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**DETERMINANTS OF BANK LENDING IN  
EUROPE AND THE UNITED STATES:  
EVIDENCE FROM CRISIS AND POST-  
CRISIS YEARS**

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Immacolata Marino

**FINANCIAL ECONOMICS**



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# DETERMINANTS OF BANK LENDING IN EUROPE AND THE UNITED STATES: EVIDENCE FROM CRISIS AND POST-CRISIS YEARS

## Abstract

We investigate bank lending patterns and their determinants in Europe and the United States over 2008-2014. Specifically, we relate bank characteristics prior to the financial crisis to their lending behaviour during and after the crisis period. Our analysis confirms the existence of a bank lending channel. This channel seems stronger in Europe than in the United States, especially if we look at corporate loans rather than at the whole loan portfolio.

JEL Classification: G21, G18, G01

Keywords: bank loans, corporate loans, bank lending channel, crisis

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**Determinants of bank lending  
in Europe and the United States:  
Evidence from crisis and post-crisis years**

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December 2016

**Abstract**

We investigate bank lending patterns and their determinants in Europe and the United States over 2008-2014. Specifically, we relate bank characteristics *prior to* the financial crisis to their lending behaviour *during* and *after* the crisis period. Our analysis confirms the existence of a bank lending channel. This channel seems stronger in Europe than in the United States, especially if we look at corporate loans rather than at the whole loan portfolio.

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## 1. Introduction

How did the global financial crisis impact banks' lending behaviour? Did it affect some banks more than others? Which banks were particularly affected and why? Were European banks more or less resilient in their bank lending than US banks? Were there variations across countries in Europe in terms of responses in bank lending to the crisis?

These are critical questions for several reasons. The impact of the global financial crisis on the solvency of banks was dramatic. The average capital to asset ratio of both US and European banks declined in response to the crisis, and both the United States and Europe collapsed into recession (Laeven and Valencia, 2010). Subsequently the United States recovered much more rapidly than Europe, which in 2010 was subject to a further round of adverse shock in the form of the Eurozone sovereign debt crisis. As a consequence, many European economies remain in recession to this day. Again, this raises the questions of what the effect of this new shock on bank lending was, and how different types of banks reacted to it.

Our work contributes to addressing these issues by investigating bank lending patterns and their determinants in Europe and the United States over 2008-2014. Because banks' balance-sheet weaknesses may affect the economy through a reduction of credit supply (Bernanke, 1983; Kashyap and Stein, 2000), looking at lending patterns in crisis times sheds important light on the role of banks in propagating a contraction of economic activity. In turn, the procyclical nature of bank lending could exert a disproportionate strain on the economy, making it harder for bank-dependent borrowers – such as small and medium-sized enterprises (SMEs) – to keep on relying on external sources of funds (Berger and Udell, 1995). Hence, the goal of our analysis is to understand the extent to which bank lending practices contributed to the decline, and how much of the difference between Europe and the United States can be attributed to differences in the two banking systems.<sup>1</sup>

To investigate the determinants of bank lending propagation mechanisms in crisis years, we exploit the cross-section heterogeneity of banks in Europe and the United States in terms of their balance sheets before the crisis. To provide evidence on the narrative that some bank-specific characteristics may be

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<sup>1</sup> It is a well-known fact that financial structures of the United States and Europe differ under several respects (ESRB, 2014). For instance, firms in Europe are more heavily dependent on bank lending than US firms. In addition, the financial crisis and the Eurozone crisis hit banks and spilled over into real economies with a different intensity in the two geographical areas. The reaction of local monetary authorities to the two crises was also different in terms of timing and nature of measures adopted (Cukierman, 2016). It is therefore worth investigating whether and to what extent bank characteristics matter in influencing loan supply during or outside of a crisis period, over and above country specificities.

relevant during a banking crisis and not during a sovereign crisis, we study the two events separately.

We use data on individual banks to explore the role of macroeconomic disturbances in the context of individual bank lending decisions. Specifically, we relate bank characteristics *prior to* the financial and sovereign crises to their lending behaviour *after* the crisis. This strategy enables us to observe both banks' immediate responses and the longer-term impact on lending as driven by bank-specific factors. Because crisis may impact banks' behaviour differently according to their location, we also examine lending strategies of banks grouped by geographical area. Hence, we can compare the effect between United States and Europe, as well as across countries within Europe, contrasting, for example, banks in Eurozone and non-Eurozone countries and those in core versus peripheral countries.

We look at several potential drivers of banks' balance sheet strength. In line with seminal contributions on the bank lending channel, we first explore the role of size, capital and liquidity as the main balance-sheet characteristics that can affect the transmission of financial shocks to the credit market, and therefore the real economy (Kashyap and Stein, 2000; Kishan and Opelia, 2000). We also look at factors that have proven relevant in influencing bank lending in crisis times: reliance on wholesale funds as a measure of unstable funding (Gambacorta and Marques-Ibanez., 2011; Kapan and Miniou, 2013); bank ownership structure, to assess whether differential lending patterns emerge between domestic versus foreign banks (Popov and Udell, 2010; Claessens and van Horen, 2012; Cull and Martinez Pería, 2013); and exposure to sovereign risk, to account for potential impact of the Eurozone sovereign crisis (Popov and van Horen, 2013; De Marco, 2016; Gennaioli et al., 2014; Altavilla et al., 2016).

We find that a bank lending channel in crisis and post-crisis years does exist in both the United States and Europe. However, there are differences across these regions in terms of the strength and types of bank characteristics affecting the banking lending channel. In particular, we find that the strength of the banking channel is more limited when we refer to total loans, rather than to corporate loans, especially for European banks. This evidence is not surprising since, in the bank lending channel view, the impact of a shock is expected to be stronger on the supply of loans to bank-dependent borrowers, which describes most European companies, but not as many US businesses (EIB, 2014; ESRB, 2014). The main factor affecting US banks' total lending behaviour is liquidity. In line with the traditional lending channel view, we find that banks with more cash holdings tend to better shield total lending – as well as, although at a lower extent, corporate lending – in crisis and post-crisis years. If we look at the impact on bank asset composition, however, the role played by bank liquidity changes, since more liquid and better capitalised US banks reduce the amount of resources allocated to corporate loans in

crisis and post-crisis years, compared to less sound and less liquid banks. Consistent with the traditional bank lending channel view, larger size and a greater reliance on core deposits are associated with a higher ratio of corporate loans to total assets.

Turning to European banks, we find that the bank lending channel is more active in the Eurozone periphery regions and for corporate lending. In line with our predictions, several factors have played a role in influencing bank lending patterns since the 2008-09 crisis. We find that size is a powerful explanatory variable, since larger banks in the periphery shield corporate lending less than smaller institutions. We also find a positive influence of capitalisation and liquidity (measured by the share of cash and due from banks and public bonds over total assets) on corporate lending levels, as well as on the share of corporate loans over total assets. Evidence on the role played by traditional funding is mixed. We find some evidence of a positive impact of traditional deposits on total lending and corporate volumes in the Eurozone since the sovereign crisis. However, if we focus on the periphery of the Eurozone, deposit-based banks lend persistently less to corporates (in terms of both levels and percentages of total assets) relative to banks with a deposit base below the median. We also discover that capitalisation mitigates the negative effects of the crisis on lending in banks from stressed countries only.

Another factor reinforcing the bank lending channel in Europe and, to a lesser extent, in the United States is bank ownership structure. The main result in this respect is the negative impact of foreign ownership on corporate lending (in terms of both levels and percentages of total assets) during crisis and post-crisis years. This finding is stronger for European banks and seems to be driven by banks from the Eurozone periphery. This evidence is suggestive of the fact that for banks from stressed countries in particular, foreign ownership may be a weakening factor of in their ability to shield lending (see, among others, Cull and Martinez Peria, 2013; Popov and van Horen, 2013) and points to the effects of banking system fragmentation (Claessens and van Horen, 2014).

Our study is mainly related to the vast bank lending channel literature. We contribute to this strand of literature in several ways. First, we focus on both European and US banks. This differs from many studies of the bank lending channel, which often adopt a more restricted geographical scope. The first empirical analyses in this field were carried out using US data (e.g., Bernanke and Blinder, 1988; Kashyap and Stein, 2000). Most contributions on banks outside the United States use data from a single geographical area – Europe (e.g., Popov and van Horen, 2013) or the Eurozone (e.g., Altavilla et al., 2016) – or even from a single country such as Spain (Jiménez et al., 2014) or Italy (Bonaccorsi and

Sette, 2012; Albertazzi et al., 2012).<sup>2</sup> With studies on Europe and the Eurozone, consensus has been harder to find because country specificities seem to contribute, together with bank-specific factors, to the bank lending channel view (Altunbas and Molyneux, 2002).

Second, while there are several works assessing the impact of *either* the 2008-09 crisis or the Eurozone sovereign crisis on bank lending, we examine how a prolonged period of downturn (comprising *both* the banking and the Eurozone debt crisis) influences lending patterns. The inclusion in our sample period of two post-crisis years clearly widens the perspective of the analysis and enables us to assess the strength of the banking channel *through* the cycle.

Moreover, while most studies on the bank lending channel in crisis years focus on total loans (e.g., Popov and van Horen, 2013; Gennaioli et al., 2014), we use both total (gross) loans as well as the subcategory of corporate loans. By examining both, we first address the concern that any results for total loans might be influenced by compositional effects (Kashyap and Stein, 2000). For example, it may be that the real estate industry and residential mortgages move differently than corporate loans over the business cycle. Exploring any differential patterns and determinants of either total or corporate loans also enables us to better understand banks' lending strategies and their potential impact on the real economy.

We also examine a large number of hypotheses together to take into account that banks' business models have changed over time, leading for instance to more intensive use of market funding sources and to a different role played by bank deposits than traditionally predicted by former analyses.

In considering the impact on lending of bank exposure to sovereigns, our study also contributes to the recent literature that has emerged since the Eurozone sovereign crisis (e.g., Altavilla et al., 2016).

Understanding how adverse financial impulses are transmitted through the banking system in a period of stress and immediately after a downturn of course has relevant policy implications. Our findings may suggest which policy and regulatory responses could be most effective in sustaining credit (for example, improving liquidity as opposed to bank recapitalisation), and which actions have to be promoted, (for example, the creation of a pan-European capital market, in the spirit of the Capital Market Union

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<sup>2</sup> We are aware of a few studies of the bank lending channel stream with a wide international geographical scope. Gennaioli et al. (2014) analyse an international sample of banks from 191 countries; Ongena et al. (2015) focus on Eastern Europe and Turkey; while Cull and Martinez Peria (2012) look at Latin American and Eastern Europe institutions. As in our analysis, Gambacorta and Marques-Ibanez (2011) focus on European and US banks, although they assess the strength of the bank lending channel only during the global financial crisis.

initiative, to replace bank lending when reduced loan supply would disrupt the economic growth) (European Commission, 2015).

The structure of the paper is as follows. In Section 2 we develop our hypotheses in light of the main related literature. In Section 3 we describe the data, highlight the cross-sectional and time series variation present in our bank-level data, and present some stylised aggregate facts. In Section 4 we present the methodology. Section 5 discusses our core results, and Section 6 concludes.

## **2. Related literature and hypothesis development**

The main background of our analysis is the bank lending channel framework. The first studies in this area emphasised the potential amplification effects that may be generated by the banking sector primarily through the impact of monetary policy on loan supply to bank-dependent borrowers (Bernanke and Blinder, 1988). Over time, changes in banks' business models and regulation have challenged the validity of the traditional bank lending channel view in several respects (Gambacorta and Marques-Ibanez, 2011). On the other hand, recent crises have reinforced the idea that banks can act either as absorbers or amplifiers of financial shocks, depending on the strength of their balance sheets (Dysiatat, 2011). In formulating our hypotheses, we rely on the traditional framework, revisited in light of institutional changes and the recent crises.

### *2.1 The traditional bank lending channel*

The preconditions for a 'bank lending channel' to be at work are (i) the existence of bank-dependent borrowers, and (ii) that monetary policy changes have a direct impact on loans granted by banks whose liabilities are largely made of reservable deposits. In this context, bank size, liquidity and capital are the characteristics that are first found to amplify the response of bank loans to monetary shocks. All are expected to be positively correlated with bank loans. Size is considered a

proxy for banks' ability to raise external funds other than (insured) deposits. The idea is that smaller banks are less likely to be able to raise uninsured deposits frictionlessly. Liquidity serves as a buffer enabling banks to shield lending against shocks to the availability of external finance by drawing on their stock of liquid assets. The role of bank capital in absorbing shocks makes it an indicator of bank health and, therefore, a measure of a bank's ability to raise alternative external finance during contractionary policy periods. The combination of these factors can reinforce the bank lending channel. Kashyap and Stein (2000) show that when a smaller bank is also illiquid, the bank lending channel appears to be strengthened. Kishan and Opiela (2000) argue that small and poorly capitalised banks (in terms of their leverage ratio) reduce their loan supply more than larger and well capitalised banks after a monetary contraction, due to their limited ability to tap uninsured sources of funds.

## *2.2 The bank lending channel revised*

### Impact of deposits

The crisis episodes that have hit the banking system globally since the summer of 2007 have either modified or amplified the effect and functioning of the lending channel view. Until the global financial crisis, most banks were easily able to complement deposits with alternative forms of financing (Romer and Romer, 1990). As banks have become more dependent on market funding, a closer connection between wholesale market conditions and banks' ability to raise funds has emerged. Following the default of Lehman Brothers in September 2008, there was a run by short-term bank creditors, making it difficult for banks to roll over their short-term debt (Ivashina and Sharfstein, 2010). The 2008-09 financial crisis has emphasised the relevance of the stability of bank funding, since banks that are more reliant on traditional deposits continued to lend even in crisis times (Cornett et al., 2011).<sup>3</sup> In light of this evidence, we propose the following hypothesis.

*H1. Contrary to the traditional bank lending channel view, we expect banks that are more dependent on customer deposits (as a percentage of total assets) to be less vulnerable to financial shocks and thus, in bad times, to expand lending more (reduce lending less) than banks that are more reliant on short-term debt.*

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<sup>3</sup> In the same vein, Kishan and Opiela (2012) introduce the risk-pricing channel argument. This implies that a bank that relies heavily on external funding, but whose condition is expected to suffer during contractionary policy, will face high policy-induced external finance premia. That is, seemingly healthy banks that are currently able to raise funds could suddenly face high premia that force them to quickly unwind their loan portfolios.

