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Résumé :

Cette étude, entreprise dans le cadre du réseau international de banques centrales IBRN (International Banking Research Network), vise à étudier la transmission à l'international du risque de liquidité, en analysant le cas des groupes bancaires français. A partir d'une base de données très complète sur les positions internationales de ces groupes, nous analysons le rôle des fragilités de bilan dans la transmission à l'étranger des chocs de liquidité. La ventilation géographique des prêts nous permet de contrôler les effets sur la demande et d'analyser les ajustements externes opérés en réponse aux chocs affectant l'offre de prêts. Les résultats montrent qu'un ratio de capital plus élevé permet de soutenir la croissance des prêts internationaux quand les conditions de liquidité globales se détériorent. Ces résultats concernent surtout les prêts transfrontaliers (à la fois aux secteurs financier et non-financier), tandis que les prêts locaux octroyés par des filiales étrangères sont peu affectés par des chocs sur les bilans des groupes bancaires pris dans leur ensemble. Nous étudions aussi dans quelle mesure les effets identifiés diffèrent selon que les banques ont accès ou non aux programmes de liquidité publique pendant la crise ; nous avons identifié dans les résultats une sensibilité aux programmes d'assistance de liquidité des banques centrales.

Codes JEL : F36, G21
Mots clés : banques internationales, risque de liquidité, transmission des chocs

Abstract:

As part of the International Banking Research Network, the Banque de France contribution to the research project on liquidity risk transmission concentrates on the "outward"' transmission of shocks affecting French banking groups. Using a rich dataset on their international positions, we analyze which balance sheet vulnerabilities contribute to the international transmission of aggregate liquidity risk shocks. The geographical breakdown of lending allows us to control for demand effects and to concentrate on the external adjustments to shocks affecting the supply of loans. We find that a higher capital ratio is associated with higher growth of lending abroad when aggregate liquidity conditions deteriorate. We find that our results are mainly driven by cross-border lending to the financial and non-financial sector whereas local lending by foreign affiliates is hardly affected by the balance sheet shocks that the overall banking group is experiencing. We also investigate to what extent the identified effects differ depending on whether banks accessed public liquidity during the crisis and find that our baseline results are sensitive to the inclusion of central bank liquidity assistance.

JEL-Classification: F36, G21
Keywords: International banking, liquidity risk, shock transmission

Non-technical summary

The International Banking Research Network (IBRN) was set up to foster research on the behavior of global banks — an issue that has received considerable attention since the 2008–09 financial crisis. The financial market developments of the recent years have highlighted the role of international banks in the origination and propagation of shocks. The IBRN consists of researchers from various central banks, each analyzing their national micro-level data on international banking activities. Among others, the aim of the IBRN is to address a research question with comparable national datasets and a common methodology. For 2013, the research question addressed the domestic and international adjustment to aggregate liquidity shocks.

As part of the International Banking Research Network, the Banque de France contribution to the research project on liquidity risk transmission concentrates on the "outward" transmission of shocks affecting French banking groups. Using a rich dataset on their consolidated international positions, we analyze which balance sheet vulnerabilities contribute to the international transmission of aggregate liquidity risk shocks. In particular, we differentiate between cross-border lending and local lending by foreign affiliates. The balance sheet items we consider as relevant for the outward transmission of aggregate shocks are (i) the core deposit ratio, to investigate the role of reliance on stable funding sources, (ii) the capital ratio, to analyze the role of solvency and funding costs as well as (iii) the commitment ratio and (iv) the liquid asset ratio, to investigate to what extent the ability to liquidate assets forces banks to adjust their external lending when they are confronted with adverse liquidity shocks.

The results can be summarized as follows. We find that a higher capital ratio is associated with higher growth of lending abroad when aggregate liquidity conditions deteriorate. We find that our results are mainly driven by cross-border lending to the financial sector whereas local lending by foreign affiliates is hardly affected by the balance sheet shocks that the overall banking group is experiencing. This result is not surprising given that cross-border lending decisions are made on the group-level (our unit of observation) whereas local lending by foreign affiliates is driven by other factors than group-level balance sheet variables. We also investigate to what extent the identified effects differ depending on whether banks accessed public liquidity during the crisis and find that our baseline results are sensitive to the inclusion of central bank liquidity assistance.

