0.555*** (0.154)	0.603*** (0.150)	0.796*** (0.144)	0.841*** (0.149)
aasf_ta	-0.072 (0.272)	-0.153 (0.281)	-0.207 (0.254)	-0.226 (0.254)	-	-	-	-
aasf_cd_ta	-	-	-	-	0.0951* (0.0490)	0.0833* (0.0475)	0.0777* (0.0462)	0.0777* (0.0468)
N	3320	3320	3695	3669	3320	3320	3695	3669
Retail and other loans								
t12k_rwa	0.424 (0.540)	-	-	-	0.382 (0.569)	-	-	-
t1k_rwa	-	0.616 (0.523)	-	-	-	0.543 (0.561)	-	-
t1k_ta	-	-	0.479 (0.734)	-	-	-	0.902 (0.605)	-
ct1k_ta	-	-	-	0.48 (0.726)	-	-	-	0.903 (0.611)
nrasf_ta	0.185 (0.251)	0.149 (0.242)	0.248 (0.218)	0.262 (0.223)	0.217 (0.257)	0.177 (0.250)	0.216 (0.224)	0.211 (0.228)
aasf_ta	0.191 (0.408)	0.261 (0.407)	0.298 (0.376)	0.472 (0.382)	-	-	-	-
aasf_cd_ta	-	-	-	-	-0.025 (0.0813)	-0.023 (0.0814)	-0.008 (0.0702)	-0.01 (0.0698)
N	3320	3320	3695	3669	3320	3320	3695	3669

Note: This table shows the results of estimating equation (1) using the GMM for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Standard errors of coefficients are reported in parentheses. A bank is considered small if its total assets are below US$1 billion.

Table A1.1c. Table A1.1c. The Determinants of European Banks' Lending Using Generalized Method of Moments for Large vs. Small European Banks During 2008–15

	[1]	[2]	[3]	[4]	[1']	[2']	[3']	[4']
	Commercial loans				Retail and other loans			
Large banks								
t12k_rwa	-0.971** (0.482)	-	-	-	-0.737** (0.347)	-	-	-
t1k_rwa	-	-0.621 (0.565)	-	-	-	-0.489 (0.402)	-	-
t1k_ta	-	-	0.53 (1.369)	-	-	-	-0.884 (1.039)	-
ct1k_ta	-	-	-	0.367 (1.353)	-	-	-	-0.462 (1.029)
nrasf_ta	0.953*** (0.304)	0.976*** (0.324)	1.348*** (0.350)	1.299*** (0.351)	-0.333* (0.298)	-0.368* (0.307)	-0.602* (0.343)	-0.661* (0.355)
aasf_ta	0.117 (0.197)	-0.003 (0.188)	-0.175 (0.196)	-0.069 (0.195)	-0.047 (0.197)	-0.092 (0.194)	-0.221 (0.212)	-0.232 (0.238)
N	1507	1507	1448	1386	1507	1507	1448	1386
Small banks								
t12k_rwa	-1.886 (1.587)	-	-	-	-0.81 (1.363)	-	-	-
t1k_rwa	-	-2.069 (1.672)	-	-	-	-1.323 (1.186)	-	-
t1k_ta	-	-	-0.66 (2.813)	-	-	-	-1.801 (1.965)	-
ct1k_ta	-	-	-	-1.898 (3.070)	-	-	-	-1.514 (2.573)
nrasf_ta	-0.682 (0.645)	-0.698 (0.619)	-0.822 (1.061)	-0.774 (0.917)	-0.114 (0.583)	-0.064 (0.558)	-0.251 (0.606)	-0.151 (0.583)
aasf_ta	-0.687 (0.859)	-0.834 (0.888)	-0.909 (0.775)	-0.882 (0.742)	-0.977 (0.691)	-1.025 (0.677)	-1.088 (0.743)	-1.053 (0.747)
N	88	88	88	88	88	88	88	88

Note: This table shows the results of estimating equation (1) using the GMM for an unbalanced panel of European commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Standard errors of coefficients are reported in parentheses. A bank is considered large if its total assets are above US$1 billion.