### Impact of liquidity

The financial crisis has also reinforced the view of the relevance of asset liquidity, because banks with more illiquid assets on their balance sheets hoard liquidity and reduce lending in crisis years more than liquid banks (Cornett et al., 2011). This is consistent with the traditional lending channel view (Kashyap and Stein, 2000), which assumes that banks hold marketable securities (such as government debt) as a precaution against deposit withdrawals. As a consequence, the greater the cost of external debt financing (or the volatility in the supply of demand deposits), the greater the demand for securities as an inventory of liquidity. In line with the role played by asset liquidity in the lending channel literature, and consistent with the evidence emerging from the 2008-09 banking crisis, we formulate the following hypothesis:

*H2. We expect banks with a large portion of highly liquid assets (cash and due from banks over total assets; government bonds to total assets) to be better able to preserve lending in crisis times.*

In H2, we first use a restrictive measure of liquid assets which only includes cash and due from banks, because some securities that have proven liquid in pre-crisis years turned into non-marketable assets during crisis years.<sup>4</sup> We also measure bank asset liquidity as a share of government bonds over total assets. Government securities have been commonly considered by banks to be a relevant component of their stock of highly liquid assets, because they can be converted into cash cheaply and quickly through direct sales in secondary markets or through their use as collateral in interbank transactions and refinancing operations with central banks.

### Impact of exposure to sovereign risk

The Eurozone crisis that developed since the late 2009 has posed a threat to the liquidity and solvency position of banks with a sizeable stock of sovereign debt on their balance sheets. Specifically, for banks heavily exposed to sovereign risk – i.e. those with large holdings of stressed countries' debt (namely, Greece, Italy, Ireland, Portugal, and Spain) – it become more costly to raise funds by issuing unsecured debt or equity (due to their increased default risk induced by a greater exposure to

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<sup>4</sup> This is what happened during the banking crisis with asset backed securities; see Cornett et al. (2011).

sovereign risk) or by using government bonds as collateral in interbank transactions (due to the drop in value of those securities).<sup>5</sup> There is ample evidence from the Eurozone sovereign crisis that large bank exposure to government debt issued by stressed countries reduces lending supply and/or increases lending rates (Albertazzi et al., 2012; Popov and van Horen, 2013; De Marco, 2016; Altavilla et al., 2016; Acharya et al., 2016). Some authors have also found evidence of a crowding-out effect of government bonds when the public debt held by banks is risky (as measured by credit default swap (CDS) spreads), at the expense of corporate lending (Becker and Ivashina, 2014). This leads to the following hypothesis, in line with the recent evidence on the real effects of the Eurozone sovereign crisis:

*H3. We therefore expect that banks from the Eurozone periphery countries with larger exposure to domestic government bonds (over total assets) reduced their lending more (increase their lending less) during the Eurozone sovereign crisis years, relative to banks less exposed to sovereign risk.*<sup>6</sup>

#### Impact of capital

Bank capital also matters in the propagation of shocks to the bank credit supply. According to the traditional lending channel view (Kishan and Opiela, 2000; Gambacorta and Mistrulli, 2004), bank capital increases the capacity to raise uninsured forms of debt, and therefore banks' ability to limit the effect of a drop in deposits on lending. Specifically, the level of bank capital influences external ratings and provides investors with a signal of the issuer's creditworthiness. Hence, the cost of debt would be higher for riskier issuers (i.e. low-capitalised banks). For the 'bank capital channel' to be at work, capital requirements need not actually be binding – even if capital holdings are greater than regulatory capital requirements, it might be still optimal for (relatively) low-capitalised banks to forgo lending opportunities *now* in order to lower the risk of capital inadequacy in the *future* (Gambacorta and Mistrulli, 2004). Bank capitalisation may also influence the way the loan supply reacts to output shocks if banks' profits – and thus their capital accumulation – depends on the business cycle. In this case, output shocks affect banks' capacity to lend if the market for equity is not frictionless and banks

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<sup>5</sup> There are several channels through which sovereign tensions are transmitted to banks. A drop in the value of government bonds may induce capital losses, which increase a bank's default risk. This in turn decreases the bank's creditworthiness. A further mechanism may operate when a bank's rating is downgraded following a downgrade in sovereign rating. In addition, sovereign tensions can affect entrepreneurial confidence and household wealth, which in turn may influence demand and quality of bank credit, and therefore the composition and risk of banks' assets. On the channels of transmission of sovereign risk to the banking sectors, see, among others, Altavilla et al. (2016) and Albertazzi et al. (2013).

<sup>6</sup> We are unable to measure banks' exposure to more stressed countries directly, because our main source of data – Bankscope – does not report the nationality of public bonds. Nevertheless, our measure is a plausible proxy for the domestic public bonds held by banks in our sample, as shown in Gennaioli et al. (2014).

have to meet regulatory capital requirements. Other things being equal, well-capitalised banks are in a better position than less-capitalised banks to absorb output shocks. Recent evidence (Popov and Udell, 2010; Jiménez et al., 2012; Kapan and Minoiu, 2013) confirms the positive impact of capitalisation on banks' ability to grant lending in crisis years. We therefore elaborate the following hypothesis:

*H4. Overall, we expect well-capitalised banks to reduce their lending less (increase their lending more) in crisis years relative to less-capitalised banks.*

The effectiveness of bank capital in shielding lending in crisis years may depend on the variable used to measure bank capitalisation (Kapan and Minoiu, 2013). In principle, with binding capital requirements based on a pure leverage ratio, when a capital shock occurs banks may react by selling securities and shrinking their asset base. This introduces a second incentive for banks (besides the liquidity motivation) to hold securities, which may also serve as a buffer against capital shocks to preserve minimum capital ratios. In contrast, with binding *risk-based* capital standards (such as the Tier 1 ratio), securities can no longer buffer loan growth from capital shocks. Since (most) government securities have a zero risk weight, liquidating securities does not free up capital to fund loans. In the years that preceded the global crisis, many banks increased their actual leverage while maintaining or improving their risk-based capital ratios (Le Leslè and Avranova, 2012). This is possible because banks are able, for example, to take on risk by expanding in certain areas where capital charges are lower (Gambacorta and Marques-Ibanez, 2011). In crisis years, when issuing new equity is more costly, this may lead banks to allocate resources by replacing riskier assets which absorb more regulatory capital (such as loans to corporates) with less risky assets.<sup>7</sup>

### Impact of size

Size is a powerful driver in the empirical banking literature, and particularly in bank lending channel studies. Indeed, size may explain several relevant aspects of banks' business models, primarily funding and lending strategies.<sup>8</sup> In the traditional bank lending channel view, bank size is a proxy for banks' ability to access external source of funds. During a tightening of monetary policy, smaller banks (particularly those that are illiquid and poorly capitalised) may find it difficult to bypass a

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<sup>7</sup> Therefore, the setting up of risk-based capital requirements can lead to a reallocation from loans to securities (Berger and Udell 1994).

<sup>8</sup> For example, Kashyap and Stein (2000), in assessing the impact of monetary policy on a large 20-year panel of US commercial banks, find that their results are largely driven by smaller banks (those in the bottom 95% of the size distribution).

deposit shock and preserve lending by raising new funds (Kashypan and Stein, 2000; Kashian and Opiela, 2000).

Generally, large banks seem to be more insulated from adverse shocks, for example because of greater diversification possibilities or because they may be ‘too big to fail’. Therefore, big banks should be less prone to reducing their credit portfolio in the event of a crisis (Gambacorta and Marques-Ibanez, 2011; Jiménez et al., 2014; Popov and van Horen, 2013). On the other hand, the business models of smaller banks tend to be more relationship-based. If ties to clients do matter, smaller banks in crisis years might be less prone to curtailing lending to corporates than larger banks (Petersen and Rajan, 1994; Berger and Udell, 1995). Also, smaller banks tend to adopt the standardised approach, rather than the internal rating-based (IRB) approach, to measure risk weights and regulatory capital requirements. This may affect lending in bad times because internal ratings (which are mainly used by large banks, especially in Europe) are procyclical, that is, risk weights and capital charges are more sensitive to the cycle and tend to increase in a recession (Bruno et al., 2016; Behn et al., 2016). Hence, to reduce their capital burden, banks following the IRB approach may want to reduce lending in crisis years by more than banks under the traditional approach with fixed risk weights. Consistent with the ambiguous role played by size, we formulate the following hypothesis:

*H6. We expect size (log of total assets) to have an impact on bank lending, although the direction is hard to predict ex ante.*

#### Impact of ownership structure

Ownership structure, in a globalised banking sector, has prompted questions over whether global banks absorb or propagate financial shocks, and specifically whether differential lending patterns emerge between domestic and foreign banks (Popov and Udell, 2010; Classens and van Horen, 2012; Cull and Pería, 2013). In particular, some evidence suggests that banks sharply reduce lending to their overseas customer in favour of domestic clients (Peek and Rosengren, 1997; Cetorelli and Goldberg, 2012). Reliance on non-traditional sources of funding and globalisation point towards the same narrative, since a source of propagation of the global financial crisis derives from international wholesale funding markets (Cull and Pería, 2013; Ongena et al., 2015) and capital constraints (Popov and Udell, 2010). On the other hand, findings from the Eurozone sovereign crisis show that domestic banks in fiscally weak countries tightened credit more than foreign banks operating in the same country (Bofondi et al., 2013).

The global financial crisis followed a period in which globalisation of the financial system increased substantially. Many banks expanded their operations in the international wholesale markets and /or

increased their presence abroad through foreign branches and subsidiaries. Both the global financial crisis and the Eurozone sovereign crisis reignited the debate on the ownership structure of the banking sector and mechanisms of the transmission of financial distress in global banking (Cull and Martinez Peria, 2012; Ongena et al., 2015; Ivashina et al., 2015). Popov and Udell (2010), for example, find strong evidence for the international transmission of financial distress in foreign-bank-dominated markets in the presence of weak (low-capitalised) foreign banks. Other contributions suggest that banks sharply reduce lending to their overseas customer in favour of domestic clients (Peek and Rosengren, 1997; Cetorelli and Goldberg, 2011). Evidence is mixed, however, since sound foreign banks from unstressed countries seemed to reduce lending less than domestic banks in countries more affected by the Eurozone sovereign crisis (Bofondi et al., 2013). We formulate the following hypothesis about bank ownership:

*H7. We expect that bank ownership (proxied by the dummy ‘foreign-owned’) matters in explaining differences in lending behaviour in crisis years. The way a foreign-owned bank reacts to the crisis (relative to domestic banks) in terms of lending behaviour is unclear, and may depend on bank specific characteristics of the parent company (e.g. the home country of the foreign owner or the soundness of the parent company).*

### **3. Data**

#### **a. Sources and sample characteristics**

We obtain bank-level data from the Bureau van Dijk’s Bankscope, which provides balance-sheet information on a broad range of bank characteristics. We rely on consolidated data between 2005 and 2014, and build a dataset that includes bank characteristics and macroeconomic indicators for a sample of 132 large European and US banks. Our original sample is comprised of all banks from Eurozone countries under the Single Supervisory Mechanism (SSM), European banks from non-Eurozone countries that participated in the European Banking Authority (EBA) EU-wide stress tests in 2014, and US bank holding companies (BHCs) that participated in the 2015 Federal Reserve stress test. We exclude from our analysis countries that adopted the euro after 2004 (Cyprus, Latvia, Malta and Slovenia).

To filter out financial institutions that are not technically banks, we excluded from the original sample banks with ratio of gross loans to total assets lower than 10%. For the same purpose, we also manually exclude institutions whose main activity is not making loans to individuals and businesses.<sup>9</sup> Then, to

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<sup>9</sup> We therefore dropped the Austrian firm Immigon Portfolioabbau AG, which takes care of the orderly disposition of VBAG

minimise the influence of outliers, we winsorise all variables in the top 1% and bottom 1% of the asset growth series and of our main dependent and explanatory variables (i.e. gross loans, corporate loans, equity/TA).

Next, to address the issue of double counting, we drop those banks that are subsidiaries of parent companies in the original sample (for example, we excluded HSBC France but kept the parent company HSBC holding, UK). The final sample is composed of 132 banks:

- 94 banks from Eurozone countries which are under the SSM, i.e. those banks belonging to the list of significant supervisory institutions according to the ECB (cut-off date: 15 August 2015).<sup>10</sup> We classify Eurozone countries into “Core” (Austria, Belgium, Finland, France, Germany, Luxembourg and the Netherlands) and “Peripheral” (Greece, Ireland, Italy, Portugal and Spain).
- 14 European banks from non-Eurozone countries that participated in the EU-wide stress test led by the EBA in 2014 (UK, Denmark and Sweden).
- 24 US banks that participated in the 2015 stress test led by the Federal Reserve. The Fed carries out an annual assessment of whether BHCs with \$50 billion or more in total consolidated assets “have effective capital planning processes and sufficient capital to absorb losses during stressful conditions, while meeting obligations to creditors and counterparties and continuing to serve as credit intermediaries”.<sup>11</sup>

To retrieve ownership information that is not present in Bankscope, we identify our banks in the comprehensive world-wide bank ownership database compiled by Claessens and van Horen (2014). This database provides panel information on bank ownership (domestic or foreign-owned) for virtually all banks in the world, and is therefore very useful for our purposes of investigating the response to the crisis of different owned banks. Following Ongena et al. (2015), we take ownership in 2007 to categorise a bank as being domestic or foreign-owned. Foreign-owned implies that foreigners hold more than 50% of the shares of a bank. Of the 132 banks in our sample, we match ownership information for 75 banks. Among these 75 banks, 11 are majority-owned by foreigners and are referred

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bank; the Dutch BNG, which does not provide financing to private customers, but exclusively to (semi-)public organisations, such as municipalities and provinces; RBC Investor Services Bank S.A. in Luxembourg, which mainly provides administration and custody services, and the Slovene Export and Development Bank.

<sup>10</sup> According to the ECB, a credit institution will be considered significant if any one of the following conditions is met: the total value of its assets exceeds €30 billion or – unless the total value of its assets is below €5 billion – exceeds 20% of national GDP; it is one of the three most significant credit institutions established in a member state; it is a recipient of direct assistance from the European Stability Mechanism; the total value of its assets exceeds €5 billion and the ratio of its cross-border assets/liabilities in more than one other participating member state to its total assets/liabilities is above 20%.

<sup>11</sup> This annual assessment includes two related programmes: the Comprehensive Capital Analysis and Review (CCAR) evaluates a BHC’s capital adequacy, capital adequacy process and its planned capital distributions, such as dividend payments and common stock repurchases; and the Dodd-Frank Act supervisory stress testing, which is a forward-looking quantitative evaluation of the impact of stressful economic and financial market conditions on BHC capital.

to as *Foreign Banks*.

Table 1 presents the list of banks in our sample by country. For each bank, we report the average values between 2005 and 2014 of total assets, and gross loans and customer deposits as percentages of total assets. The table shows that banks in our sample are sufficiently heterogeneous with regards to three above-mentioned variables to allow us to define treatment and control groups within each country. The largest banks (with total assets over \$2 trillion) are located in France, Germany, the United Kingdom and the United States. In terms of prevalent business models, in all countries banks with a major focus on commercial banking compete with banks with a more limited focus on the traditional banking business.