1 Introduction

The sharp retrenchment in international bank lending that took place in the wake of the 2008–09 financial crisis underlines the need to better understand the determinants of cross-border banking. The International Banking Research Network (IBRN) was set up to fill this gap, aiming to put together the efforts of different central banks and share their experience in collecting and analyzing the relevant data. The IBRN consists of researchers from various central banks, each analyzing their national micro-level data on international banking activities. Among others, the aim of the IBRN is to address a research question with comparable national datasets and a common methodology. In this paper, we present key stylized facts about the foreign activities of French banks, in particular French banking groups with significant amounts of foreign banking operations, and describe their lending behavior abroad, both covering the financial crisis in 2008–09 as well as the European debt crisis in 2011.

More specifically, the research question that is being investigated here focuses on the transmission of funding shocks to foreign countries through external banking activities. Banks are active abroad either through direct cross-border lending to foreign residents or through their foreign affiliate network. The drivers affecting foreign lending are both bank-specific and destination-specific. In this paper, we focus on bank-specific determinants; in particular, we investigate which balance sheet items make banks vulnerable to aggregate liquidity risk conditions and whether the resulting balance sheet effects are transmitted across borders.

One important aspect of the French banking system is that a few large banking groups account for a significant share of total activities, including lending. We constructed a dataset at the consolidated bank level, which contains destination-specific data on loans for six major French banking groups which intermediate about three quarters of the French household wealth (IMF, 2013). The high concentration in the French banking sector implies that bank-specific factors will be estimated with a relatively small number of observations. The geographical breakdown, by contrast, is much larger. In order to control for demand effects in destination markets, most of the analysis presented here relies on panel data regressions along three dimensions (bank, destination country and time) making use of the methodology of Khwaja and Mian (2008). The paper presents results at the sectoral level (for the financial and non-financial sectors as well as for lending to public institutions) and across types of lending (local lending by affiliates and cross-border loans).

The main results can be summarized as follows. We find that the effect of aggregate liquidity shocks materialize via banks' capital ratio and are transmitted abroad: in general, better capitalized banks have higher growth rates of their foreign lending during crisis times. As banks with a higher capital ratio experience smaller shocks to their funding costs, they are better able to sustain or increase their foreign lending. This result is mainly driven by cross-border lending to the financial sector. We thus find that parent bank shocks directly affect their cross-border activities (which are most likely to be decided on the group-level), but cannot detect any second-round effects which would affect affiliate lending abroad. With regards to stable funding (core deposit ratio) and liquid assets, we cannot find consistent evidence for these variables to translate aggregate liquidity conditions into bank-specific funding stress which is transmitted abroad. This is probably due to the fact that many structural changes took place in the banking sector during recent episodes: banks decreased their reliance on unstable funding during the crisis, either due

to anticipation effects of future regulation or a generally higher perception of counterparty risk in interbank markets. Banks also changed their availability of liquidity in a way that is not captured by our data for a sufficiently long time period (see section 2.2).

From a more general point of view, we show that the identified balance sheet vulnerabilities are not having any effect on domestic lending. This is probably due to the fact that the universal banking model adapted by French banks, which is characterized by relatively stable retail business activities and a high degree of diversification, insulated French banks' domestic activities from the market distress in 2008–09 and 2011. We also find that controlling for cross-country demand effects is important when analyzing the transmission of supply side shocks.

The identification of a bank-specific liquidity or funding cost shock via balance sheet variables could be complicated by the fact that many banks made use of the European Central Bank's (long-term) refinancing operations which provided them with large amounts of liquidity. This paper also investigates whether the provision of public liquidity assistance (through large-scale central bank refinancing) could dampen the effect of liquidity or funding shocks and their transmission abroad. When banks access public liquidity and are confronted with a liquidity shock that materializes via a high commitment ratio, they lend more abroad than in the case of no public liquidity provision. However, with regards to other balance sheet variables, we find that there is substantial heterogeneity across sectors and types of lending.