Table A1.2a. The Determinants of Large U.S. Banks' Lending Using Alternative Weights for Liquidity Ratios Inspired by Basel III During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
						Commercial loans						
t12k_rwa	0.183	0.181	0.184	-	-	-	-	-	-	-	-	-
	(0.99)	(0.99)	(1.00)									
t1k_rwa	-	-	-	0.146	0.145	0.146	-	-	-	-	-	-
				(0.76)	(0.75)	(0.76)						
t1k_ta	-	-	-	-	-	-	0.454	0.455	0.45	-	-	-
							(1.63)	(1.63)	(1.61)			
ct1k_ta	-	-	-	-	-	-	-	-	-	0.686**	0.686**	0.683**
										(2.35)	(2.35)	(2.33)
nrasf015_ta	0.522***	0.520***	0.528***	0.524***	0.522***	0.530***	0.591***	0.588***	0.595***	0.596***	0.594***	0.600***
	(5.27)	(5.29)	(5.30)	(5.30)	(5.32)	(5.32)	(6.21)	(6.23)	(6.24)	(6.21)	(6.22)	(6.23)
aasf_ta	-0.106	-	-	-0.111	-	-	-0.086	-	-	-0.086	-	-
	(-1.07)			(-1.11)			(-0.91)			(-0.91)		
aasf05_ta	-	-0.089	-	-	-0.091	-	-	-0.077	-	-	-0.076	-
		(-1.36)			(-1.39)			(-1.25)			(-1.25)	
aasf09_ta	-	-	-0.047	-	-	-0.06	-	-	-0.041	-	-	-0.045
			(-0.25)			(-0.32)			(-0.23)			(-0.24)
r2	0.297	0.297	0.295	0.300	0.301	0.299	0.263	0.264	0.262	0.252	0.254	0.252
N	1810	1810	1974	1949	1810	1810	1974	1949	1810	1810	1974	1949
t12k_rwa	0.149	0.147	0.151	-	-	-	-	-	-	-	-	-
	(0.81)	(0.80)	(0.82)									
t1k_rwa	-	-	-	0.107	0.106	0.108	-	-	-	-	-	-
				(0.55)	(0.54)	(0.55)						
t1k_ta	-	-	-	-	-	-	0.549*	0.549*	0.547*	-	-	-
							(1.97)	(1.97)	(1.95)			
ct1k_ta	-	-	-	-	-	-	-	-	-	0.745**	0.745**	0.744**
										(2.56)	(2.56)	(2.55)
nrasf05_ta	0.721***	0.719***	0.725***	0.724***	0.722***	0.728***	0.782***	0.780***	0.784***	0.785***	0.783***	0.787***
	(6.95)	(6.96)	(6.97)	(6.98)	(6.99)	(6.99)	(7.85)	(7.86)	(7.86)	(7.69)	(7.70)	(7.70)
aasf_ta	-0.097	-	-	-0.102	-	-	-0.087	-	-	-0.087	-	-
	(-1.01)			(-1.06)			(-0.95)			(-0.95)		
aasf05_ta	-	-0.08	-	-	-0.082	-	-	-0.074	-	-	-0.073	-
		(-1.27)			(-1.31)			(-1.24)			(-1.23)	
aasf09_ta	-	-	-0.058	-	-	-0.072	-	-	-0.072	-	-	-0.076
			(-0.32)			(-0.39)			(-0.41)			(-0.42)
r2	0.325	0.325	0.324	0.329	0.329	0.327	0.295	0.296	0.295	0.284	0.284	0.283
N	1810	1810	1974	1949	1810	1810	1974	1949	1810	1810	1974	1949
						Retail and other loans						
t12k_rwa	0.272	0.272	0.276	-	-	-	-	-	-	-	-	-
	(0.86)	(0.86)	(0.87)									
t1k_rwa	-	-	-	0.405	0.404	0.411	-	-	-	-	-	-
				(1.30)	(1.29)	(1.32)						
t1k_ta	-	-	-	-	-	-	0.878*	0.870*	0.909**	-	-	-
							(1.90)	(1.88)	(1.97)			
ct1k_ta	-	-	-	-	-	-	-	-	-	0.66	0.653	0.692
										(1.47)	(1.45)	(1.55)
nrasf015_ta	0.153	0.157	0.139	0.134	0.139	0.12	0.188	0.193	0.173	0.185	0.19	0.169
	(1.10)	(1.13)	(1.00)	(0.98)	(1.01)	(0.88)	(1.28)	(1.31)	(1.19)	(1.24)	(1.27)	(1.14)
aasf_ta	-0.03	-	-	-0.03	-	-	-0.098	-	-	-0.088	-	-
	(-0.21)			(-0.21)			(-0.73)			(-0.65)		
aasf05_ta	-	0.019	-	-	0.019	-	-	-0.02	-	-	-0.013	-
		(0.20)			(0.20)			(-0.22)			(-0.14)	
aasf09_ta	-	-	-0.444*	-	-	-0.446*	-	-	-0.550**	-	-	-0.552**
			(-1.74)			(-1.75)			(-2.31)			(-2.28)
r2	0.087	0.087	0.089	0.089	0.089	0.091	0.093	0.093	0.096	0.089	0.089	0.092
N	1810	1810	1974	1949	1810	1810	1974	1949	1810	1810	1974	1949
t12k_rwa	0.455	0.455	0.458	-	-	-	-	-	-	-	-	-
	(1.42)	(1.42)	(1.43)									

t1k_rwa	-	-	-	0.589* (1.84)	0.588* (1.84)	0.594* (1.86)	-	-	-	-	-	-
t1k_ta	-	-	-	-	-	-	0.811* (1.79)	0.803* (1.77)	0.844* (1.87)	-	-	-
ct1k_ta	-	-	-	-	-	-	-	-	-	0.63 (1.43)	0.622 (1.41)	0.663 (1.50)
nrasf05_ta	-0.273 (-1.59)	-0.269 (-1.57)	-0.283 (-1.64)	-0.290* (-1.69)	-0.286* (-1.68)	-0.300* (-1.74)	-0.167 (-1.00)	-0.163 (-0.98)	-0.176 (-1.05)	-0.178 (-1.05)	-0.174 (-1.03)	-0.188 (-1.11)
aasf_ta	-0.07 (-0.50)	-	-	-0.07 (-0.50)	-	-	-0.133 (-1.00)	-	-	-0.125 (-0.94)	-	-
aasf05_ta	-	-0.008 (-0.08)	-	-	-0.008 (-0.08)	-	-	-0.043 (-0.48)	-	-	-0.037 (-0.42)	-
aasf09_ta	-	-	-0.504* (-1.94)	-	-	-0.505* (-1.95)	-	-	-0.609** (-2.50)	-	-	-0.612** (-2.48)
r2	0.091	0.091	0.094	0.094	0.094	0.096	0.093	0.092	0.097	0.090	0.089	0.093
N	1810	1810	1974	1949	1810	1810	1974	1949	1810	1810	1974	1949

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. Weights are changed in the liquidity ratios inspired by Basel III. The 0.25 weight for consumer loans is changed to 0.15 and 0.5. The 0.7 weight for demand and saving deposits is changed to 0.5 and 0.9. A bank is considered large if its total assets are above US$1 billion.