Table 2 provides the distribution of banks by bank type (according the definition provided by Bankscope) and by country. All US banks in our sample are bank holding companies. In Europe, banks are mainly labelled as commercial banks (44% of European banks by total assets), cooperative banks (18%), bank holding companies (15%) or savings banks (9%).<sup>12</sup> Finally, Table 3 presents the sample representativeness in terms of total assets for Eurozone (panel A) and US (panel B) banks. We compare total assets of Eurozone and US banks in our sample to total Eurozone and US banking assets according to ECB and Fed statistics, by year. In both geographical areas, banks in our sample hold, on average, more than 80% of total banking assets. Figures 1 to 3 show the trend of our main lending variables for the whole sample over 2005-2014. Similarly to the aggregate statistics, the loan growth rate falls to a negative level in 2008 (Figure 1), and the drop is more relevant for the sub-category of loans to corporates. There are signs of a recovery in the post-crisis years (2013-2014). Nonetheless, lending growth rates of both total and corporate loans have remained lower than the pre-crisis level. Looking at volumes (Figure 2), total lending seems to be relatively stable over 2008-2012, while loans to corporates drops consistently. Finally, there is evidence of a composition effect (Figure 3). Banks only partly shrink their loan portfolio as a percentage of total assets during the crisis years. Within loan portfolios, however, the amount of resources allocated to corporates as a percentage of total assets falls remarkably (from an average of 30 % in the pre-crisis years to about 20% in 2014).

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<sup>12</sup> The remaining banks are classified as specialised governmental credit institutions (8%), finance companies (2%), investment and trust corporations (3%), and real estate and mortgage banks (1%).

## **b. Summary statistics**

In Table 4, we report summary statistics (for 2005-2014) of the main variables used in the empirical analysis. Panel A reports statistics on European banks, Panel B on US banks, Panel C on banks from Eurozone countries, and Panel D on banks in Eurozone periphery countries.

The banks in our sample are, on average, large (about \$400 billion in total assets in both Europe and the United States). Within Europe, the average bank is smaller in the Eurozone, and in particular in Eurozone periphery countries (about \$250 billion and \$160 billion in total assets, respectively). Bank assets have increased on average in all geographical areas; banks from the United States and the Eurozone periphery have grown at a similar average rate (5.5% and 4.9%, respectively).<sup>13</sup>

Focusing on the lending business, there are no striking differences in the average total loan growth rate, which, on average, has been positive and has mirrored the bank asset growth rate in all areas. Interestingly, in all areas corporate loans have grown at a slower pace than the whole loan portfolio. The average corporate loan growth rate has been nearly 3%, with the highest rate in the Eurozone periphery and the lowest rate in the United States (3.7% and 2.5%, respectively).

Interestingly, there are no striking differences between US and European banks in terms of the relevance of the lending business. Lending seems to be the prevalent business for the average bank in all areas, accounting for more than half of total bank assets. The largest share of loans as a percentage of total assets (nearly 70%) is held by Eurozone periphery banks. Focusing on the composition of the loan portfolio, US banks tend to allocate relatively fewer resources to corporates (39% of total loans) compared to the average European bank (44% of total loans). This is not surprisingly in light of the fact that US firms are traditionally less bank-dependent than European corporates. The quality of the loan portfolio of European banks is, on average, much lower than that of US banks, a probable effect of the more prolonged downturn in Europe (Beck et al., 2013). The average share of impaired loans to gross loans is around 6% for European banks, and less than 2% for US institutions. The ratio is on average higher (9%) in banks from stressed countries which have suffered most during the Eurozone sovereign crisis. The topic of non-performing loans (NPLs) is currently under scrutiny by policymakers in many European countries (European Parliament, 2016); in Italy and other periphery countries, in particular, NPLs represent a heavy burden on the entire banking sector (Bruno and Marino, 2016).

Focusing on funding strategies, on average, US banks in our sample rely more on traditional deposits

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<sup>13</sup> Hypo Real Estate Holding AG in Germany showed a negative growth rate every year since 2007 and registered the lowest rate of -47.95%.

than European banks –the ratio of customer deposits to total assets is around 64% for US banks, and less than 40% for European banks. Looking at liquidity and capitalisation, US banks seem to be, on average, in a better position in terms of our indicators of balance sheet strength. We consider two indicators of bank liquidity: a narrow indicator given by the ratio of cash and due from banks to total assets; and a broader one, which is the ratio of government bonds to total assets. Public bonds are very liquid assets that play a crucial role in banks’ everyday activities such as storing funds, posting collateral, or maintaining a cushion of safe assets (Gennaioli et al., 2014; Bofondi et al., 2013, Altavilla et al., 2016). US banks exhibit, on average, larger exposure to government bonds (10%) relative to European banks (roughly 7%), while the average amount of cash and due from banks, as a percentage of total assets, is similar (around 2%, on average) in all geographical areas.

As for capitalisation, US banks record a ratio of equity to total assets that is almost double the level of European banks (10% and 5.5%, respectively). Interestingly, the gap falls remarkably when we focus on a risk-weighted capital ratio (i.e. the Tier 1 ratio, which is in all areas well above the minimum requirements set by Basel III).<sup>14</sup> This may be the result of the different models for measuring risk weights adopted in European relative to US banks. Notoriously, large European banks tend to use internal rating models more extensively than their US peers (Le Leslé and Avramova, 2012). Since 2004, a growing number of banks have opted for the (IRB) approach in Europe. Many of them have achieved substantial benefits in terms of lower capital consumption compared to the standardised approach based on agency ratings (Le Leslé and Avramova, 2012).<sup>15</sup> Finally, only a small percentage of banks (fewer than 10%) are foreign-owned, with the highest value registered in the United States and the lowest in the Eurozone periphery.<sup>16</sup>

Tables 5 and 6 show a dynamic picture of the banking sector over 2005-2014, by bank size. We split the sample in three percentiles based on the level of total assets (below 25%, 25 to 75%, top 75%) and three different periods. The years 2005-2007 represent the pre-crisis period, 2008-2012 the two crises years, and 2013-2014 the post-crisis period. Table 5 shows the evolution of our main dependent variables: total assets, gross loans and corporate loans. Table 6 records the evolution of our main independent variables.

Table 5 shows that, overall, the growth rate of both total assets and gross loans fell in 2013- 2014 compared to the pre-crisis period, regardless of bank size. Signals of a recovery in the post-crisis period

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<sup>14</sup> The minimum Tier 1 ratio is 6%. The required amount comprehensive of the capital conservation buffer is 8.5%.

<sup>15</sup> This has contributed to the distrust towards IRB models, and investors have started to look at “RWA tweaking” as a suspicious practice (Bruno et al. 2016). The 2007-2009 Great Financial Crisis has reinforced the belief that RWAs may have helped banks disguise a rising credit bubble by keeping their stated capital ratios artificially high. Capital- constrained banks may use the IRB approach strategically to improve the capital ratios.

<sup>16</sup> We define a bank as foreign owned if in 2007 more than 50% of the bank’s shares were owned by foreigners.

are only evident for US banks, which expanded the size of their balance sheet and of their lending portfolio in 2013-2014, although at a lower pace than in the pre-crisis years. In terms of ratio to total assets, however, US banks have reduced the amount of resources allocated to lending (especially to corporate loans). The contraction of the ratio of gross loans to total assets is more remarkable for the largest banks (nearly -20% between 2005-2014), while it is the smallest banks that reduced the allocation to business loans by more (-5%).

Both bank assets and loan growth rates in European banks have dropped during the global financial crisis and Eurozone sovereign crisis, becoming negative in the post-crisis years. The loan to total asset ratio has not changed significantly, while there has been a remarkable contraction of corporate loans as a percentage of total assets.

To gain further insights on the characteristics of the banks in our sample, Table 6 shows the average composition, and its evolution over 2005-2014, of European and US bank assets and liabilities. Three main facts emerge. First, European banks have dramatically increased their exposure to sovereigns. This increase has been more accentuated in small and medium-sized banks from the Eurozone periphery. Interestingly, the largest US banks have also incremented their public bond holdings significantly (+8 percentage points), which suggests that a reallocation from gross loans (-9 percentage points, see Table 5) to sovereigns, as a percentage of total assets, has taken place. Second, the amount of bank assets financed through deposits has increased across all areas, probably as an effect of a switch from sources of funding (i.e. wholesale funds) that have proven unstable during the banking crisis. Third, both US and European banks have improved their capital position. Interestingly, as a distinctive feature, US banks tend to hold higher non-risk weighted capital ratios compared to European banks. The opposite is true if we look at the Tier 1 ratio, which is generally higher in European institutions due to lower risk-weighted asset (RWA) densities (i.e. RWA/total assets). Fourth, the loan portfolio quality of European banks has deteriorated over time, regardless of their size, as shown by the dramatic rise of impaired loans in percentage of total loans. This phenomenon seems to be driven by Eurozone periphery banks, which at the end of the period hold the highest percentage of impaired loans to total loans (17% on average, compared with the European average of nearly 10%).

#### **4. Empirical strategy**

To investigate the main drivers of bank lending in crisis years, we split our sample period into the global banking crisis (2008-2009), the Eurozone sovereign debt crisis (2010-2012) and the post-crisis years (2013-2014). The identification of the crisis period has been challenging, since there is no

consensus among academics and policymakers on the start and end dates of the subprime and Eurozone sovereign crises. Some commentators view the start of the subprime financial crisis as August 2007, when the French bank BNP Paribas froze redemptions for three investment funds (e.g., Bonaccorsi and Sette, 2012). This event was seen as the starting point of a period of instability in the interbank market both in Europe and the United States. A commonly acknowledged trigger event was, of course, the failure of Lehman Brothers in September 2008 (Ivashina and Sharfstein, 2010). Laeven and Valencia (2013), on the basis of various criteria, argue that start date of the banking crisis in the United States and the United Kingdom was 2007, while for all other European countries it was 2008. The beginning and the duration of the Eurozone sovereign crisis are also subject to debate. In December 2009, Greece saw its credit rating downgraded to the lowest level in the Eurozone as fears mounted over its deteriorating public finances. However, the first half of 2010 is commonly considered to be the starting date of the Eurozone sovereign crisis, when Greece's financial weakness became public and the ECB and IMF agreed a first bailout package to rescue the country. During 2010, the contagion spread out to other Eurozone countries (namely, Ireland) and further bailout measures were agreed by the EU and IMF. Portugal agreed to a bailout on May 2011; Spain and Italy did not become 'programme countries, but instead saw a gradual deterioration of their government bond yields (Popov and van Horen, 2013). The deterioration of economic conditions in Greece only triggered contagion in Italy in June 2011, when spreads on Italian sovereign debt rose abruptly (Bofondi et al., 2013). Using more restrictive criteria, Laven and Valencia (2013) date the start of the sovereign crisis by looking at the year of the sovereign default to private investors and the year of debt rescheduling.<sup>17</sup>

Our main interest is in whether banks that enter crisis periods with certain characteristics respond differently to the crisis shock (in terms of lending growth, volumes and composition). The identification strategy is a differences-in-differences (DiD), with multiple treatment variables defined over the pre-crisis period (2005-2007) as time-invariant dummies indicating whether a bank is in the top half of the sample in terms of a certain characteristic (e.g. *Size*). Our strategy is similar to that implemented by Popov and van Horen (2015). Specifically, we compute the cross-sectional median of several balance sheet measures, within each country, across all banks in the pre-crisis period. We define as 'treated' a bank that is above the median at least in one of the pre-crisis years.<sup>18</sup> This should

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<sup>17</sup> These criteria yield only one recent episode of sovereign debt crisis in the Eurozone, namely, Greece in 2012.

<sup>18</sup> We test whether our results are affected by alternative definition of treatments, by adding time-varying control variables, and by using an alternative measure of capitalisation (Tier 1 ratio instead of equity-to-total asset ratio). We first consider estimates from a regression where treatment variables are continuous instead of dummies. These tests confirm that our main result does not depend on how we choose treatment variables, and are robust to several controls. Estimates from robust tests are available upon request.

enable us to deal with the endogeneity issue, since we assume that the probability that a bank is above or below the median in the pre-crisis period is not affected by the ‘crisis shock’ and by the way the crisis influenced lending patterns after 2007. We estimate the following specification:

$$\begin{aligned}
&= \mathbf{BankingCrisis}(\beta_1\mathit{Size}_{bc} + \beta_2\mathit{Sovereign}_{bc} + \beta_3\mathit{Deposits}_{bc} + \beta_4\mathit{Liquidity}_{bc} + \\
&\beta_5\mathit{Equity}_{bc} + \beta_6\mathit{ForeignOwned}_{bc}) + \mathbf{SovCr}(\gamma_1\mathit{Size}_{bc} + \gamma_2\mathit{Sovereign}_{bc} + \\
&\gamma_3\mathit{Deposits}_{bc} + \gamma_4\mathit{Liquidity}_{bc} + \gamma_5\mathit{Equity}_{bc} + \\
&\gamma_6\mathit{ForeignOwned}_{bc}) + \mathbf{Post2012}_t(\theta_1\mathit{Size}_{bc} + \theta_2\mathit{Sovereign}_{bc} + \theta_3\mathit{Deposits}_{bc} + \\
&\theta_4\mathit{Liquidity}_{bc} + \theta_5\mathit{Equity}_{bc} + \theta_6\mathit{ForeignOwned}_{bc}) + \vartheta\mathit{ImpLoans}_{bct-1} + \delta_b + \lambda_t + \varepsilon_{bct} \quad (1)
\end{aligned}$$

where  $Y_{bct}$  is the dependent variable and represents, for a bank  $b$  in country  $c$ , the annual growth rate of gross (corporate) loans, the percentage of gross (corporate) loans over total assets, or the nominal level of gross (corporate) loans in local currency expressed in logarithm, in year  $t$ .

We measure the impact of the crisis on bank lending by looking at three different indicators. We first want to understand whether and to what extent the global financial crisis and the Eurozone sovereign crisis led to a credit crunch, i.e. to an actual reduction in banks loans supplied relative to the ‘normal’ supply estimated from a control period. Alternatively, banks may react to the crisis by slowing down the credit supply. We assess bank lending behaviour in the crisis years by considering both the lending volume and a measure of loan growth rate. We also ask whether credit tightening is a consequence of bank deleveraging (as expected during crisis years), or alternatively whether banks reduce (slow down) the loan supply to a greater extent than they shrink their assets. To assess this composition effect in crisis and post-crisis years, we look at the ratio of loans over total assets.