The rest of the paper is constructed as follows. The following section reviews the literature. Section 3 presents the data and key stylized facts. Section 4 discusses the main empirical results, while Section 5 concludes.

2 Literature review

The contraction of international lending during the 2008–2009 financial crisis, which was more pronounced than contractions in domestic lending, has triggered a rich research agenda on the sources and the international transmission channels of funding and liquidity shocks.

Among the balance sheet indicators that made banks particularly vulnerable to funding shocks, high reliance on wholesale funding – in contrast to retail deposits – has been shown to lead to a higher contraction in lending during the crisis (Cornett *et al.*, 2011; Huang and Ratnovski, 2009; Bologna, 2011; Federico and Vazquez, 2012; Berger and Bouwman, 2013). In particular, banks characterized by high dependence on US dollar funding were confronted with particularly severe funding distress when disturbances in currency swap markets translated into funding shortages for those banks with important currency mismatches (McGuire and von Peter, 2009; Ivashina *et al.*, 2012).

Whereas the aforementioned papers concentrate on the *identification of sources* of shocks, several authors look at the *transmission* of funding shocks across borders via internal capital markets or direct lending. Banking flows cross international borders either through affiliate networks ("intra-group" flows), i.e. flows among subsidiaries and branches as well as the parent bank of the same bank holding company, or through direct lending or borrowing between a bank and a foreign entity ("cross-border flows"), i.e. bank loans to non-resident businesses and financial institutions. Globally active banks with subsidiaries

and branches in several countries adjust to funding shocks by intra-group reallocation of capital (Cetorelli and Goldberg, 2012b,a; de Haas and van Lelyveld, 2010; Buch *et al.*, 2011). However, whether parent banks constitute a source of support or strain for their affiliates depends on their relative shocks and the type of crisis (de Haas and van Lelyveld, 2011).

Internal capital markets of global banks are only one channel via which financial shocks are transmitted. From a more general point of view, funding shocks lead to an adjustment on the asset side of the balance sheet, both with regards to domestic and external lending. The financial crisis of 2008–2009 has led to a global retrenchment, thus breaking the pronounced period of increasing international financial integration that preceded the crisis. In this respect, Giannetti and Laeven (2012) and Milesi-Ferretti and Tille (2011) show that the contraction of cross-border lending led to a larger "home bias" in asset allocation.

3 Empirical analysis

The French banking system is concentrated and French banks generally adopt a universal banking model. In France, the banking sector is characterized by a relatively low presence of foreign banks, with the notable exception of HSBC France. The universal banking model adopted by most French banks, including the ones present in our sample, is very much reliant on retail banking and features a high saturation of the domestic market. These universal banks contributed to dampen the effects of the financial crisis notably with regards to credit supply. The diversified business model, in terms of both liabilities and assets, guaranteed relative stable funding and comparatively limited losses on assets. A comparison of the performance of French banks vis-à-vis their European and US counterparts during the crisis of 2008–09 is provided in Xiao (2009) who shows that French banks were relatively less profitable before the crisis, but were hit less severely than some of their counterparts. Compared to other industrialized countries, the French banking system proved to be relatively resilient to the financial crisis of 2008–09 due to its domestic retail activities (IMF, 2013).

For our analysis, we rely on consolidated data for French banking groups. Data on external lending is collected at quarterly frequency by the Statistics Department of the Banque de France as well as by the Autorité de Contrôle Prudentiel et de Résolution (ACPR). In particular, we build a dataset of the stocks of outstanding loans held by six major French banking groups. The data are collected on a consolidated level and allow for a geographical as well as sectoral breakdown. As we are working with consolidated data (collected among others for the purpose of constructing the Bank of International Settlements' consolidated banking statistics), we are also able to distinguish between local lending by French affiliates abroad as well as pure cross-border lending. The drawback of this dataset, however, is that we are not able to identify intra-group flows on a locational level, nor are we able to identify the geographical origin of a cross-border flow. The balance sheet variables are only collected at biannual frequency which is why we interpolate them in order to not lose the quarterly information contained in the dependent variable. Since the balance sheet variables used in our framework do not vary excessively from one semester to the other (see figure 3), results are not expected to be sensitive to this interpolation approach. Concerning the international lending activities of the banks in our sample, the available data runs from 2004Q1 to 2013Q2. However, since we only have consistent balance sheet

variables available from 2005Q4 to 2013Q2 (with missing values for the commitment ratio in 2007Q2), our regressions are constrained to this time period.