Table A1.2b. The Determinants of Small U.S. Banks' Lending Using Alternative Weights for Liquidity Ratios Inspired by Basel III During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Commercial loans												
t12k_rwa	0.664*** (3.32)	0.664*** (3.32)	0.658*** (3.27)	-	-	-	-	-	-	-	-	-
t1k_rwa	-	-	-	0.638*** (3.07)	0.638*** (3.07)	0.632*** (3.02)	-	-	-	-	-	-
t1k_ta	-	-	-	-	-	-	1.058*** (4.01)	1.058*** (4.01)	1.049*** (3.97)	-	-	-
ct1k_ta	-	-	-	-	-	-	-	-	-	1.063*** (4.04)	1.062*** (4.04)	1.051*** (3.98)
nrasf015_ta	0.582*** (7.47)	0.582*** (7.49)	0.588*** (7.49)	0.583*** (7.48)	0.583*** (7.49)	0.588*** (7.48)	0.697*** (9.35)	0.697*** (9.35)	0.701*** (9.40)	0.707*** (9.32)	0.706*** (9.32)	0.711*** (9.37)
aasf_ta	-0.15 (-1.52)	-	-	-0.157 (-1.61)	-	-	-0.145 (-1.62)	-	-	-0.158* (-1.77)	-	-
aasf05_ta	-	-0.0976* (-1.67)	-	-	-0.102* (-1.75)	-	-	-0.0947* (-1.77)	-	-	-0.103* (-1.91)	-
aasf09_ta	-	-	-0.18 (-0.75)	-	-	-0.197 (-0.82)	-	-	-0.17 (-0.80)	-	-	-0.197 (-0.93)
r2	0.247	0.248	0.246	0.251	0.252	0.250	0.280	0.281	0.278	0.273	0.273	0.271
N	3320	3320	3695	3669	3320	3320	3695	3669	3320	3320	3695	3669
t12k_rwa	0.485** (2.43)	0.485** (2.43)	0.480** (2.40)	-	-	-	-	-	-	-	-	-
t1k_rwa	-	-	-	0.477** (2.30)	0.477** (2.31)	0.472** (2.27)	-	-	-	-	-	-
t1k_ta	-	-	-	-	-	-	1.188*** (4.68)	1.188*** (4.68)	1.182*** (4.65)	-	-	-
ct1k_ta	-	-	-	-	-	-	-	-	-	1.205*** (4.78)	1.204*** (4.78)	1.197*** (4.73)
nrasf05_ta	0.949*** (10.66)	0.949*** (10.67)	0.953*** (10.68)	0.947*** (10.42)	0.947*** (10.43)	0.951*** (10.42)	1.014*** (12.86)	1.014*** (12.86)	1.017*** (12.88)	1.029*** (12.93)	1.029*** (12.93)	1.032*** (12.95)
aasf_ta	-0.071 (-0.73)	-	-	-0.082 (-0.86)	-	-	-0.087 (-1.00)	-	-	-0.101 (-1.16)	-	-
aasf05_ta	-	-0.048 (-0.85)	-	-	-0.055 (-0.97)	-	-	-0.057 (-1.10)	-	-	-0.065 (-1.26)	-
aasf09_ta	-	-	-0.039 (-0.16)	-	-	-0.063 (-0.26)	-	-	-0.087 (-0.41)	-	-	-0.117 (-0.55)
r2	0.307	0.308	0.307	0.313	0.313	0.311	0.354	0.354	0.353	0.348	0.348	0.346
N	3320	3320	3695	3669	3320	3320	3695	3669	3320	3320	3695	3669
Retail and other loans												
t12k_rwa	0.689** (2.11)	0.692** (2.12)	0.682** (2.09)	-	-	-	-	-	-	-	-	-
t1k_rwa	-	-	-	0.715** (2.30)	0.718** (2.31)	0.709** (2.28)	-	-	-	-	-	-
t1k_ta	-	-	-	-	-	-	0.916** (2.23)	0.922** (2.24)	0.908** (2.20)	-	-	-
ct1k_ta	-	-	-	-	-	-	-	-	-	0.724* (1.73)	0.731* (1.75)	0.712* (1.70)
nrasf015_ta	-0.059 (-0.45)	-0.061 (-0.47)	-0.054 (-0.41)	-0.059 (-0.46)	-0.061 (-0.48)	-0.054 (-0.42)	0.096 (0.89)	0.094 (0.88)	0.099 (0.92)	0.104 (0.96)	0.102 (0.94)	0.106 (0.99)
aasf_ta	0.137 (0.98)	-	-	0.138 (0.99)	-	-	0.259* (1.86)	-	-	0.266* (1.90)	-	-
aasf05_ta	-	0.068 (0.76)	-	-	0.068 (0.78)	-	-	0.142 (1.64)	-	-	0.147* (1.68)	-
aasf09_ta	-	-	0.458 (1.43)	-	-	0.453 (1.42)	-	-	0.682** (2.20)	-	-	0.688** (2.21)
r2	0.085	0.085	0.084	0.093	0.094	0.092	0.112	0.113	0.111	0.099	0.100	0.098
N	3320	3320	3695	3669	3320	3320	3695	3669	3320	3320	3695	3669
		t12k_r		**w a**		1.080*** (3.28)						