The dummy variable  $Size$  is defined at the bank level before 2008 and is time-invariant over 2005-2014. It equals one if the logarithm of total assets of bank  $b$  is above the median in at least one year between 2005 and 2007. We follow the same strategy for the identification of the dummies  $Sovereign$ ,  $Deposits$ ,  $Liquidity$  and  $Equity$ . These variables equal one if government bonds, customer deposits, cash and due from banks, and equity as a percentage of total assets, respectively, exceed the median in at least one year prior to 2008. The dummy variable  $ForeignOwned$  equals one if the bank was foreign-owned in 2007, and zero otherwise. We implement the identification strategy within each country in order to have a representative number of banks from different geographical areas in both the treated and control groups. We include bank fixed effects ( $\delta_b$ ), time fixed effects ( $\lambda_t$ ), and country-year fixed effects ( $\theta_{ct}$ ). In all specifications, we account for changes in bank portfolio quality by controlling for

the ratio of impaired loans to gross loans. The time dummy *BankingCrisis* equals one in 2008 and 2009, and zero otherwise. The country-year dummies capture differences in time-varying macro factors that are country-specific, such as changes to aggregate credit demand. *SovCrisis* is an indicator time dummy for the years 2010, 2011 and 2012. The *PostCrisis* dummy equals one in years 2013 and 2014, and zero otherwise. All variables are winsorised at the 1<sup>st</sup> and 99<sup>th</sup> percentiles to mitigate the impact of possible outliers on the estimates. All regressions include a constant. The model is estimated using OLS, and standard errors are clustered at the bank level according to Bertrand et al. (2002). The inclusion of country-year fixed effects allows us to deal with differences in the timing and in the intensity of the two crises across countries. This specification thus differences out country-specific shocks, business cycle effects and bank fixed effects. Any systematic difference between ‘treated’ and ‘non-treated’ banks in terms of our various treatment dummies is attributable to the ‘treatment’ (e.g. a difference in *Size*).

Our coefficients of interest,  $\beta_j, \gamma_j, \theta_j(j=1, \dots, 6)$ , capture the change in lending outcomes from the pre-treatment to the *BankingCrisis*, *SovCrisis* and *Post2012* years for the treatment group (affected banks in terms of different bank characteristics) relative to a control group (non-affected banks). The key identifying assumption here is that trends in the dependent variables would be the same in both the treated and control banks in the absence of treatment, and the treatment induces a deviation from this common trend. Although the treatment and control banks can differ in levels, this difference is fully captured when we include bank fixed effects.

We estimate different versions of equation (1) for banks operating in Europe and, separately, in the United States. Then we run the same regression within Eurozone countries and in periphery countries only. In the next section, we present the main results from our empirical strategy.

## 5. Main results

Tables 8 to 13 present the results of the main regressions. Overall, we find some evidence of the existence of a bank lending channel (although this is not confirmed in all specifications). This channel appears to be stronger in Europe and when we focus on corporate lending. We also find some differences between European and US banks in terms of the main bank characteristics affecting the lending channel.

Tables 8 and 9 show the results of estimating equation (1) for the logarithm of gross and corporate loans, respectively, for banks in Europe (column 1), in the United States (column 2), in the Eurozone (column 3), and in Eurozone periphery countries (column 4). In Europe (particularly in the Eurozone), lending in crisis years is better shielded in smaller banks, as well as in banks that are more capitalised (H4) and those that rely more on deposits (H1). In the United States, the most powerful driver of lending seems to be asset liquidity (H2). The bank lending channel is reinforced when we focus on corporate loans by European banks. Table 9 shows that, in line with our predictions, capitalisation and liquidity play a positive role in corporate lending only in banks from the Eurozone periphery, while the opposite is true in the larger sample of Eurozone banks. Larger exposure to sovereigns in Eurozone periphery banks seems also to have a beneficial effect on corporate loan volumes. Consistent with our prediction (H7), ownership structure is a persistent and powerful driver of bank lending in all Europe. In particular, we find that foreign ownership weakens bank lending, in particular if banks are located in stressed countries. This evidence confirms that the European banking system is fragmented and points to implications for stability from cross-border lending. Contrary to our expectations, we also find that Eurozone periphery banks that rely more on deposits contract their corporate lending more relative to banks with a less traditional funding base.

These results on the main drivers of corporate lending in the Eurozone periphery banks are confirmed when we focus on the corporate loans to total assets variable (Table 13, column 4). Looking at US banks (column 2), some of the bank characteristics that have proven ineffective in previous analyses are now significant. Consistent with the extant literature on the traditional bank lending channel (Kashyap and Stein, 2000), size and reliance on deposits are positively related to the ratio of corporate loans to total assets. In contrast, liquidity and capitalisation do not shield corporate lending in the United States, with both variables negatively correlated to the ratio of corporate loans to total assets. Interestingly, the persistent and negative nexus between the foreign ownership dummy and the corporate loan to total asset ratio is confirmed for all banks, irrespective of their location. This result confirms previous evidence on the negative impact of foreign banks on lending during the global financial crisis (Cull and Martinez Peria, 2013) and the Eurozone sovereign crisis (Popov and van Horen, 2015).

## **6. Conclusions**

This work presents a comprehensive analysis of the main drivers of bank lending in Europe and the

United States over 2008-2014. We examine how bank lending has changed from the pre-crisis period of 2005-2007 to the crisis years of 2008-2012 and the post-crisis years of 2013-2014, and how these changes have been influenced by bank specific key variables. Both crises remind us of the crucial role played by banks in supplying lending to the economy, especially in a situation of serious distress.

Our analysis confirms the existence of a bank lending channel which is stronger in Europe than in the United States, especially if we look at corporate loans rather than at the whole loan portfolio. We also find interesting differences across regions and over time in terms of the way banks adjust lending.

We uncover that the main bank characteristics affecting lending – as emerged in previous studies – are size, capitalisation, liquidity and ownership, as well as, to a lesser extent, reliance on deposits and exposure to government bonds. Some of these factors have indeed shielded bank lending as predicted, but the results are not always in the expected direction and are not confirmed across all specifications. Our findings point to the existence of a revised version of the traditional bank lending channel, where new powerful drivers of bank lending may emerge (such as bank ownership structure), suggesting that further and more comprehensive analysis is needed.

## References

- Acharya, V.V., T. Eisert, C. Eufinger and C. Hirsch (2016), “Real Effects of the Sovereign Debt Crisis in Europe: Evidence from Syndicated Loans”, RELTIF Working Paper, 5 April.
- Albertazzi, U., T. Ropele, G. Sene and F.M. Signoretti (2012), “The impact of the sovereign debt crisis on the activity of Italian banks”, Banca d'Italia Occasional Papers 133, September.
- Altavilla, C., M. Pagano and S. Simonelli (2016), “Banks exposures and sovereign stress transmission”, ESRB Working Paper Series No. 11, May.
- Altunbas, Y. and P. Molyneux (2002), “Evidence on the bank lending channel in Europe”, *Journal of Banking and Finance* 26(11), 2093-2110.
- Becker, B., and V. Ivashina (2014), “Cyclicality of Credit Supply: Firm Level Evidence”, *Journal of Monetary Economics* 62, 76-93.
- Berger, A.N. and G.F. Udell (1995), “Relationship Lending and lines of credit in small firm finance”, *Journal of Business* 68(3), 351-381.
- Bernanke, B.S. (1983), “Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression”, *American Economic Review* 73, 257- 276.
- Bernanke, B.S. and A.S. Blinder (1988), “Credit, Money, and Aggregate Demand”, *American Economic Review (Papers and Proceedings)* 78(2), 435–439
- Bertrand, M., E. Duflo and S. Mullainathan (2002), “How much should we trust differences- in-

differences estimates?”, NBER Working Paper No. 8841.

Behn, M., R. Haselmann and P. Wachtel (2016), “Pro-cyclical capital regulation and lending”, *Journal of Finance*, 71(2), 919-956.

Bofondi, M., L. Carpinelli and E. Sette (2013), “Credit supply during a sovereign debt crisis”, Banca d’Italia Working Papers, Temi di Discussione No. 909.

Bruno, B. and I. Marino (2016), “NPLS and resource allocation in crisis and post crisis years: Evidence from European banks”, in G. Bracchi, U. Filotto, and D. Masciandaro (eds), *The Changing Face of Banking: Banking Industry, Behavioural Economics, Regulation and Supervision*, 21st Report on the Italian Financial System, Fondazione Rosselli.

Bruno, B., G. Nocera and A. Resti (2016), “Are risk-based capital requirements detrimental to corporate lending? Evidence from Europe”, RELTIF Working paper, 6 December.

Cetorelli, N. and L.S. Goldberg (2012), “Banking Globalization and Monetary Transmission”, *Journal of Finance* 67(5), 1811-1843.

Claessens, Stijn and Neeltje van Horen (2012), “Foreign Banks: Trends, Impact and Financial Stability”.

Claessens, S. and N. van Horen (2014), “The Impact of the Global Financial Crisis on Banking Globalization”, IMF Working Paper No. 14/197.

Cornett, M.M., J.J. McNutt, P.E. Strahan and H. Tehranian (2011), “Liquidity risk management and credit supply in the financial crisis”, *Journal of Financial Economics* 101, 297-312.

Cukierman, A. (2016), “Global Crisis in the US vs. the Eurozone: Banks and Monetary Policy”, 16 April. Available at <http://voxeu.org/article/global-crisis-us-vs-eurozone-banks-and-monetary-policy>.

Cull, R. and M.S. Martinez Peria (2013), “Bank ownership and lending patterns during the 2008–2009 financial crisis: evidence from Latin America and Eastern Europe”. *Journal of Banking and Finance* 37(12), 4861-4878.

De Marco, F. (2016), “Bank Lending and the European Sovereign Debt Crisis”, Working Paper, 15 February. Available at SSRN: <https://ssrn.com/abstract=2673967> or <http://dx.doi.org/10.2139/ssrn.2673967>

Disyatat, P. (2011), “The Bank Lending Channel Revisited”, *Journal of Money, Credit and Banking* 43(4), 711–734.

European Commission (2015), Economic analysis accompanying the "Action plan on building a capital markets union", 30 September.

European Investment Bank (2014), *Unlocking lending in Europe*.

European Parliament (2016), *Non-Performing Loans in the Banking Union: Stocktaking and Challenges*, March 18.

- European Systemic Risk Board (2014) “Is Europe overbanked?”, Reports of the Advisory Scientific Committee, No. 4/June.
- Gambacorta, L. and D. Marques-Ibanez (2011), “The bank lending channel: lessons from the crisis”, BIS Working Paper No. 345.
- Gambacorta, L. and P.E. Mistrulli (2004), “Does bank capital affect lending behavior?”, *Journal of Financial Intermediation* 13, 436–457
- Gennaioli, N., A. Martin and S. Rossi (2014), “Banks, Government Bonds, and Default: What do the Data Say?”, IMF Working Paper No. 14/120.
- Ivashina, V., Scharfstein, D.S., and Stein, J.C. (2015). “Dollar funding and lending behavior of global banks”. *Quarterly Journal of Economics*, 130, 1241-1281.
- Ivashina, V. and D. Scharfstein (2010), “Bank lending during the financial crisis of 2008”, *Journal of Financial Economics* 97(3), 319-338.
- Jiménez, G., S. Ongena, J.L. Peydro, and J. Saurina (2012), “Credit Supply and Monetary Policy: Identifying the Bank Balance-Sheet Channel with Loan Applications”, *American Economic Review* 102, 2301-2326.
- Jiménez, G., S. Ongena, J.L. Peydro, and J. Saurina (2014), “Credit Demand Forever? On the Strengths of Bank and Firm Balance-Sheet Channels in Good and Crisis Times”, Working Paper, 28 October. Available at SSRN: <https://ssrn.com/abstract=1980139> or <http://dx.doi.org/10.2139/ssrn.1980139>
- Kapan, T. and C. Minoiu (2013), “Balance sheet strength and bank lending during the global financial crisis”, IMF Working Paper No. 13/102.
- Kashyap, A.K. and J.C. Stein (2000), “What Do a Million Observations on Banks Say about the Transmission of Monetary Policy?”, *American Economic Review* 90, 407-428
- Kishan, R.P. and T.P. Opiela (2000), “Bank size, bank capital and the bank lending channel”, *Journal of Money Credit and Banking* 32, 121-141.
- Laeven, L. and F. Valencia (2010), “Resolution of banking crisis: the good, the bad, and the ugly”, IMF Working Paper No. 10/46.
- Le Leslè, V. and S. Avramova (2012), “Revisiting risk-weighted assets. Why do RWAs differ across countries and what can be done about it?”, IMF Working Paper No. 12/90.
- Ongena, S., J.L. Peydro and N. van Horen (2015), “Shocks Abroad, Pain at Home? Bank- Firm Level Evidence on the International Transmission of Financial Shocks”, *IMF Economic Review*, 63(4), 698-750.
- Peek, J. and E.S. Rosengren (1997), “The International Transmission of Financial Shocks: The Case of Japan”, *American Economic Review* 87(4), 495–505.
- Petersen, M.A. and R.G. Rajan (1994), “The benefits of lending relationships: evidence from small

business data”, *Journal of Finance* 49, 3–37.

Popov, A. and N. van Horen (2013), “The Impact of Sovereign Debt Exposure on Bank Lending: Evidence from the European Debt Crisis”, *De Nederlandsche Bank Working Paper* No. 382.

Available at SSRN: <https://ssrn.com/abstract=2289290> or <http://dx.doi.org/10.2139/ssrn.2289290>

Popov, A. and N. van Horen (2015), “Exporting sovereign stress: Evidence from syndicated bank lending during the euro area sovereign debt crisis”, *Review of Finance* 19(5), 1825-1866.

Popov, A. and G.F. Udell (2010), “Cross-border banking and international transmission of financial distress during the crisis of 2007-2008”, ECB Working Paper No. 1203.

Romer, C.D. and D.H. Romer (1990), “New Evidence on the Monetary Transmission Mechanism”, *Brookings Papers on Economic Activity* 1, 149-213.

**Table 1: List of sample banks, by country**

The table reports, for each bank in our sample, the average total assets, gross loans, and ratio of deposits to total assets between 2005 and 2014.