3.1 International lending patterns of French banks

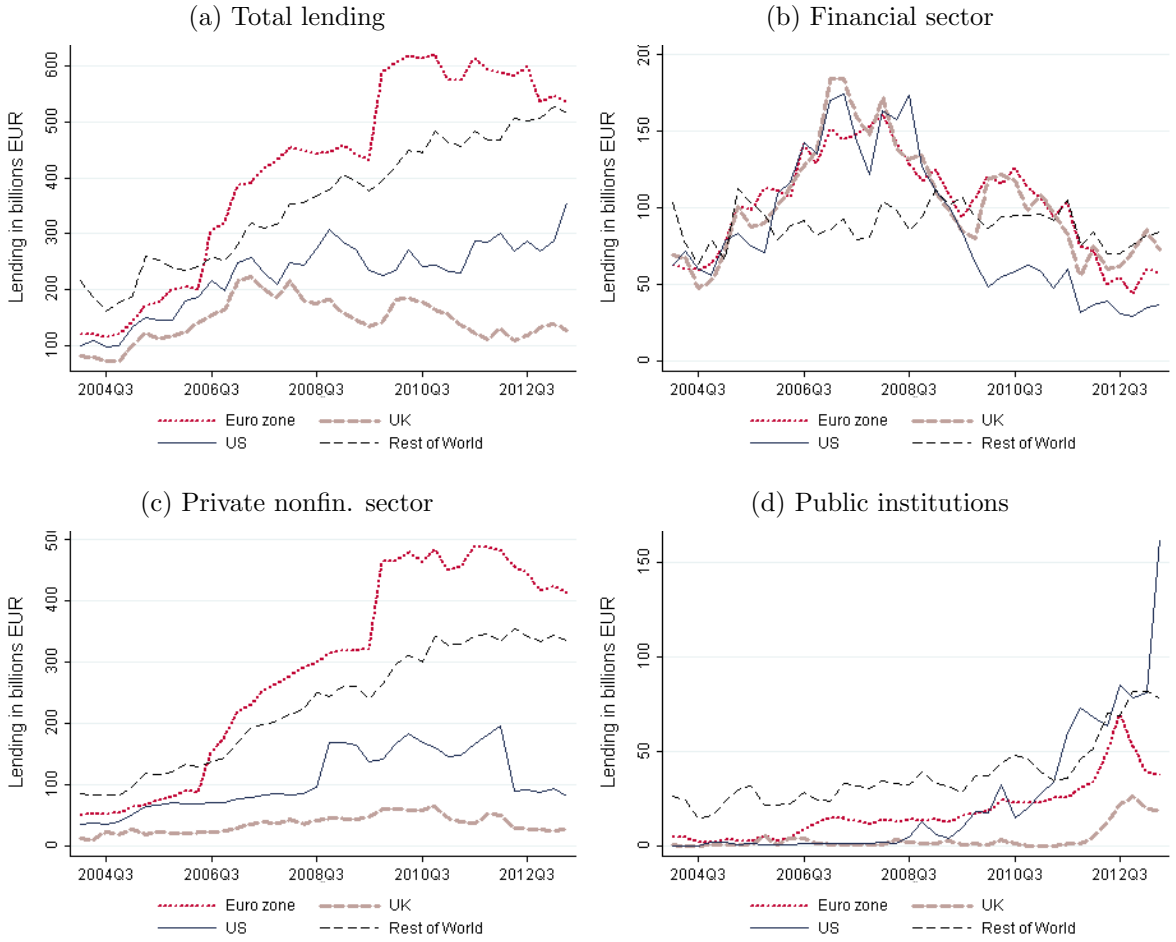
Figure 1 displays the sum of the outstanding amounts of loans of the banking groups in our sample across different sectoral counterparties and regions. The international expansion of French banks since 2000 is comparable to the growth of external assets and liabilities of other European banks over the same period (IMF, 2013). Several key stylized facts stand out from figure 1. Starting with the overall pattern of lending by the six banks considered in this study, a substantial increase of similar magnitude across the US, UK, the Eurozone and the "Rest of the World" was recorded until 2007, when trends in the different regions diverged. For example, lending to the UK fell more strongly in 2008 and in the following years than lending to the US and to the Eurozone.