1.082*** (3.28)		1.073*** (3.25)	-									
			-									
			-									
			-									
			-									
			-									
			-									
			-									
			-									
t1k_rwa	-	-	-	1.079*** (3.44)	1.081*** (3.45)	1.072*** (3.42)	-	-	-	-	-	-
t1k_ta	-	-	-	-	-	-	0.699* (1.70)	0.703* (1.71)	0.690* (1.68)	-	-	-
ct1k_ta	-	-	-	-	-	-	-	-	-	0.489 (1.18)	0.496 (1.20)	0.477 (1.15)
nrasf05_ta	-0.751*** (-4.68)	-0.752*** (-4.70)	-0.745*** (-4.64)	-0.741*** (-4.70)	-0.742*** (-4.71)	-0.736*** (-4.65)	-0.530*** (-3.87)	-0.531*** (-3.88)	-0.527*** (-3.85)	-0.536*** (-3.88)	-0.537*** (-3.90)	-0.533*** (-3.87)
aasf_ta	0.016 (0.11)	-	-	0.024 (0.17)	-	-	0.171 (1.25)	-	-	0.178 (1.29)	-	-
aasf05_ta	-	-0.005 (-0.06)	-	-	0.003 (0.00)	-	-	0.089 (1.04)	-	-	0.094 (1.08)	-
aasf09_ta	-	-	0.215 (0.68)	-	-	0.221 (0.70)	-	-	0.512* (1.69)	-	-	0.521* (1.71)
r2	0.183	0.183	0.180	0.186	0.187	0.184	0.158	0.159	0.156	0.147	0.148	0.145
N	3320	3320	3695	3669	3320	3320	3695	3669	3320	3320	3695	3669

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. Weights are changed in the liquidity ratios inspired by Basel III. The 0.25 weight for consumer loans is changed to 0.15 and 0.5. The 0.7 weight for demand and saving deposits is changed to 0.5 and 0.9. A bank is considered small if its total assets are below US$1 billion.

Table A1.2c. The Determinants of Large European Banks' Lending Using Alternative Weights for Liquidity Ratios Inspired by Basel III During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
						Commercial loans						
t12k_rwa	-0.192	-0.196	-0.189	-	-	-	-	-	-	-	-	-
	(-0.51)	(-0.52)	(-0.50)									
t1k_rwa				-0.066	-0.069	-0.062	-	-	-	-	-	-
				(-0.15)	(-0.16)	(-0.14)						
t1k_ta	-	-	-	-	-	-	0.112	0.097	0.131	-	-	-
							(0.13)	(0.12)	(0.16)			
ct1k_ta	-	-	-	-	-	-	-	-	-	0.235	0.225	0.248
										(0.31)	(0.30)	(0.33)
nrasf015_ta	0.898***	0.898***	0.897***	0.893***	0.893***	0.892***	0.863***	0.861***	0.864***	0.835***	0.834***	0.835***
	(4.90)	(4.91)	(4.89)	(4.66)	(4.67)	(4.65)	(4.40)	(4.40)	(4.40)	(4.22)	(4.23)	(4.22)
aasf_ta	-0.081	-	-	-0.081	-	-	-0.179*	-	-	-0.163	-	-
	(-0.77)			(-0.77)			(-1.65)			(-1.37)		
aasf05_ta	-	-0.07	-	-	-0.07	-	-	-0.142	-	-	-0.137	-
		(-0.74)			(-0.73)			(-1.40)			(-1.24)	
aasf09_ta	-	-	-0.091	-	-	-0.091	-	-	-0.210*	-	-	-0.182
			(-0.80)			(-0.81)			(-1.86)			(-1.45)
r2	0.173	0.174	0.173	0.175	0.175	0.174	0.173	0.173	0.172	0.183	0.184	0.182
N	1507	1507	1448	1386	1507	1507	1448	1386	1507	1507	1448	1386
t12k_rwa	-0.456	-0.46	-0.451	-	-	-	-	-	-	-	-	-
	(-1.29)	(-1.31)	(-1.28)									
t1k_rwa				-0.349	-0.353	-0.344	-	-	-	-	-	-
				(-0.78)	(-0.79)	(-0.77)						
t1k_ta							-0.133	-0.152	-0.11	-	-	-
							(-0.15)	(-0.17)	(-0.12)			
ct1k_ta										-0.057	-0.07	-0.041
										(-0.07)	(-0.08)	(-0.05)
nrasf05_ta	1.533***	1.532***	1.533***	1.529***	1.528***	1.529***	1.545***	1.542***	1.547***	1.491***	1.490***	1.492***
	(6.19)	(6.19)	(6.19)	(5.95)	(5.95)	(5.95)	(5.85)	(5.84)	(5.87)	(5.62)	(5.62)	(5.64)
aasf_ta	-0.117	-	-	-0.123	-	-	-0.227**	-	-	-0.208*	-	-
	(-1.08)			(-1.15)			(-2.01)			(-1.67)		
aasf05_ta	-	-0.101	-	-	-0.107	-	-	-0.182*	-	-	-0.175	-
		(-1.02)			(-1.08)			(-1.68)			(-1.50)	
aasf09_ta	-	-	-0.131	-	-	-0.137	-	-	-0.263**	-	-	-0.230*
			(-1.13)			(-1.20)			(-2.26)			(-1.79)
r2	0.262	0.262	0.261	0.262	0.263	0.261	0.268	0.269	0.267	0.285	0.286	0.283
N	1507	1507	1448	1386	1507	1507	1448	1386	1507	1507	1448	1386
						Retail and other loans						
t12k_rwa	-0.759***	-0.763***	-0.751***	-	-	-	-	-	-	-	-	-
	(-3.68)	(-3.69)	(-3.66)									
t1k_rwa	-	-	-	-0.539**	-0.539**	-0.535**	-	-	-	-	-	-
				(-2.05)	(-2.06)	(-2.03)						
t1k_ta	-	-	-	-	-	-	-1.295**	-1.296**	-1.286**	-	-	-
							(-2.51)	(-2.50)	(-2.51)			
ct1k_ta	-	-	-	-	-	-	-	-	-	-0.965**	-0.961**	-0.428
										(-2.08)	(-2.06)	(-0.65)
nrasf015_ta	-0.147	-0.151	-0.143	-0.148	-0.152	-0.144	-0.267	-0.27	-0.263	-0.26	-0.263	-0.164
	(-0.86)	(-0.88)	(-0.84)	(-0.84)	(-0.86)	(-0.82)	(-1.56)	(-1.57)	(-1.55)	(-1.47)	(-1.48)	(-0.81)
aasf_ta	0.059	-	-	0.043	-	-	0.009	-	-	0.015	-	-
	(0.60)			(0.44)			(0.08)			(0.12)		
aasf05_ta	-	0.086	-	-	0.071	-	-	0.047	-	-	0.053	-
		(0.95)			(0.79)			(0.48)			(0.51)	
aasf09_ta	-	-	0.017	-	-	0.001	-	-	-0.042	-	-	-0.132
			(0.17)			(0.01)			(-0.36)			(-1.04)
r2	0.057	0.058	0.057	0.059	0.060	0.059	0.035	0.035	0.036	0.036	0.036	0.035
N	1507	1507	1448	1386	1507	1507	1448	1386	1507	1507	1448	1386
t12k_rwa	-0.513**	-0.517**	-0.504**	-	-	-	-	-	-	-	-	-
	(-2.32)	(-2.33)	(-2.29)									