Country	Bank Name	Total Assets (USD/billion)	Gross Loans (% Total Assets)	Customer Deposits (% Total Assets)
Austria	VTB Bank (Austria) AG	11,4	45	20,2
Austria	Sberbank Europe AG	15,6	72	45,2
Austria	Raiffeisenlandesbank Niederösterreich-Wien AG	35,6	34,4	25,4
Austria	Raiffeisen-Holding Niederösterreich-Wien reg.Gen.mbH	40	31,2	22,4
Austria	Raiffeisenlandesbank Oberösterreich AG	45,6	53,4	26,2
Austria	Bank für Arbeit und Wirtschaft und Österreichische Postsparkasse Aktiengesellschaft-BAWAG P.S.K. AG	57	54,6	54,4
Austria	Raiffeisen Zentralbank Oesterreich AG - RZB	184,6	54	42,4
Austria	Erste Group Bank AG	262,8	61	55,2
Belgium	Banque Degroof SA-Bank Degroof NV	8	34,8	75,4
Belgium	Argenta Spaarbank-ASPA	42,2	62,2	69
Belgium	Investar SA-Investeringsmaatschappij Argenta NV	43	52	71,2
Belgium	Belfius Banque SA/NV-Belfius Bank SA/NV	312,8	38,8	28,6
Belgium	KBC Groep NV/ KBC Groupe SA-KBC Group	406,2	47	44,8
Belgium	Dexia SA	634,4	49,8	13
Denmark	Sydbank A/S	25,4	56	45,2
Denmark	Nykredit Bank A/S	33,6	30,4	25,6
Denmark	Jyske Bank A/S (Group)	40,6	55	45,2
Denmark	Danske Bank A/S	574	55,2	25
Finland	Danske Bank Plc	36,8	74	51,6
Finland	OP-Pohjola Group-OP Osuuskunta	109,4	66,8	48,2
Finland	Nordea Bank Finland Plc	334,2	33,2	22,4
France	RCI Banque SA	35,4	92,2	12
France	La Banque Postale	221,8	24,2	80,8
France	Fédération du Crédit Mutuel	590	50,4	36,4
France	Société Générale SA	1484	31,8	25,2
France	BPCE Group	1499,4	49,2	34,8
France	Crédit Agricole S.A.	2005,6	21,6	29
France	BNP Paribas SA	2395,8	31	25
Germany	IKB Deutsche Industriebank AG	35,2	70,8	19,2
Germany	Münchener Hypothekenbank eG	46,4	67,2	28,4
Germany	Deutsche Apotheker- und Aertztebank eG	49,2	67,4	46,4
Germany	HASPA Finanzholding	52,8	65,6	67,2
Germany	Aareal Bank AG	55,8	60,4	23,2
Germany	SEB AG	63,2	47,4	42,4
Germany	Landeskreditbank Baden-Wuerttemberg - Förderbank-L-Bank	85,4	37,6	11,2
Germany	Volkswagen Financial Services AG	90,6	85,4	34,2
Germany	Erwerbsgesellschaft der S- Finanzgruppe mbH & Co. KG	104	46	40,8
Germany	WGZ-Bank AG Westdeutsche Genossenschafts-Zentralbank	124,4	35,8	20,8
Germany	DekaBank Deutsche Girozentrale AG	163,2	19	20,6
Germany	Landesbank Berlin AG	169,8	34,8	27,6
Germany	HSH Nordbank AG	214,8	60,4	29,8
Germany	Landesbank Hessen-Thueringen Girozentrale - HELABA	236,4	49,2	24
Germany	Norddeutsche Landesbank Girozentrale NORD/LB	294,6	48,6	25,2
Germany	Hypo Real Estate Holding AG	317,8	43,2	10,4
Germany	Bayerische Landesbank	441,8	49	28,2
Germany	Landesbank Baden-Wuerttemberg	505,2	34,4	22,8

Germany	DZ Bank AG-Deutsche Zentral-Genossenschaftsbank	548,8	28,6	21,2
Germany	Commerzbank AG	845,8	41,8	31,4
Germany	Deutsche Bank AG	2416,4	18	26,6
Greece	Piraeus Bank SA	76	72,2	53
Greece	Alpha Bank AE	82,2	77,4	55,6
Greece	Eurobank Ergasias SA	96,4	67,6	48,2
Greece	National Bank of Greece SA	134,2	65,2	61,8
Ireland	Permanent Tsb Group Holdings P.L.C	48	87	48,6
Ireland	Ulster Bank Ireland Limited	63,2	81,8	45,6
Ireland	Allied Irish Banks plc	195,8	68,8	48
Ireland	Bank of Ireland-Governor and Company of the Bank of Ireland	223,8	68,2	45,8
Italy	Banca Piccolo Credito Valtellinese-Credito Valtellinese Soc Coop	31,4	79,8	55,4
Italy	Banca Popolare di Sondrio Societa Cooperativa per Azioni	33,4	75,8	70,8
Italy	Iccrea Holding SpA	35	43,8	11,8
Italy	Veneto Banca scpa	35,4	76,2	43,6
Italy	Credito Emiliano SpA-CREDEM	38,2	63,2	44,2
Italy	Banca Popolare di Vicenza Societa cooperativa per azioni	46,4	73,4	41,4
Italy	Banca Carige SpA	47,8	61,2	36,4
Italy	Banca Popolare di Milano SCaRL	62,4	70	45,8
Italy	Banca popolare dell'Emilia Romagna	73,8	79,6	53,4
Italy	Mediobanca SpA-MEDIOBANCA - Banca di Credito Finanziario Societa per Azioni	91,2	52	16,2
Italy	Unione di Banche Italiane Scpa-UBI Banca	164,6	75,8	38,8
Italy	Banco Popolare - Societa Cooperativa-Banco Popolare	173,6	67,8	37,2
Italy	Banca Monte dei Paschi di Siena SpA-Gruppo Monte dei Paschi di Siena	267,4	67,6	34,4
Italy	Intesa Sanpaolo	826,4	59	33,8
Italy	UniCredit SpA	1216,6	59,8	38,6
Luxembourg	UBS (Luxembourg) SA	15	18,2	75,2
Luxembourg	Banque et Caisse d'Epargne de l'Etat Luxembourg	53,4	37,8	59,4
Netherlands	Nederlandse Waterschapsbank NV	58,6	80,6	10,8
Netherlands	SNS Reaal NV	162,2	53,6	29,4
Netherlands	ABN AMRO Group N.V.	515	70,6	52
Netherlands	Cooperatieve Centrale Raiffeisen-Boerenleenbank B.A-Rabobank Nederland	845,6	66,4	44,6
Netherlands	ING Groep NV	1600	46,4	41
Portugal	Banco BPI SA	55,6	66,4	51,6
Portugal	Novo Banco	79,4	61,2	42,6
Portugal	Banco Comercial Português, SA-Millennium bcp	117	75,8	50,4
Portugal	Caixa Geral de Depositos	146,6	66,2	55,2
Spain	Cajas Rurales Unidas Sociedad Cooperativa de Crédito	47,8	86,8	66
Spain	Unicaja Banco SA	52,2	58,2	54
Spain	Liberbank SA	56,6	72,8	55,4
Spain	Ibercaja Banco SAU	68	67,2	54,4
Spain	Bankinter SA	70,6	74,8	34,4
Spain	Banco Mare Nostrum Group	72,2	61	65,2
Spain	Abanca Corporacion Bancaria SA	77,8	58,4	52,4
Spain	Kutxabank SA	83,4	77,4	59,6
Spain	Catalunya Banc SA	87	55,6	50,2
Spain	Banco de Sabadell SA	139,8	77,4	47,8
Spain	Banco Popular Espanol SA	162	78	42
Spain	BFA Tenedora de Acciones SAU	407	59,8	38,8

Spain	Caixabank, S.A.	411	64,6	46,8
Spain	Banco Bilbao Vizcaya Argentaria SA	719,2	60	42,8
Spain	Banco Santander SA	1435	60	40
Sweden	Swedbank AB	245	68,4	29,8
Sweden	Svenska Handelsbanken	311,8	66,6	28,6
Sweden	Skandinaviska Enskilda Banken AB	330,4	49	33,6
Sweden	Nordea Bank AB (publ)	707	53,6	31,6
United Kingdom	Nationwide Building Society	292,4	82,4	68,6
United Kingdom	Standard Chartered Plc	487,6	46,8	58
United Kingdom	Lloyds Banking Group Plc	1090,6	58,6	44
United Kingdom	Royal Bank of Scotland Group Plc (The)	2043,8	41	36,2
United Kingdom	Barclays Bank Plc	2234,2	29,2	25,2
United Kingdom	HSBC Holdings Plc	2359	40,6	48,8
United States	Huntington Bancshares Inc	51,8	74	75,4
United States	Zions Bancorporation	52,2	72,4	78,6
United States	Comerica Incorporated	61,4	74,6	75,6
United States	M&T Bank Corporation	72,2	75	71,8
United States	MUFG Americas Holdings Corporation	79,8	65	75,8
United States	BMO Financial Corp	82,4	48,4	55,8
United States	Northern Trust Corporation	84	33,4	77,4
United States	KeyCorp	94	65,6	68,4
United States	Fifth Third Bancorp	117	71	71
United States	Regions Financial Corporation	125,8	65,4	72,6
United States	American Express Company	140,8	39	21
United States	Citizens Financial Group Inc.	142,8	68	68,2
United States	BB&T Corporation	156,6	66,2	68,6
United States	Ally Financial Inc	169	65,6	27,2
United States	SunTrust Banks, Inc.	179,4	71,2	70
United States	State Street Corporation	179,6	12,4	67
United States	Capital One Financial Corporation	210,8	64,4	63,4
United States	PNC Financial Services Group Inc	234,2	57,8	67,2
United States	Bank of New York Mellon Corporation	292,4	16,6	65,6
United States	US Bancorp	298,2	66,6	64,4
United States	Wells Fargo & Company	1110,2	64,2	67
United States	Citigroup Inc	1873,6	35,2	44
United States	Bank of America Corporation	1932	45,8	48,6
United States	JPMorgan Chase & Co	2005,2	32,6	48,4

**Table 2: Sample description by country and bank type, 2013**

The table reports, for each country, the total amount of total assets and gross loans by bank type in 2013.

Country	Specialization	Total Assets (USD/billion)	Gross Loans (USD billion)
AUSTRIA	Cooperative Banks	91.7	43.7
AUSTRIA	Commercial Banks	77.8	47.6
AUSTRIA	Bank Holding & Holding Companies	516.9	315.7
BELGIUM	Commercial Banks	259.2	122.6
BELGIUM	Savings Bank	40.7	28.2
BELGIUM	Bank Holding & Holding Companies	636.7	352.5
DENMARK	Commercial Banks	713.3	347.9
FINLAND	Cooperative Banks	139.3	94.6
FINLAND	Commercial Banks	457.1	185.1
FRANCE	Cooperative Banks	2796.9	820.8
FRANCE	Commercial Banks	4489.8	1496.7
FRANCE	Bank Holding & Holding Companies	1549.5	792.1
GERMANY	Bank Holding & Holding Companies	91.7	47.3
GERMANY	Specialized Governmental Credit Institution	1789.6	812.8
GERMANY	Investment Banks	33.2	19.2
GERMANY	Finance Companies (Credit Card. Factoring & Leasing)	229.4	151.7
GERMANY	Commercial Banks	3024.1	857.7
GERMANY	Cooperative Banks	704.7	253.7
GERMANY	Real Estate & Mortgage Bank	107.2	72.5
GREECE	Commercial Banks	488.5	370.4
IRELAND	Bank Holding & Holding Companies	44.1	37.5
IRELAND	Commercial Banks	385.7	287.7
ITALY	Investment Banks	96.2	45.6
ITALY	Bank Holding & Holding Companies	63.7	16.2
ITALY	Cooperative Banks	695	504.4
ITALY	Commercial Banks	2406.4	1469.9
LUXEMBOURG	Savings Bank	56.1	23.6
LUXEMBOURG	Commercial Banks	11.6	2.1
NETHERLANDS	Bank Holding & Holding Companies	1642.8	805.2
NETHERLANDS	Cooperative Banks	922.8	626
NETHERLANDS	Specialized Governmental Credit Institution	100.7	83.7
NETHERLANDS	Commercial Banks	513.1	361.3
PORTUGAL	Commercial Banks	349	234.5
PORTUGAL	Bank Holding & Holding Companies	59.1	37.1
SPAIN	Commercial Banks	1806.3	1126.2
SPAIN	Savings Bank	584.8	316.3
SPAIN	Bank Holding & Holding Companies	53.3	30.2
SWEDEN	Commercial Banks	773.6	452.4
SWEDEN	Savings Bank	284	190.1
SWEDEN	Bank Holding & Holding Companies	869.4	422.1
UK	Commercial Banks	2213.8	727.1
UK	Bank Holding & Holding Companies	6425.8	2824.9
UK	Real Estate & Mortgage Bank	316	279.3
US	Bank Holding & Holding Companies	11236.2	4953.1

**Table 3: Sample representativeness**

The table provides sample representativeness for our sample of Eurozone (Panel A) and US banks (Panel B). The table shows the total amount of total assets of our sample banks (column 1) compared to those reported in the BSI and Fed statistics (columns 2) between 2005 and 2012. Column 3 reports our sample's main assets as a percentage of the same variables in the consolidated data reported in the BSI statistics of the ECB and in the Fed statistics for large commercial banks in the United States.

<b>A: Eurozone</b>			
Year	Total assets (€billion)		(%)
	Sample (1)	ECB (2)	
2005	12,047	17,863	.67
2006	16,729	19,700	.85
2007	19,293	22,352	.86
2008	22,495	24,066	.93
2009	21,542	23,814	.90
2010	22,639	25,768	.88
2011	23,334	26,685	.87
2012	22,933	26,214	.87
2013	19,807	24,594	.81
2014	21,125	25,875	.82
<b>B: United States</b>			
Year	Total assets (\$ billion)		(%)
	Sample (1)	FED (2)	
2005	6,132	8,179	.75
2006	6,761	9,183	.74
2007	8,307	10,218	.81
2008	8,255	11,429	.72
2009	10,041	11,034	.91
2010	10,305	11,281	.91
2011	10,529	11,862	.88
2012	11,134	12,615	.88
2013	11,236	12,935	.87
2014	11,725	13,768	.85

**Table 4: Descriptive statistics**

The table reports summary statistics between 2005 and 2014 of the main variables used in the empirical analysis. Panel A reports statistics on European banks, Panel B on US banks, Panel C on banks from Eurozone countries, and Panel D on banks in Eurozone periphery countries.