Lending patterns also exhibited substantial heterogeneity across sectors: lending to the financial sector fell sharply (panel b), whereas lending to the private non-financial sector (panel c) proved to be more robust. Presumably, this deleveraging in the financial sector was strongly related to the stress in interbank markets as well as a return to banks' core business. Another aspect that could explain the heterogeneous dynamics of lending to the financial and non-financial sector could be differences in maturities. As noted by McGuire and von Peter (2009), claims to banks are often characterized by shorter maturities, thus allowing for a faster deleveraging in the financial sector. In contrast, lending to the non-financial sector in the Eurozone actually rose very substantially towards the end of 2008, before abating somewhat in the following years. The breaks in the series concerning loans to the non-financial sector in the Eurozone are due to the acquisition of a foreign bank in 2006Q3 and another in 2009Q4.[1] Figure 1 also shows that the dynamics of lending to the Eurozone are mainly driven by lending to the non-financial sector. Finally, lending to public institutions outside the Eurozone remained relatively stable until the end of 2010, when it started to increase markedly. Lending to the US public sector actually increased by very large amounts in the last two years of our sample. This stark increase is mainly due to banks' hoarding of US dollar liquidity in the form of deposits at the Federal Reserve.

Distinguishing across destination markets and sectors proves essential given the very pronounced degree of heterogeneity that characterizes the distribution of lending. Another important aspect of foreign lending, which is displayed in figure 2, is the means by which global banks lend abroad: directly to non-residents (cross-border lending) or through their affiliate network (local lending). The distribution of outstanding loan amounts of local lending by foreign affiliates shows a stark difference between the US and the Eurozone. Whereas local lending in the US is heavily focused on the financial sector, French banks' affiliates in the Eurozone concentrate on lending to non-financial businesses. For direct cross-border flows, the UK accounts for a large share of lending to the financial sector (in line with London being one of the world's major financial center), whereas cross-border lending to the non-financial sector is directed mostly to the aggregate "Rest of the World", which includes, among others, a lot of countries in which French banks have no affiliate network and therefore lend directly to non-resident private businesses.

[1] See the explanations provided by the BIS: http://www.bis.org/statistics/breakstablescons.pdf