t1k_rwa					-0.229 (-0.82)	-0.229 (-0.82)	-0.225 (-0.80)	-	-	-	-	-	-
t1k_ta	-	-	-	-	-	-	-1.135** (-2.37)	-1.132** (-2.35)	-1.129** (-2.37)	-	-	-	
ct1k_ta										-0.743 (-1.62)	-0.737 (-1.60)	-0.743 (-1.63)	
nrasf05_ta	-0.788*** (-3.63)	-0.791*** (-3.64)	-0.785*** (-3.61)	-0.808*** (-3.64)	-0.811*** (-3.66)	-0.804*** (-3.62)	-0.894*** (-4.17)	-0.896*** (-4.18)	-0.891*** (-4.15)	-0.876*** (-3.96)	-0.879*** (-3.98)	-0.873*** (-3.95)	
aasf_ta	0.095 (0.96)	-	-	0.086 (0.87)	-	-	0.051 (0.46)	-	-	0.056 (0.47)	-	-	
aasf05_ta	-	0.121 (1.32)	-	-	0.113 (1.25)	-	-	0.084 (0.84)	-	-	0.09 (0.85)	-	
aasf09_ta	-	-	0.053 (0.50)	-	-	0.043 (0.41)	-	-	0.002 (0.02)	-	-	0.005 (0.04)	
r2	0.216	0.215	0.215	0.214	0.214	0.214	0.244	0.243	0.243	0.247	0.246	0.247	
N	1507	1507	1448	1386	1507	1507	1448	1386	1507	1507	1448	1386	

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of European commercial banks over the period 2008–15. All bank-specific explanatory variables, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. Weights are changed in the liquidity ratios inspired by Basel III. The 0.25 weight for consumer loans is changed to 0.15 and 0.5. The 0.7 weight for demand and saving deposits is changed to 0.5 and 0.9. A bank is considered large if its total assets are above US$1 billion.