Panel A: Europe							
	Mean (1)	Min (2)	P50 (3)	P75 (4)	Max (5)	St.Dev. (6)	N.Obs (7)
Growth of Total Assets (annual % change)	3.59	-47.95	2.42	9.95	67.18	13.39	851
Growth of Gross Loans (annual % change)	4.09	-64.59	2.31	10.92	91.62	14.34	851
Growth of Corporate Loans (annual % change)	2.85	-91.25	0.27	10.63	99.09	21.06	289
Total Assets (LCU/billion)	400.76	5.75	115.21	382.62	3343.88	669.44	959
Gross Loans (LCU/billion)	196.34	1.77	66.34	173.94	1839.59	344.48	959
Corporate Loans (LCU/billion)	122.52	0.06	31.83	91.60	1383.81	248.91	365
Gross Loans/TA (%)	56.74	12.31	59.63	69.81	92.38	17.99	959
Corporate Loans/TA (%)	24.47	0.14	23.90	34.42	60.78	14.95	365
Corporate Loans/Gross Loans (%)	44.43	0.00	45.52	60.65	100.00	25.79	365
Government Bonds/TA (%)	7.13	0.01	6.00	9.96	25.06	5.79	768
Total Customer Dep/TA (%)	39.79	5.20	39.42	50.69	82.74	16.52	953
Cash and Due from Banks/TA (%)	2.08	0.06	1.29	2.73	10.26	2.18	959
Total Equity/TA (%)	5.45	0.68	5.04	7.03	15.05	2.64	959
Impaired Loans/GL (%)	5.99	0.09	3.92	7.37	34.18	6.45	806
Tier 1 Capital Ratio (%)	10.68	5.45	10.10	12.70	22.10	3.33	865
Foreign Owned (%)	0.07	0.00	0.00	0.00	1.00	0.26	1045

Panel B: US							
	Mean (1)	Min (2)	P50 (3)	P75 (4)	Max (5)	St.Dev. (6)	N.Obs (7)
Growth of Total Assets (annual % change)	5.51	-27.85	4.21	10.18	54.82	10.66	205
Growth of Gross Loans (annual % change)	4.84	-42.22	3.56	8.34	84.01	14.02	205
Growth of Corporate Loans (annual % change)	2.54	-91.01	6.52	13.82	45.63	19.39	193
Total Assets (LCU/billion)	412.36	32.76	142.32	269.86	2573.13	644.71	229
Gross Loans (LCU/billion)	185.52	6.48	75.66	139.49	975.50	255.36	229
Corporate Loans (LCU/billion)	59.82	1.64	31.03	55.84	348.39	74.51	217
Gross Loans/TA (%)	56.36	12.31	64.41	70.43	81.78	18.73	229
Corporate Loans/TA (%)	22.81	0.43	21.70	29.59	63.02	14.21	217
Corporate Loans/Gross Loans (%)	39.05	2.78	35.85	45.40	88.71	17.94	217
Government Bonds/TA (%)	10.81	0.02	12.35	15.70	25.06	6.93	177
Total Customer Dep/TA (%)	63.59	10.28	67.92	73.76	82.74	15.16	229
Cash and Due from Banks/TA (%)	2.23	0.30	1.84	2.68	8.17	1.24	229
Total Equity/TA (%)	10.02	3.66	9.77	11.19	15.05	2.21	229
Impaired Loans/GL (%)	1.86	0.09	1.51	2.81	7.29	1.48	224
Tier 1 Capital Ratio (%)	11.29	6.80	11.50	12.60	20.50	2.45	225
Foreign Owned (%)	0.09	0.00	0.00	0.00	1.00	0.28	235

Panel C: Euro area

	Mean (1)	Min (2)	P50 (3)	P75 (4)	Max (5)	St.Dev. (6)	N.Obs (7)
Growth of Total Assets (annual % change)	3.23	-47.95	2.04	9.48	60.98	13.35	729
Growth of Gross Loans (annual % change)	4.09	-64.59	2.34	11.32	91.62	14.64	729
Growth of Corporate Loans (annual % change)	2.80	-91.25	0.13	10.54	99.09	22.58	227
Total Assets (LCU/billion)	245.38	5.75	80.43	232.50	2202.41	391.98	823
Gross Loans (LCU/billion)	111.91	1.77	48.60	119.64	750.56	149.72	823
Corporate Loans (LCU/billion)	38.68	0.06	25.46	57.26	248.78	44.66	291
Gross Loans/TA (%)	57.46	12.31	60.70	70.60	92.38	18.33	823
Corporate Loans/TA (%)	24.83	0.14	24.57	37.31	60.78	16.28	291
Corporate Loans/Gross Loans (%)	44.32	0.00	44.47	64.10	100.00	28.07	291
Government Bonds/TA (%)	7.68	0.01	6.71	10.78	25.06	5.94	655
Total Customer Dep/TA (%)	39.97	5.20	39.81	51.12	82.74	17.01	817
Cash and Due from Banks/TA (%)	1.94	0.06	1.26	2.47	10.26	2.03	823
Total Equity/TA (%)	5.57	0.68	5.24	7.42	15.05	2.79	823
Impaired Loans/GL (%)	6.58	0.23	4.30	7.94	34.18	6.80	670
Tier 1 Capital Ratio (%)	10.49	5.45	10.00	12.30	22.10	3.21	730
Foreign Owned (%)	0.08	0.00	0.00	0.00	1.00	0.28	909

Panel D: Euro-Periphery

	Mean (1)	Min (2)	P50 (3)	P75 (4)	Max (5)	St.Dev. (6)	N.Obs (7)
Growth of Total Assets (annual % change)	4.90	-29.98	3.21	11.04	60.98	13.77	309
Growth of Gross Loans (annual % change)	4.86	-39.08	1.77	12.89	69.28	14.84	309
Growth of Corporate Loans (annual % change)	3.65	-91.25	0.08	13.62	60.16	21.83	99
Total Assets (LCU/billion)	159.07	8.91	65.17	130.92	1269.63	241.56	351
Gross Loans (LCU/billion)	101.79	6.82	46.67	94.90	750.56	143.48	351
Corporate Loans (LCU/billion)	33.90	0.06	26.60	35.29	248.78	39.37	130
Gross Loans/TA (%)	68.68	23.70	68.98	76.00	92.38	10.42	351
Corporate Loans/TA (%)	27.25	0.14	30.60	37.81	60.78	16.91	130
Corporate Loans/Gross Loans (%)	39.62	0.00	45.36	55.83	100.00	23.98	130
Government Bonds/TA (%)	8.95	0.01	7.91	12.73	25.06	5.82	327
Total Customer Dep/TA (%)	45.62	5.20	45.04	54.10	78.56	12.73	350
Cash and Due from Banks/TA (%)	1.99	0.11	1.43	2.53	9.33	1.63	351
Total Equity/TA (%)	6.52	0.68	6.29	7.85	15.05	2.55	351
Impaired Loans/GL (%)	8.98	0.27	5.88	12.54	34.18	8.05	342
Tier 1 Capital Ratio (%)	9.38	5.45	9.00	11.00	17.90	2.36	332
Foreign Owned (%)	0.05	0.00	0.00	0.00	1.00	0.21	410

**Table 5: Average bank characteristics between 2005 and 2014, by period and geographical area: dependent variables**

	EUROPE			2005-2007	US		2005-2007	EURO area			Euro-Periphery	
	2005-2007	2008-2012	2013-2014		2008-2012	2013-2014		2008-2012	2013-2014	2005-2007	2008-2012	2013-2014
<b>Growth Total Assets (%)</b>												
≤p25	11.2	6	-4.3	16.3	2.1	4.8	10.9	7	-5.4	17	10.8	-6
P25-p75	10.8	4.3	-1.3	9.4	3.1	3	9.5	4.1	-1.8	15	5.7	-5
>p75	11.8	.5	-3	13.4	7.1	3.5	11.5	.1	-3.4	11.2	1.6	-2.3
<b>Growth Gross Loans (%)</b>												
≤p25	12.6	6.3	-4.4	18.5	1.4	3.6	12.9	7.9	-5.5	19.5	9	-7.7
P25-p75	10.6	3.8	-8	12.6	1	4.1	9.1	3.8	-1.1	18.6	4.4	-1.5
>p75	17.6	1	-1.7	13.5	4.1	3.1	19.1	1.3	-2	18.7	.8	-2.9
<b>Growth Corporate Loans (%)</b>												
≤p25	10.9	6.8	-2.1	11.1	-2	.8	7.8	10.2	-2.7	15.6	.3	-1.2
P25-p75	14.1	1.5	.3	5.2	2.5	4.8	14	.5	1	26.3	-1.5	6.6
>p75	17.7	-3	.7	6.6	2.5	-4.9	19.7	-3.5	.1	21.3	-8.9	4.3
<b>Total Assets (LCU/billion)</b>												
≤p25	52.3	70.2	76.6	47	60.3	74.2	38.4	40.6	59	40.7	50.5	52.4
P25-p75	186.1	218.5	308.3	105.7	132.5	175.4	153.9	197.9	240.9	73.8	83.9	112.7
>p75	744.2	920	846	1034.3	1088.8	1471.6	662.3	765	719	437.5	555.5	503.2
<b>Gross Loans (LCU/billion)</b>												
≤p25	30.3	51.7	50.2	34.1	44.8	50.9	23.5	29.9	35.7	28.2	38.8	37.8
P25-p75	96.8	117.3	157	62.9	70.8	97.1	74.4	105.1	126.9	52.4	61.5	73
>p75	297.9	381.7	348.6	454	457.8	580.6	261.6	331.3	305.8	263.4	348.4	304.6
<b>Corporate Loans (LCU/billion)</b>												
≤p25	22.5	11.1	15.4	19.6	24.3	24.1	12.9	2.7	8.6	22.5	.5	14.8
P25-p75	71	71.2	64.1	25.8	26	35.5	48.4	57.2	46.1	42.9	23.8	23.1
>p75	112.4	130.5	115.9	132	127.8	182.2	86.6	67.5	62.1	102.5	62.9	41.9
<b>Gross Loans/TA (%)</b>												
≤p25	65.1	69.7	65.4	72.6	74	69.1	65.9	70.2	65.1	69.4	77.6	71.1
p25-p75	56.8	57.9	56.1	59.8	54.4	56.6	56.1	58.7	57.8	69.4	71.9	64.8
>p75	48.4	49.8	50.5	50.3	46.7	40.2	48.3	51.2	52.2	62	65.6	64.1
<b>Corporate Loans/TA (%)</b>												
≤p25	31.5	12	16.7	41.6	41	33.4	33.7	11.1	16.8	38.4	.8	18.6
p25-p75	33.9	28.2	22.9	26.2	20	20.7	36	28.6	23	45.9	28.4	20.4
>p75	28	21.8	16.9	17.6	13.1	12.4	28.5	22.1	16.3	30	26	17.7

**Table 6: Average bank characteristics between 2005 and 2014, by period and geographical area: independent variables**

	EUROPE			US			EURO area			Euro-Periphery		
	2005-2007	2008-2012	2013-2014	2005-2007	2008-2012	2013-2014	2005-2007	2008-2012	2013-2014	2005-2007	2008-2012	2013-2014
<b>Sovereign (% TA)</b>												
≤p25	5	4.6	9.8	7.4	8.8	9.4	5	5.1	10.9	5.2	6.3	14.4
P25-p75	5.2	7.4	9.8	6.7	10.7	7.1	6	7.9	10.6	5.2	8.6	14.7
>p75	5.5	7.4	10.7	8	14.9	15.9	5.9	7.7	10.9	7	8.4	13.5
<b>Deposits (% TA)</b>												
≤p25	37.6	43.8	53.9	74	75.7	79.4	36.5	43.1	54.4	40.8	55.2	57.4
P25-p75	39.3	40.7	40.9	61.5	62.2	66.8	39.1	41	40.8	45	44.8	46.5
>p75	35.1	35.5	39	51.3	58.7	61.2	35.3	36.2	39.9	42.8	42.5	47
<b>Liquidity (% TA)</b>												
≤p25	1.9	2.5	2.2	3.7	2	1.5	1.8	2.5	2.1	1.6	1.3	1.5
P25-p75	1.3	1.9	2.6	3	1.8	1.6	1.3	1.7	2	2	1.7	1.8
>p75	1.6	2.5	3.1	2.8	2.2	2.5	1.8	2.4	3	2.4	2.7	3.1
<b>Equity (% TA)</b>												
≤p25	6.3	6.1	6.6	9.3	9.5	10.7	6.3	6.4	6.7	6.2	6.5	7.4
P25-p75	5.6	5.4	6	9.7	10.1	11.6	6	5.5	6.1	7.8	6.4	6.8
>p75	5	4.4	5.3	8.6	10.1	9.9	5.1	4.5	5.3	6.5	5.6	6.3
<b>Tier1 (Capital Ratio)</b>												
≤p25	9.8	10.7	13.8	8.3	11.2	12	9.9	9.9	12.2	8.1	9.3	12.1
P25-p75	8.5	10.6	13.1	8.9	12.7	12.6	8.5	10.4	10.7	8.3	9	11.2
>p75	8.1	10.9	13.2	8.3	11.9	12.7	8.2	10.7	9.6	7.8	9.4	11.8
<b>ImpLoans (% GL)</b>												
≤p25	2.5	6.5	10.9	.6	2.6	1.4	2.6	8.3	13.2	2.6	9.2	18.1
p50-p75	2.7	6.1	9.8	.5	2.6	1.7	3.3	6.4	12.8	2.6	8.5	16.9
>p75	2.5	6	8.7	.4	2.5	2.6	2.7	6.3	12.9	3	9	15.8
<b>Foreign Owned (%)</b>												
≤p25	.2	.1	.2	.3	0	0	.2	.1	.2	.3	0	.2
p25-p75	.1	.1	0	.1	.2	.2	.1	.1	0	0	.1	0
>p75	0	0	0	0	0	0	0	0	0	0	0	0

**Table 7: Bank characteristics and lending: A correlation analysis**

<b>Dep. Var. Log Gross Loans</b>				
	(1)	(2)	(3)	(4)
	Europe	US	Eurozone	Eurozone
Size	0.725*** (0.067)	0.722*** (0.110)	0.690*** (0.074)	0.692*** (0.089)
Sovereign	-0.004** (0.002)	-0.006* (0.003)	-0.004* (0.002)	-0.005* (0.003)
Deposits	0.004 (0.002)	0.003 (0.004)	0.003 (0.003)	0.002 (0.003)
Liquidity	-0.007 (0.007)	-0.023 (0.019)	-0.012** (0.006)	-0.014* (0.007)
Equity	0.023*** (0.006)	0.015 (0.010)	0.021*** (0.006)	0.021*** (0.006)
Impaired Loans	-0.003 (0.004)	-0.013 (0.015)	-0.002 (0.004)	0.000 (0.004)
Constant	6.213*** (1.772)	6.364** (3.000)	7.006*** (1.985)	6.970*** (2.346)
Observations	570	149	472	279
Mean	25.28	25.36	25	24.80
St. Dev.	1.256	1.123	1.090	0.987
Adjusted R-squared	0.735	0.618	0.746	0.767