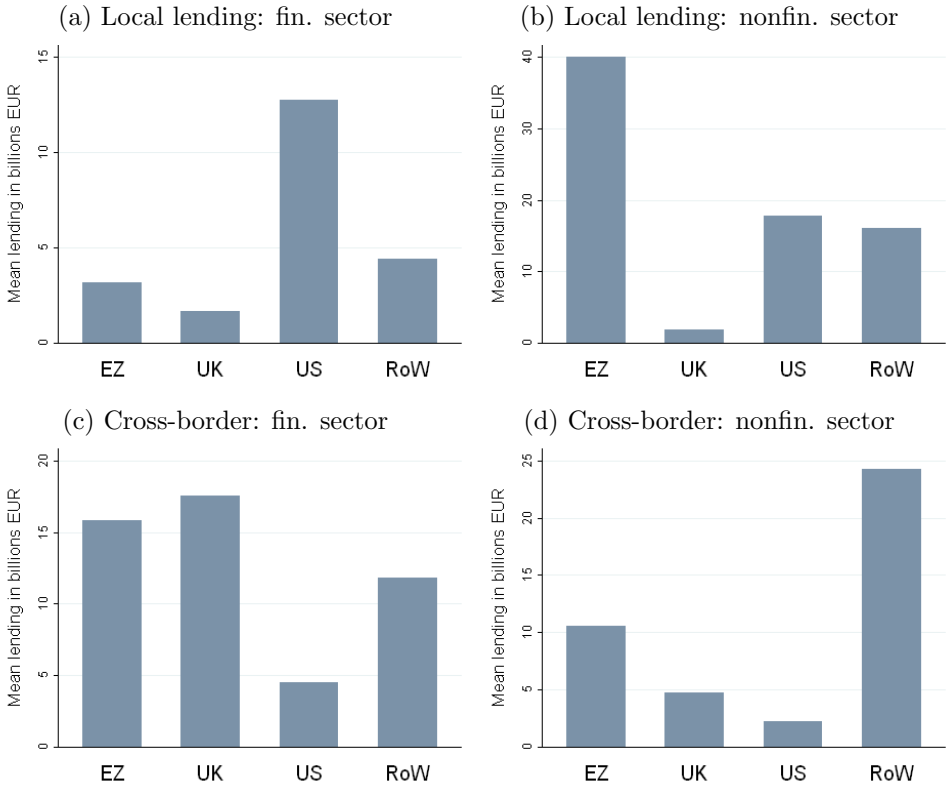
Figure 1: Sum of cross-border and local lending by region and counterparty



Notes: The figures display the levels of the sum of outstanding loans (stocks) held by major French banking groups over the period 2004Q1 to 2013Q2.

Another noteworthy aspect of the data can be seen in table 1, which reports lending by counterparty and by type, distinguishing between local and cross-border lending. Table 1 reports separately the mean number of countries in which French banks have non-zero positions and the actual amounts. If we consider the relative importance of the sectoral breakdown, the amount of local lending is higher for the non-financial sector than for the financial sector, whereas the reverse applies to cross-border loans. The fact that lending to the non-financial sector predominantly takes the form of local lending, whereas lending to the financial sector is mostly associated with direct cross-border lending, is somewhat intuitive: lending to non-financial businesses requires more soft information and may therefore be done more easily through local (relationship) lending. By contrast, when we consider the number of countries in which French banks are present either through foreign affiliates or through direct lending to residents, cross-border lending appears to be more important for the non-financial sector, perhaps reflecting the fact that for a lot of small, developing countries, local lending is not possible in the absence of established affiliates. Therefore, multinational companies might lend cross-border from banks resident in France. Figure 2 is representative of a general phenomenon in international banking: as lending to non-financial businesses is characterized by more relationship lending, local affiliates will concentrate on this sector (if affiliates are present in the destination country); however,

Figure 2: Lending by region and type



Notes: The figures display the geographical distribution of the sum of outstanding loans (stocks) held by major French banking groups (sum over the period 2004Q1 to 2013Q2).

lending to the financial sector is primarily decided on the level of the parent bank. The regression analysis below will show that this pattern is important for the international transmission of shocks that affect the parent bank balance sheet.

3.2 Econometric specification and variables

The basic methodology is described in detail in Buch and Goldberg (2014). In this section, we focus on the specific variables available for conducting the analysis for the French context. We start by running the following bank-level regressions:

$$Y_{i,t} = c + \alpha X_{i,t-1} + \beta(X_{i,t-1} \times r_t) + \mu_i + \gamma_t$$

The dependent variable $Y_{i,t}$ is defined as $Y_{i,t} = (y_{i,t} - y_{i,t-1})/\text{Assets}_{i,t-1}$. We consider various dependent variables for $y_{i,t}$:

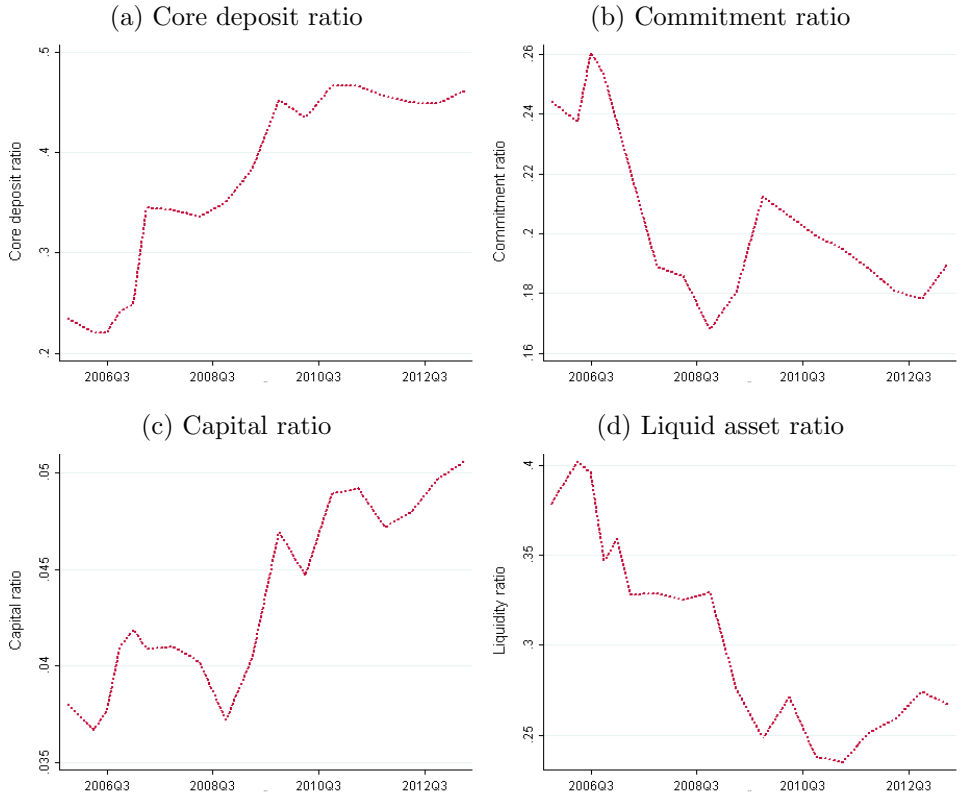
- Total foreign lending
- Foreign local lending by affiliates
- Foreign cross-border lending
- Domestic lending
- Total credit (domestic and foreign lending, plus commitments)
- Liquid assets

These variables capture not only the adjustment of foreign lending, but also concern domestic lending, overall credit and liquid assets. Panel (a) of table 2 describes the summary statistics of the above variables. Over the sample period, domestic loans grew more than foreign loans. This is typical of the general retrenchment in foreign markets during the crisis, thus leading to a larger home bias.

Balance sheet variables $X_{i,t-1}$ are lagged by one period. The explanatory variables $X_{i,t-1}$, which represent various dimensions of balance sheet vulnerabilities, are as follows:

- (Core deposits) $_{i,t-1}$ / Assets$_{i,t-1}$
- Commitments $_{i,t-1}$ /(Assets$_{i,t-1}$ + Commitments$_{i,t-1}$)
- Capital $_{i,t-1}$ / Assets$_{i,t-1}$
- (Liquid assets) $_{i,t-1}$ / Assets$_{i,t-1}$
- log (Real assets$_{i,t-1}$)

Figure 3: Mean balance sheet ratios



Notes: The figures display the mean ratios for major French banking groups over the period 2005Q4 to 2013Q2 (biannual data).

Figure 3 displays the evolution of the mean of these balance sheet variables of the banks in our sample. The start of the 2008–09 financial crisis coincided with a significant rise in the core deposit ratio and in the capital ratio while the commitment ratio fell markedly around that time. These developments are representative of general tendencies in the banking sector: banks were under more intense pressure to report sound balance sheets after the collapse of Lehman and shrank their balance sheets. Furthermore, French banks have increased their capital position over the time period in our sample notably due to an

increase in the regulatory constraints (or in anticipation of such an increase). In contrast to these developments, the mean ratio of liquid assets to overall assets declined until 2011 before picking up again. The liquid asset ratio presented in figure 3 does not include assets with a short maturity, but only cash, balances with central banks and financial assets designated at fair value through profit or loss. This is due to the fact that sufficiently long data, which take into account the full maturity structure of the balance sheet items, is not available.