Table A1.2d. The determinants of small European banks' lending using alternative weights in liquidity ratios inspired by Basel III During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Commercial loans												
t12k_rwa	-1.724	-1.652	-1.832	-	-	-	-	-	-	-	-	-
	(-0.97)	(-0.93)	(-1.02)									
t1k_rwa				-1.698	-1.685	-1.683	-	-	-	-	-	-
				(-0.91)	(-0.93)	(-0.86)						
t1k_ta							-0.648	-0.71	-0.486	-	-	-
							(-0.23)	(-0.25)	(-0.17)			
ct1k_ta										1.524	-1.575	-1.377
										(-0.53)	(-0.54)	(-0.47)
nrasf015_ta	-0.73	-0.769	-0.653	-0.781	-0.824	-0.705	-0.89	-0.935	-0.814	-0.851	-0.893	-0.782
	(-1.08)	(-1.12)	(-1.00)	(-1.16)	(-1.20)	(-1.09)	(-0.80)	(-0.83)	(-0.75)	(-0.87)	(-0.90)	(-0.82)
aasf_ta	-0.959	-	-	-1.164	-	-	-1.066	-	-	-1.09	-	-
	(-1.21)			(-1.39)			(-1.29)			(-1.38)		
aasf05_ta	-	-0.727	-	-	-0.946	-	-	-0.896	-	-	-0.914	-
		(-1.29)			(-1.53)			(-1.34)			(-1.47)	
aasf09_ta	-	-	-0.807	-	-	-0.781	-	-	-0.642	-	-	-0.665
			(-0.83)			(-0.78)			(-0.79)			(-0.81)
r2	0.758	0.829	0.726	0.666	0.745	0.664	0.534	0.616	0.520	0.538	0.608	0.527
N	88	88	88	88	88	88	88	88	88	88	88	88
t12k_rwa	-2.001	-1.95	-2.085	-	-	-	-	-	-	-	-	-
	(-1.03)	(-1.00)	(-1.06)									
t1k_rwa				-1.942	-1.932	-1.924	-	-	-	-	-	-
				(-0.93)	(-0.94)	(-0.89)						
t1k_ta							-0.339	-0.389	-0.206	-	-	-
							(-0.12)	(-0.13)	(-0.07)			
ct1k_ta										1.569	-1.611	-1.443
										(-0.49)	(-0.51)	(-0.45)
nrasf05_ta	-0.404	-0.441	-0.321	-0.395	-0.451	-0.301	-0.456	-0.509	-0.372	-0.431	-0.484	-0.35
	(-0.48)	(-0.51)	(-0.39)	(-0.48)	(-0.54)	(-0.39)	(-0.37)	(-0.40)	(-0.31)	(-0.40)	(-0.44)	(-0.34)
aasf_ta	-0.838	-	-	-1.056	-	-	-0.905	-	-	-0.955	-	-
	(-1.02)			(-1.23)			(-1.08)			(-1.19)		
aasf05_ta	-	-0.604	-	-	-0.845	-	-	-0.751	-	-	-0.789	-
		(-1.01)			(-1.31)			(-1.09)			(-1.23)	
aasf09_ta	-	-	-0.788	-	-	-0.754	-	-	-0.581	-	-	-0.621
			(-0.81)			(-0.75)			(-0.72)			(-0.75)
r2	0.633	0.712	0.581	0.501	0.575	0.483	0.374	0.411	0.365	0.387	0.434	0.378
N	88	88	88	88	88	88	88	88	88	88	88	88
Retail and other loans												
t12k_rwa	-0.957	-0.891	-1.056	-	-	-	-	-	-	-	-	-
	(-0.61)	(-0.56)	(-0.66)									
t1k_rwa				-1.394	-1.381	-1.385	-	-	-	-	-	-
				(-1.06)	(-1.06)	(-1.00)						
t1k_ta							2.183	-2.233	-2.029	-	-	-
							(-1.01)	(-1.04)	(-0.92)			
ct1k_ta										2.249	-2.287	-2.121
										(-0.87)	(-0.89)	(-0.80)
nrasf015_ta	-0.021	-0.055	0.05	0.01	-0.024	0.075	-0.227	-0.266	-0.151	-0.108	-0.142	-0.044
	(-0.04)	(-0.09)	(0.09)	(0.02)	(-0.04)	(0.14)	(-0.36)	(-0.43)	(-0.25)	(-0.18)	(-0.24)	(-0.08)
aasf_ta	-0.875	-	-	-1.011	-	-	-1.078	-	-	-1.026	-	-
	(-1.10)			(-1.26)			(-1.27)			(-1.22)		
aasf05_ta	-	-0.66	-	-	-0.79	-	-	-0.869	-	-	-0.824	-
		(-1.10)			(-1.28)			(-1.36)			(-1.30)	
aasf09_ta	-	-	-0.745	-	-	-0.758	-	-	-0.744	-	-	-0.716
			(-0.87)			(-0.91)			(-0.87)			(-0.85)
r2	0.414	0.416	0.409	0.421	0.425	0.415	0.417	0.421	0.411	0.416	0.420	0.411
N	88	88	88	88	88	88	88	88	88	88	88	88
t12k_rwa	-0.913	-0.849	-0.998	-	-	-	-	-	-	-	-	-
	(-0.60)	(-0.56)	(-0.64)									
t1k_rwa				-1.342	-1.332	-1.325	-	-	-	-	-	-
				(-1.04)	(-1.05)	(-0.98)						

t1k_ta							-2.214 (-1.06)	-2.272 (-1.09)	-2.055 (-0.96)	-	-	-
ct1k_ta										-2.247 (-0.87)	-2.289 (-0.89)	-2.112 (-0.80)
nrasf05_ta	-0.247 (-0.30)	-0.298 (-0.36)	-0.156 (-0.19)	-0.192 (-0.24)	-0.247 (-0.31)	-0.099 (-0.13)	-0.385 (-0.49)	-0.447 (-0.57)	-0.282 (-0.36)	-0.253 (-0.33)	-0.309 (-0.40)	-0.164 (-0.22)
aasf_ta	-0.926 (-1.20)	-	-	-1.052 (-1.35)	-	-	-1.102 (-1.35)	-	-	-1.052 (-1.29)	-	-
aasf05_ta	-	-0.717 (-1.25)	-	-	-0.838 (-1.42)	-	-	-0.903 (-1.49)	-	-	-0.857 (-1.42)	-
aasf09_ta	-	-	-0.745 (-0.89)	-	-	-0.76 (-0.93)	-	-	-0.738 (-0.87)	-	-	-0.714 (-0.85)
r2	0.435	0.441	0.430	0.437	0.444	0.430	0.425	0.432	0.419	0.425	0.432	0.420
N	88	88	88	88	88	88	88	88	88	88	88	88

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of European commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. Weights are changed in the liquidity ratios inspired by Basel III. The 0.25 weight for consumer loans is changed to 0.15 and 0.5. The 0.7 weight for demand and saving deposits is changed to 0.5 and 0.9. A bank is considered small if its total assets are below US$1 billion.