<b>Dep. Var. Log Corporate Loans</b>				
	(1)	(2)	(3)	(4)
	Europe	US	Eurozone	Eurozone
Size	0.433 (0.296)	-0.274 (0.430)	0.418 (0.415)	0.800** (0.297)
Sovereign	-0.008 (0.010)	-0.016* (0.009)	-0.012 (0.012)	-0.020** (0.008)
Deposits	-0.003 (0.007)	-0.001 (0.009)	-0.002 (0.008)	-0.003 (0.005)
Liquidity	-0.012 (0.013)	-0.025 (0.036)	-0.014 (0.022)	-0.075*** (0.021)
Equity	0.011 (0.013)	-0.021 (0.032)	0.010 (0.015)	0.001 (0.015)
Impaired Loans	-0.022 (0.014)	0.044* (0.025)	-0.016 (0.015)	-0.045*** (0.014)
Constant	13.393* (7.743)	31.987** (11.829)	13.196 (10.643)	4.423 (7.552)
Observations	214	142	163	86
Mean	24.56	24.32	24.01	23.80
St. Dev.	1.641	1.083	1.327	1.234
Adjusted R-squared	0.851	0.0959	0.864	0.939

**Table 8: The effect of bank characteristics on gross loans**

The dependent variable is the logarithm of gross loans (LCU/billion). The variable BankingCrisis is a time dummy equal to one in 2008 and 2009, the dummy SovCrisis equals one between 2010 and 2012, Post2012 is a dummy equal one in 2013 and 2014. Each treatment variable (Size, Sovereign, Deposits, Liquidity, Equity, ForeignOwned) is a time-invariant dummy zero/one indicating whether the bank was below/above the median of a certain characteristic in the pre-crisis period (2005-2007). We control for bank FEs, year FEs, and country-year FEs. Robust standard errors, clustered at bank-level, in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

	Europe (1)	US (2)	Euro area (3)	Euro-Periphery (4)
BankingCrisis*Size	-0.043 (0.052)	0.271 (0.280)	0.036 (0.046)	-0.058 (0.037)
SovCrisis*Size	-0.198*** (0.056)	0.315 (0.293)	-0.105** (0.048)	-0.203*** (0.054)
Post2012*Size	-0.328*** (0.062)	0.323 (0.311)	-0.246*** (0.069)	-0.329*** (0.062)
BankingCrisis*Sovereign	0.014 (0.054)	-0.045 (0.223)	-0.010 (0.047)	0.060 (0.040)
SovCrisis*Sovereign	0.056 (0.069)	0.298 (0.234)	0.048 (0.062)	0.095 (0.061)
Post2012*Sovereign	0.125 (0.078)	0.322 (0.247)	0.109 (0.084)	0.040 (0.074)
BankingCrisis*Deposits	-0.018 (0.050)	0.197 (0.294)	0.042 (0.046)	0.018 (0.034)
SovCrisis*Deposits	0.058 (0.055)	0.146 (0.293)	0.125** (0.050)	0.097* (0.053)
Post2012*Deposits	0.122* (0.062)	0.117 (0.304)	0.172*** (0.062)	0.163*** (0.051)
BankingCrisis*Liquidity	-0.022 (0.055)	0.377** (0.147)	0.062 (0.051)	0.073* (0.038)
SovCrisis*Liquidity	0.002 (0.059)	0.480*** (0.154)	0.077 (0.062)	0.063 (0.048)
Post2012*Liquidity	0.035 (0.069)	0.505*** (0.160)	0.116 (0.088)	0.107* (0.054)
BankingCrisis*Equity	-0.010 (0.051)	0.033 (0.275)	0.041 (0.045)	0.085** (0.037)
SovCrisis*Equity	0.017 (0.064)	0.347 (0.286)	0.088 (0.055)	0.134** (0.062)
Post2012*Equity	-0.062 (0.071)	0.405 (0.295)	0.002 (0.070)	0.029 (0.072)
BankingCrisis*ForeignOwned	-0.082 (0.081)	0.056 (0.228)	0.021 (0.071)	0.003 (0.077)
SovCrisis*ForeignOwned	-0.019 (0.118)	-0.203 (0.232)	0.094 (0.112)	-0.068 (0.136)
Post2012*ForeignOwned	-0.156 (0.145)	-0.044 (0.244)	-0.055 (0.140)	-0.285** (0.122)
Impaired Loans	0.004 (0.006)	-0.054** (0.021)	0.003 (0.005)	0.006 (0.005)
Controls:				
Bank FEs	yes	yes	yes	yes
Time FEs	yes	yes	yes	yes
Country-year FEs	yes	yes	yes	yes
Observations	607	147	497	271
Mean Outcome (PreCrisis)	25.25	25.53	24.95	24.78
St. Dev. Outcome (Pre-Crisis)	1.256	1.157	1.054	0.991
Adjusted R-squared	0.515	0.689	0.529	0.739

**Table 9: The effect of bank characteristics on corporate loans**

The dependent variable is the logarithm of corporate loans (LCU/billion). The variable BankingCrisis is a time dummy equal to one in 2008 and 2009, the dummy SovCrisis equals one between 2010 and 2012, Post2012 is a dummy equal one in 2013 and 2014. Each treatment variable (Size, Sovereign, Deposits, Liquidity, Equity, ForeignOwned) is a time-invariant dummy zero/one indicating whether the bank was below/above the median of a certain characteristic in the pre-crisis period (2005-2007). We control for bank FEs, year FEs, and country-year FEs. Robust standard errors, clustered at bank-level, in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

	Europe (1)	US (2)	Euro area (3)	Euro-Periphery (4)
BankingCrisis*Size	-0.254 (0.169)	0.447 (0.341)	-0.589*** (0.189)	-6.713*** (0.343)
SovCrisis*Size	-0.270* (0.144)	0.571 (0.348)	-0.587*** (0.173)	-6.025*** (0.259)
Post2012*Size	-0.559*** (0.183)	0.434 (0.402)	-1.398*** (0.135)	-5.904*** (0.221)
BankingCrisis*Sovereign	0.064 (0.157)	0.162 (0.286)	0.374** (0.153)	6.587*** (0.348)
SovCrisis*Sovereign	0.068 (0.121)	0.090 (0.253)	0.376* (0.191)	5.762*** (0.246)
Post2012*Sovereign	0.092 (0.160)	0.168 (0.269)	0.572*** (0.102)	5.086*** (0.186)
BankingCrisis*Deposits	0.105 (0.111)	0.328 (0.332)	0.087 (0.104)	-3.831*** (0.287)
SovCrisis*Deposits	0.176 (0.112)	0.482 (0.336)	0.217* (0.121)	-4.183*** (0.185)
Post2012*Deposits	0.421*** (0.140)	0.620 (0.397)	0.363*** (0.109)	-4.155*** (0.180)
BankingCrisis*Liquidity	-0.099 (0.164)	0.519* (0.245)	-0.113 (0.098)	3.785*** (0.278)
SovCrisis*Liquidity	-0.124 (0.176)	0.378* (0.190)	-0.341*** (0.121)	4.071*** (0.194)
Post2012*Liquidity	-0.093 (0.229)	0.251 (0.219)	-0.390*** (0.102)	4.131*** (0.173)
BankingCrisis*Equity	-0.339* (0.181)	-0.099 (0.338)	-0.746*** (0.199)	2.293*** (0.209)
SovCrisis*Equity	-0.199 (0.177)	-0.280 (0.359)	-0.651*** (0.195)	2.853*** (0.071)
Post2012*Equity	-0.419 (0.252)	-0.196 (0.388)	-1.576*** (0.160)	2.977*** (0.074)
BankingCrisis*ForeignOwned	-0.909** (0.369)	-0.262 (0.249)	-1.668*** (0.370)	-4.682*** (0.463)
SovCrisis*ForeignOwned	-0.793** (0.351)	-0.302 (0.198)	-1.677*** (0.230)	-3.658*** (0.229)
Post2012*ForeignOwned	-1.489*** (0.502)	-0.166 (0.283)	-3.612*** (0.179)	-3.569*** (0.184)
Impaired loans	-0.015 (0.009)	-0.002 (0.036)	-0.006 (0.008)	-0.008 (0.008)
Controls:				
Bank FEs	yes	yes	yes	yes
Time FEs	yes	yes	yes	yes
Country-year FEs	yes	yes	yes	yes
Observations	186	138	136	84
Mean Outcome (PreCrisis)	24.80	24.54	24.34	24.33
St. Dev. Outcome (Pre-Crisis)	1.226	0.883	0.822	0.828
Adjusted R-squared	0.912	0.176	0.955	0.984

**Table 10: The effect of bank characteristics on growth of gross loans**

The dependent variable is the annual growth rate of gross loans (%). The variable BankingCrisis is a time dummy equal to one in 2008 and 2009, the dummy SovCrisis equals one between 2010 and 2012, Post2012 is a dummy equal one in 2013 and 2014. Each treatment variable (Size, Sovereign, Deposits, Liquidity, Equity, ForeignOwned) is a time-invariant dummy zero/one indicating whether the bank was below/above the median of a certain characteristic in the pre-crisis period (2005-2007). We control for bank FEs, year FEs, and country-year FEs. Robust standard errors, clustered at bank-level, in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

	Europe (1)	US (2)	Euro area (3)	Euro-Periphery (4)
BankingCrisis*Size	-1.369 (3.613)	2.491 (8.759)	-1.791 (3.944)	2.873 (4.573)
SovCrisis*Size	-4.895 (3.451)	2.994 (8.653)	-9.121** (4.210)	-1.208 (3.785)
Post2012*Size	-0.639 (3.549)	13.200* (7.334)	-4.058 (4.286)	3.554 (4.282)
BankingCrisis*Sovereign	-1.827 (3.088)	-12.736 (9.473)	-4.314 (3.422)	-7.403 (5.631)
SovCrisis*Sovereign	-1.123 (3.297)	2.316 (5.683)	-2.649 (3.842)	-6.784 (4.099)
Post2012*Sovereign	-2.322 (3.199)	-9.335 (6.627)	-3.278 (3.783)	-9.822** (4.695)
BankingCrisis*Deposits	-2.938 (3.497)	-5.521 (7.631)	-3.035 (4.111)	-2.521 (4.814)
SovCrisis*Deposits	2.452 (3.428)	-15.302** (5.673)	-0.825 (4.080)	1.085 (3.389)
Post2012*Deposits	-0.140 (2.860)	-2.872 (5.962)	-2.390 (3.618)	-2.964 (3.611)
BankingCrisis*Liquidity	1.625 (3.371)	-8.947 (9.337)	4.158 (4.037)	4.957 (4.295)
SovCrisis*Liquidity	-1.524 (3.120)	-7.623 (4.885)	-1.843 (4.069)	-1.455 (3.344)
Post2012*Liquidity	2.790 (2.553)	-1.338 (4.652)	2.593 (3.464)	2.459 (3.456)
BankingCrisis*Equity	1.589 (4.123)	5.477 (10.187)	2.474 (4.691)	2.077 (5.939)
SovCrisis*Equity	4.816 (3.807)	19.151** (7.543)	3.233 (4.609)	-1.489 (4.275)
Post2012*Equity	2.449 (3.645)	0.520 (6.833)	1.189 (4.639)	-7.601 (4.963)
BankingCrisis*ForeignOwned	14.768 (10.077)	21.209 (13.142)	14.596 (9.304)	24.627* (13.708)
SovCrisis*ForeignOwned	13.539* (7.176)	1.982 (10.716)	9.831 (6.859)	12.980 (10.383)
Post2012*ForeignOwned	7.228* (4.206)	20.053** (8.083)	4.531 (4.376)	6.777 (6.812)
Impaired loans	-1.027** (0.401)	-5.268*** (1.783)	-0.877** (0.415)	-0.704 (0.524)
Controls:				
Bank FEs	yes	yes	yes	yes
Time FEs	yes	yes	yes	yes
Country-year FEs	yes	yes	yes	yes
Observations	607	147	497	271
Mean Outcome (PreCrisis)	4.906	5.159	5.044	6.160
St. Dev. Outcome (Pre-Crisis)	14.48	14.03	14.82	13.90
Adjusted R-squared	607	147	497	271

**Table 11: The effect of bank characteristics on growth of corporate loans**

The dependent variable is the annual growth rate of corporate loans (%). The variable BankingCrisis is a time dummy equal to one in 2008 and 2009, the dummy SovCrisis equals one between 2010 and 2012, Post2012 is a dummy equal one in 2013 and 2014. Each treatment variable (Size, Sovereign, Deposits, Liquidity, Equity, ForeignOwned) is a time-invariant dummy zero/one indicating whether the bank was below/above the median of a certain characteristic in the pre-crisis period (2005-2007). We control for bank FEs, year FEs, and country-year FEs. Robust standard errors, clustered at bank-level, in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

	Europe (1)	US (2)	Euro (3)	Euro-Periphery (4)
BankingCrisis*Size	7.224 (7.689)	7.599 (13.664)	16.043 (22.675)	62.730 (66.789)
SovCrisis*Size	7.847* (3.995)	20.866 (14.901)	8.916 (13.488)	43.193 (57.314)
Post2012*Size	4.197 (7.704)	13.921 (12.918)	9.526 (11.581)	19.794 (43.310)
BankingCrisis*Sovereign	-6.963 (8.513)	-32.632** (14.351)	-19.032 (18.775)	-60.001 (65.220)
SovCrisis*Sovereign	-6.819 (5.802)	-27.175* (13.399)	-6.750 (14.241)	-44.861 (52.539)
Post2012*Sovereign	-6.731 (5.466)	-16.643 (13.507)	-15.506 (10.623)	-25.798 (38.170)
BankingCrisis*Deposits	3.111 (7.569)	2.157 (12.193)	5.961 (10.931)	30.145 (45.919)
SovCrisis*Deposits	-1.947 (4.029)	0.901 (11.196)	1.155 (12.844)	-0.487 (35.186)
Post2012*Deposits	5.354 (4.799)	-4.756 (11.870)	1.919 (12.099)	12.226 (35.473)
BankingCrisis*Liquidity	-12.970 (9.923)	0.159 (11.374)	-5.765 (9.471)	-31.085 (50.112)
SovCrisis*Liquidity	-1.730 (8.410)	-0.870 (11.691)	-1.603 (10.848)	0.796 (36.862)
Post2012*Liquidity	7.749 (7.221)	1.188 (12.410)	14.362 (10.731)	4.044 (36.714)
BankingCrisis*Equity	-4.093 (8.857)	-3.970 (15.437)	-14.462 (22.922)	20.803 (16.134)
SovCrisis*Equity	9.850* (5.367)	-13.627 (14.581)	13.356 (23.393)	20.916 (14.573)
Post2012*Equity	7.727 (9.516)	14.751 (14.013)	20.890 (28.990)	10.467 (13.830)
BankingCrisis*ForeignOwned	-12.601 (17.125)	30.341** (13.287)	-9.645 (43.268)	76.881 (62.896)
SovCrisis*ForeignOwned	17.404 (10.799)	18.192 (13.171)	20.389 (29.522)	59.175 (50.823)
Post2012*ForeignOwned	5.571 (18.766)	44.659*** (12.187)	28.715 (30.417)	28.572 (32.441)
Impaired loans	-0.908 (0.691)	-4.347** (2.017)	-1.582 (1.373)	-1.576 (1.503)
Controls:				
Bank FEs	yes	yes	yes	yes
Time FEs	yes	yes	yes	yes
Country-year FEs	yes	yes	yes	yes
Observations	186	138	136	84
Mean Outcome (PreCrisis)	17.70	3.245	19.53	22.27
St. Dev. Outcome (Pre-Crisis)	17.25	18.93	19.13	21.20
Adjusted R-squared	0.646	0.190	0.670	0.704

**Table 12: The effect of bank characteristics on gross loans as percentage of total assets**

The dependent variable is the percentage of gross loans relative to total assets (%). The variable BankingCrisis is a time dummy equal to one in 2008 and 2009, the dummy SovCrisis equals one between 2010 and 2012, Post2012 is a dummy equal one in 2013 and 2014. Each treatment variable (Size, Sovereign, Deposits, Liquidity, Equity, ForeignOwned) is a time-invariant dummy zero/one indicating whether the bank was below/above the median of a certain characteristic in the pre-crisis period (2005-2007). We control for bank FEs, year FEs, and country-year FEs. Robust standard errors, clustered at bank-level, in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

	Europe (1)	US (2)	Euro area (3)	Euro-Periphery (4)
BankingCrisis*Size	-1.075 (1.630)	3.877 (5.512)	0.593 (1.962)	0.575 (1.652)
SovCrisis*Size	-1.538 (1.789)	4.001 (6.269)	0.736 (2.173)	1.046 (2.697)
Post2012*Size	0.004 (2.703)	5.280 (6.199)	2.426 (3.751)	5.065 (4.976)
BankingCrisis*Sovereign	-3.254** (1.569)	-10.819 (6.580)	-3.260* (1.732)	-3.242 (2.010)
SovCrisis*Sovereign	-2.130 (1.626)	-2.303 (6.065)	-2.061 (1.814)	-2.273 (2.831)
Post2012*Sovereign	-2.026 (1.978)	-4.933 (7.008)	-1.659 (2.228)	-3.802 (3.201)
BankingCrisis*Deposits	-2.000 (1.541)	-0.376 (4.783)	-1.060 (1.579)	-1.911 (1.519)
SovCrisis*Deposits	0.390 (1.674)	1.086 (4.532)	1.484 (1.855)	0.748 (2.274)
Post2012*Deposits	0.023 (2.090)	-1.499 (5.037)	1.034 (2.715)	1.458 (3.227)
BankingCrisis*Liquidity	-2.263 (1.666)	-1.271 (4.390)	-0.506 (1.922)	-2.175 (1.538)
SovCrisis*Liquidity	-2.190 (1.837)	-1.260 (4.177)	-0.116 (1.952)	-0.566 (2.312)
Post2012*Liquidity	-0.968 (2.253)	-3.658 (4.391)	1.153 (2.389)	1.520 (2.856)
BankingCrisis*Equity	-1.736 (1.528)	-4.026 (6.408)	0.078 (1.815)	-1.967 (1.903)
SovCrisis*Equity	-2.943* (1.743)	3.710 (6.776)	-0.933 (2.131)	-1.677 (2.999)
Post2012*Equity	-4.489* (2.533)	2.063 (6.856)	-2.004 (3.442)	-2.475 (4.563)
BankingCrisis*ForeignOwned	-0.827 (5.173)	4.848 (7.566)	1.379 (5.238)	4.057 (6.282)
SovCrisis*ForeignOwned	0.875 (6.348)	-5.188 (7.813)	3.571 (6.516)	8.149 (8.765)
Post2012*ForeignOwned	1.590 (6.893)	5.055 (8.493)	4.352 (7.029)	9.031 (11.330)
Impaired loans	0.143 (0.214)	-0.670 (0.488)	0.136 (0.247)	0.148 (0.340)
Controls:				
Bank FEs	yes	yes	yes	yes
Time FEs	yes	yes	yes	yes
Country-year FEs	yes	yes	yes	yes
Observations	607	147	497	271
Mean Outcome (PreCrisis)	58.08	55.32	59.45	69.85
St. Dev. Outcome (Pre-Crisis)	17.93	19.18	18.09	10.04
Adjusted R-squared	0.284	0.375	0.218	0.265

**Table 13: The effect of bank characteristics on corporate loans as percentage of total assets**

The dependent variable is the percentage of corporate loans relative to total assets (%). The variable BankingCrisis is a time dummy equal to one in 2008 and 2009, the dummy SovCrisis equals one between 2010 and 2012, Post2012 is a dummy equal one in 2013 and 2014. Each treatment variable (Size, Sovereign, Deposits, Liquidity, Equity, ForeignOwned) is a time-invariant dummy zero/one indicating whether the bank was below/above the median of a certain characteristic in the pre-crisis period (2005-2007). We control for bank FEs, year FEs, and country-year FEs. Robust standard errors, clustered at bank-level, in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

	Europe (1)	US (2)	Euro (3)	Euro-Periphery (4)
BankingCrisis*Size	-2.345 (2.657)	4.638 (3.005)	-21.392*** (4.603)	-142.867*** (9.856)
SovCrisis*Size	-2.473 (3.037)	9.396** (3.646)	-21.884*** (3.599)	-124.222*** (8.823)
Post2012*Size	-5.892 (5.077)	12.469** (4.982)	-31.869*** (2.890)	-118.961*** (6.787)
BankingCrisis*Sovereign	2.469 (2.928)	2.059 (2.943)	16.444*** (3.333)	139.340*** (9.730)
SovCrisis*Sovereign	6.924** (2.769)	-5.058** (1.847)	18.733*** (3.595)	120.181*** (8.256)
Post2012*Sovereign	6.707* (3.781)	-7.857*** (1.838)	19.010*** (2.226)	106.163*** (5.731)
BankingCrisis*Deposits	-1.913 (2.676)	4.945** (1.841)	-5.139* (2.532)	-66.892*** (8.190)
SovCrisis*Deposits	2.041 (2.487)	9.255*** (1.764)	-2.654 (2.301)	-84.069*** (4.979)
Post2012*Deposits	7.385** (3.570)	10.289*** (2.055)	3.484 (2.252)	-83.704*** (5.317)
BankingCrisis*Liquidity	4.369 (4.277)	2.273 (2.659)	4.901** (2.066)	66.350*** (7.465)
SovCrisis*Liquidity	0.770 (4.894)	-3.258** (1.253)	-1.778 (2.467)	79.839*** (4.803)
Post2012*Liquidity	-1.473 (6.597)	-3.752** (1.477)	-8.278*** (2.226)	78.936*** (4.653)
BankingCrisis*Equity	-11.321*** (3.771)	-5.903** (2.575)	-36.585*** (4.203)	18.480*** (2.505)
SovCrisis*Equity	-8.465** (3.652)	-13.113*** (2.605)	-37.249*** (4.657)	33.280*** (1.397)
Post2012*Equity	-12.046** (5.711)	-14.250*** (2.943)	-49.925*** (4.921)	37.545*** (1.423)
BankingCrisis*ForeignOwned	-22.444*** (5.924)	-12.606*** (2.866)	-67.689*** (8.279)	-132.964*** (9.568)
SovCrisis*ForeignOwned	-22.794*** (6.581)	-12.948*** (2.454)	-71.703*** (6.354)	-104.268*** (8.192)
Post2012*ForeignOwned	-34.835*** (11.598)	-8.904** (3.867)	-101.823*** (5.798)	-101.472*** (5.723)
Impaired loans	-0.611*** (0.181)	-0.526 (0.390)	-0.242 (0.195)	-0.259 (0.205)
Controls:				
Bank FEs	yes	yes	yes	yes
Time FEs	yes	yes	yes	yes
Country-year FEs	yes	yes	yes	yes
Observations	186	138	136	84
Mean Outcome (PreCrisis)	31.74	26.62	33.87	34.96
St. Dev. Outcome (Pre-Crisis)	12.74	9.838	13.73	12.44
Adjusted R-squared	0.806	0.530	0.906	0.944

Figure 1: Growth of gross and corporate loans

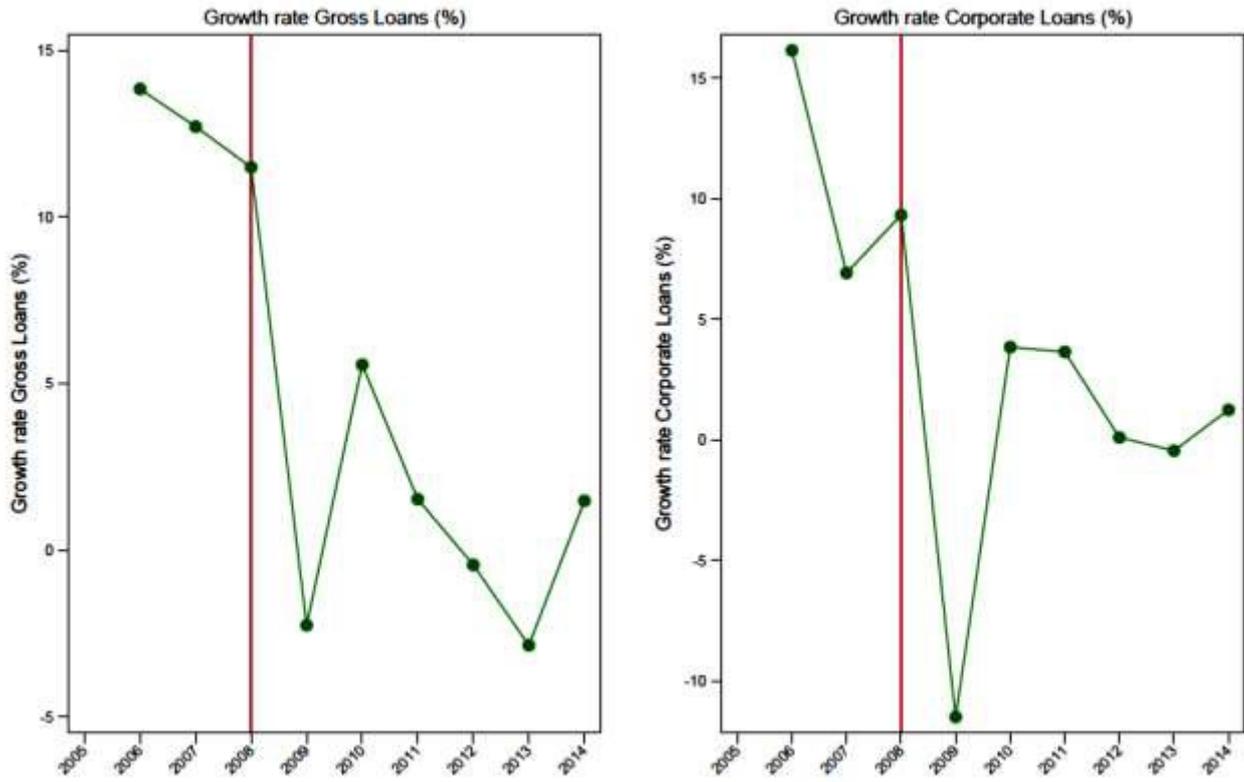


Figure 2: Gross and corporate loans (Log)

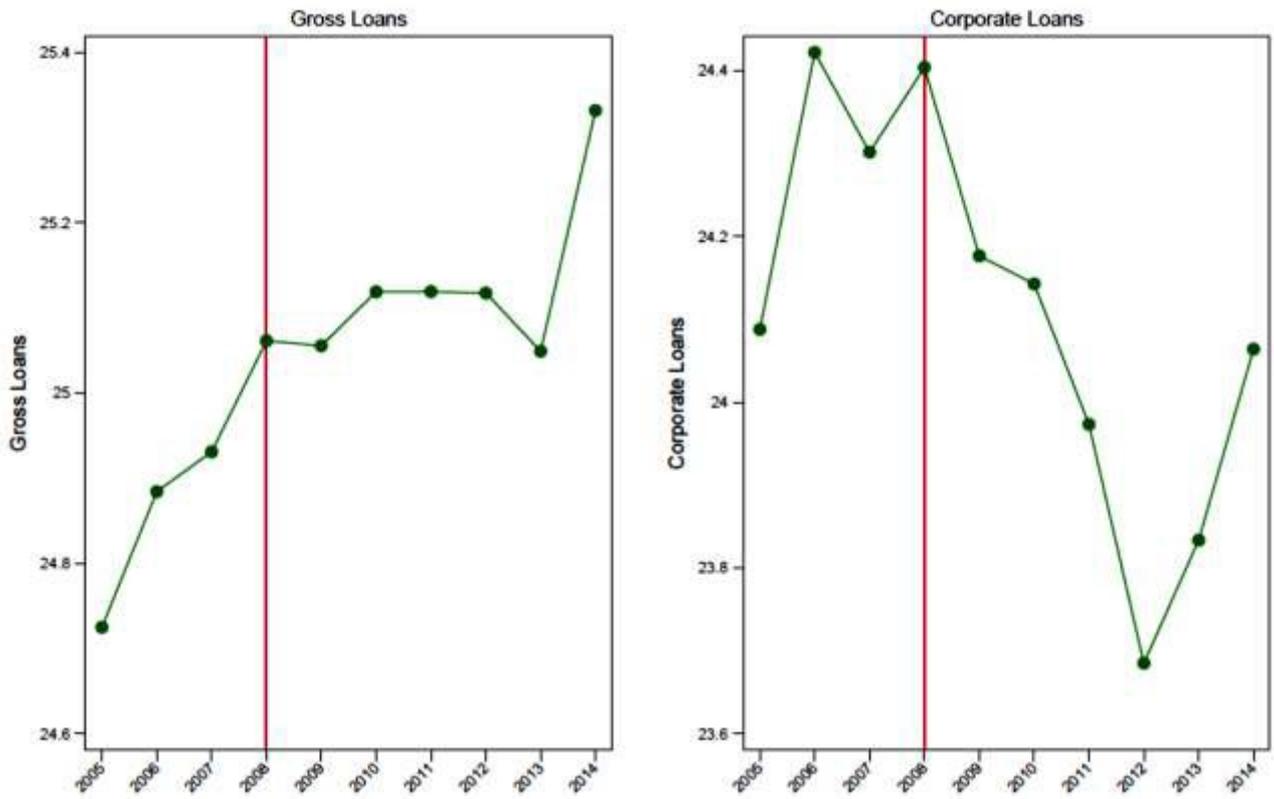


Figure 3: Gross and corporate loans as a percentage of total assets