Table A1.3a. The determinants of Very Large U.S. banks' commercial vs. retail lending During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Commercial loans								
t12k_rwa	0.355 (0.73)	-	-	-	0.297 (0.62)	-	-	-
t1k_rwa	-	-0.88 (-1.61)	-	-	-	-0.897 (-1.56)	-	-
t1k_ta	-	-	-0.228 (-0.30)	-	-	-	-0.326 (-0.43)	-
ct1k_ta	-	-	-	-1.02 (-0.77)	-	-	-	-1.507 (-1.23)
nrasf_ta	0.399** (2.54)	0.546*** (3.45)	0.399 (1.62)	0.538** (2.20)	0.530*** (3.14)	0.669*** (4.22)	0.504* (2.02)	0.678** (2.73)
aasf_ta	0.317* (1.88)	0.312 (1.70)	0.318 (1.50)	0.228 (0.99)	-	-	-	-
aasf_cd_ta	-	-	-	-	0.041 (0.78)	0.041 (0.75)	0.066 (1.28)	0.069 (1.36)
r2	0.532	0.550	0.470	0.500	0.526	0.544	0.469	0.513
N	133	133	149	145	133	133	149	145
Retail and other loans								
t12k_rwa	0.335 (0.39)	-	-	-	0.395 (0.48)	-	-	-
t1k_rwa	-	1.007 (1.04)	-	-	-	1.085 (1.16)	-	-
t1k_ta	-	-	1.31 (1.46)	-	-	-	1.351 (1.50)	-
ct1k_ta	-	-	-	2.933 (1.67)	-	-	-	2.793 (1.66)
nrasf_ta	0.611* (1.84)	0.535* (1.77)	0.662* (1.75)	0.647 (1.69)	0.711* (1.84)	0.639* (1.79)	0.770* (1.81)	0.791* (1.75)
aasf_ta	0.238* (1.89)	0.222* (1.84)	0.19 (1.49)	0.293 (1.57)	-	-	-	-
aasf_cd_ta	-	-	-	-	0.015 (0.33)	0.021 (0.44)	0.042 (0.82)	0.033 (0.61)
r2	0.338	0.353	0.270	0.219	0.364	0.381	0.289	0.218
N	133	133	149	145	133	133	149	145

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. A bank is considered very large if its total assets are below US$50 billion.

Table A1.3b. The Determinants of Other Large U.S. Banks' Commercial vs. Retail Lending During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Commercial loans								
t12k_rwa	0.14 (0.75)	-	-	-	0.167 (0.85)	-	-	-
t1k_rwa	-	0.135 (0.69)	-	-	-	0.175 (0.86)	-	-
t1k_ta	-	-	0.514* (1.77)	-	-	-	0.548* (1.90)	-
ct1k_ta	-	-	-	0.732** (2.42)	-	-	-	0.731** (2.44)
nrasf_ta	0.632*** (6.04)	0.631*** (6.03)	0.703*** (7.04)	0.709*** (7.01)	0.679*** (6.06)	0.676*** (6.05)	0.757*** (7.19)	0.762*** (7.12)
aasf_ta	-0.117 (-1.13)	-0.122 (-1.17)	-0.096 (-0.97)	-0.097 (-0.98)	-	-	-	-
aasf_cd_ta	-	-	-	-	-0.022 (-0.38)	-0.021 (-0.37)	-0.013 (-0.24)	-0.014 (-0.27)
r2	0.319	0.325	0.322	0.308	0.331	0.337	0.332	0.318
N	1677	1677	1825	1804	1677	1677	1825	1804
Retail and other loans								
t12k_rwa	0.277 (0.84)	-	-	-	0.273 (0.87)	-	-	-
t1k_rwa	-	0.426 (1.32)	-	-	-	0.402 (1.31)	-	-
t1k_ta	-	-	0.799* (1.69)	-	-	-	0.801* (1.75)	-
ct1k_ta	-	-	-	0.652 (1.43)	-	-	-	0.575 (1.28)
nrasf_ta	0.021 (0.14)	0.002 (0.01)	0.075 (0.48)	0.074 (0.46)	0.043 (0.29)	0.026 (0.18)	0.104 (0.69)	0.105 (0.69)
aasf_ta	-0.032 (-0.21)	-0.032 (-0.21)	-0.1 (-0.71)	-0.091 (-0.64)	-	-	-	-
aasf_cd_ta	-	-	-	-	-0.178* (-1.91)	-0.180* (-1.93)	-0.169** (-1.99)	-0.170** (-2.01)
r2	0.082	0.084	0.089	0.086	0.091	0.093	0.104	0.099
N	1677	1677	1825	1804	1677	1677	1825	1804

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of U.S. commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. Total assets of the other large banks vary between US$50 billion and US$1 billion.

Table A1.3c. The Determinants of European Banks' Lending Considering Very Large vs. Other Large Banks During 2008–15

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Commercial loans				Retail and other loans			
Very large banks								
t12k_rwa	-0.619 (-1.45)	-	-	-	-1.005*** (-3.03)	-	-	-
t1k_rwa	-	-0.585 (-1.43)	-	-	-	-0.989*** (-2.68)	-	-
t1k_ta	-	-	0.003 (0.00)	-	-	-	-2.859** (-2.26)	-
ct1k_ta	-	-	-	1.438 (1.51)	-	-	-	-2.127** (-2.50)
nrasf_ta	0.884*** (3.55)	0.936*** (3.89)	0.600* (1.90)	0.504** (2.17)	-0.116 (-0.48)	-0.028 (-0.12)	-0.356* (-1.89)	-0.410** (-2.18)
aasf_ta	0.038 (0.35)	0.021 (0.19)	0.014 (0.14)	0.134 (1.14)	-0.06 (-0.54)	-0.087 (-0.76)	-0.227* (-1.97)	-0.285** (-2.20)
r2	0.230	0.239	0.221	0.219	0.256	0.262	0.271	0.270
N	496	496	448	397	496	496	448	397
Other large banks								
t12k_rwa	-0.141 (-0.40)	-	-	-	-0.239 (-0.92)	-	-	-
t1k_rwa	-	-0.259 (-0.56)	-	-	-	0.057 (0.18)	-	-
t1k_ta	-	-	-0.003 (-0.00)	-	-	-	-1.102* (-1.92)	-
ct1k_ta	-	-	-	-0.412 (-0.43)	-	-	-	-0.746 (-1.31)
nrasf_ta	1.305*** (4.10)	1.317*** (3.94)	1.348*** (4.08)	1.331*** (3.95)	-0.45 (-1.58)	-0.485 (-1.64)	-0.523* (-1.79)	-0.489* (-1.65)
aasf_ta	-0.189 (-1.17)	-0.19 (-1.21)	-0.307** (-2.01)	-0.315** (-2.05)	0.232 (1.51)	0.218 (1.44)	0.238 (1.49)	0.231 (1.42)
r2	0.194	0.189	0.208	0.203	0.120	0.121	0.125	0.126
N	1011	1011	1000	989	1011	1011	1000	989

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of European commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. A bank is considered very large if its total assets are below US$50 billion. Total assets of the other large banks vary between US$50 billion and US$1 billion.

Table A1.4. The Determinants of European Banks' Lending Using Alternative Definitions to Separate Them by Size During 2008–15

	[1]	[2]	[3]	[4]	[1']	[2']	[3']	[4']
	Commercial loans				Retail and other loans			
Large banks								
t12k_rwa	-0.018 (-0.03)	-	-	-	-0.805*** (-3.10)	-	-	-
t1k_rwa	-	0.217 (0.38)	-	-	-	-0.607* (-1.78)	-	-
t1k_ta	-	-	1.361 (1.01)	-	-	-	-1.755* (-1.80)	-
ct1k_ta	-	-	-	1.796* (1.72)	-	-	-	-1.225 (-1.44)
nrasf_ta	1.208*** (4.87)	1.201*** (4.75)	1.207*** (3.91)	1.100*** (3.78)	-0.495** (-2.55)	-0.467** (-2.37)	-0.655*** (-3.64)	-0.627*** (-3.47)
aasf_ta	-0.013 (-0.11)	-0.009 (-0.08)	-0.043 (-0.34)	0.034 (0.26)	-0.043 (-0.39)	-0.064 (-0.60)	-0.066 (-0.56)	-0.092 (-0.70)
r2	0.190	0.194	0.173	0.209	0.249	0.247	0.263	0.270
F	7.79	7.94	8.21	10.05	11.81	11.25	11.08	10.01
p	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	792	792	743	683	792	792	743	683
Small banks								
t12k_rwa	-0.356 (-0.64)	-	-	-	-0.11 (-0.32)	-	-	-
t1k_rwa	-	-0.416 (-0.62)	-	-	-	0.328 (0.87)	-	-
t1k_ta	-	-	0.302 (0.50)	-	-	-	-0.491 (-0.96)	-
ct1k_ta	-	-	-	0.075 (0.13)	-	-	-	0.035 (0.06)
nrasf_ta	0.942*** (2.80)	0.949*** (2.72)	0.897** (2.45)	0.885** (2.43)	-0.262 (-0.91)	-0.324 (-1.08)	-0.309 (-1.06)	-0.297 (-1.02)
aasf_ta	-0.264 (-1.39)	-0.266 (-1.45)	-0.340* (-1.88)	-0.333* (-1.82)	0.025 (0.13)	-0.001 (-0.01)	-0.008 (-0.04)	-0.012 (-0.06)
r2	0.175	0.173	0.180	0.180	0.124	0.125	0.121	0.121
F	8.72	9.20	10.11	9.91	7.06	7.11	7.85	7.80
p	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	803	803	793	791	803	803	793	791

Note: This table shows the results of estimating equation (1) using standard OLS for an unbalanced panel of European commercial banks over the period 2008–15. All bank-specific explanatory variables, which are presumably endogenous in the existing literature, and several macroeconomic indicators, are replaced by their one-year lagged values. See Table 4 for the definitions of the variables included in the regression framework. Standard errors are robust from heteroskedasticity. * Indicate statistical significance at the 10 percent level. ** Indicate statistical significance at the 5 percent level. *** Indicate statistical significance at the 1 percent level. Student-t statistics are reported in parentheses. A bank is considered large if its total assets are above US$20 billion.