The interaction of $X_{i,t-1}$ with an indicator of market-wide liquidity risk represents the idiosyncratic realization of the shock we are interested in. This specification at the bank-level does not allow us to control for demand effects which could stem from cross-sectional differences in sectoral and geographical exposures.

In order to control for demand effects, we run regressions on the bank-country level and include country-time fixed effects. As long as at least two banks lend to a particular destination market j, demand effects in this market are captured by country-time fixed effects. Common shocks affecting all banks to the same degree are also taken care of in this set-up. The estimated equation is:

$$Y_{i,j,t} = c + \alpha X_{i,t-1} + \beta(X_{i,t-1} \times r_t) + \mu_i + \gamma_{j,t}$$

In this setup, the dependent variable $Y_{i,j,t}$ is the growth rate of lending of bank i in country j at time t; in particular, the dependent variable is expressed in log differences.

As in the case of the bank-level regressions, we use total foreign lending as well as local lending by French banks' foreign affiliates and pure cross-border lending of the bank holding company as dependent variables. We also consider different sectors, in particular lending to financial institutions, the private non-financial sector as well as public entities. Panel b of table 2 displays the summary statistics of dependent variables at the bank-country level. One noteworthy aspect of theses statistics is the high standard deviation of growth rates (compared to their means). Not surprisingly, foreign lending is more volatile in the disaggregated bank-country level than on the bank-level.

In a third step, we test for the importance of public liquidity assistance. As is the case for many industrialized economies, the European Central Bank provided liquidity assistance in times of financial distress. French banks made use of the refinancing operations provided by the ECB. These refinancing operations, which are characterized by longer maturities than the usual main refinancing operations, were used during the financial crisis to provide liquidity assistance to the banking sector. In particular, we define a dummy indicator $L_{i,t}$ which equals one whenever a bank's liabilities vis-à-vis the central bank is larger than a certain percentage of its core deposits. We chose as a threshold the ECB's minimum reserve requirements which are 2% of core deposits until 2011 and 1% from 2012 onward. In particular, we run the following regressions (at the bank and at the bank-country level) to test whether the transmission of funding or liquidity shocks was dampened in times of public liquidity provision:

$$\begin{aligned} Y_{i,t} &= c_1 + \alpha_1 X_{i,t-1} + \beta_1(X_{i,t-1} \times r_t) \\ &\quad + [c_2 + \alpha_2 X_{i,t-1} + \beta_2(X_{i,t-1} \times r_t)]\, L_{i,t} + \mu_i + \gamma_t \\ Y_{i,j,t} &= c_1 + \alpha_1 X_{i,t-1} + \beta_1(X_{i,t-1} \times r_t) \\ &\quad + [c_2 + \alpha_2 X_{i,t-1} + \beta_2(X_{i,t-1} \times r_t)]\, L_{i,t} + \mu_i + \gamma_{j,t} \end{aligned}$$

4 Regression results

Our analysis is conducted on the level of the bank-holding company. With regards to foreign loans, we can distinguish between two types of loans, pure cross-border lending of the bank holding company as a full entity as well as local lending by French banks' foreign affiliates. Though we are mainly interested in the outward transmission of liquidity shocks, we also consider the effect on domestic loans. Investigating differential effects between foreign and domestic lending is relevant as many governments put pressure on banks during the crisis to keep up lending domestically, potentially at the detriment of cross-border lending and lending by foreign affiliates if the latter have to repatriate funds to the parent bank.

The above balance sheet variables capture various channels through which increased liquidity risk materialized into bank-specific shocks. A high share of core deposits is generally associated with cheap and stable funding and has been shown to be a good indicator of resilience to funding shocks (Huang and Ratnovski, 2009; Bologna, 2011; Berger and Bouwman, 2013). Another variable that proxies the cost of funding is the capital ratio. According to the bank capital channel, financial intermediaries are collateral constrained in the same way as other borrowers are; as a consequence, a higher capital ratio is associated with lower funding costs.

Whereas both the core deposit and the capital ratio are used to investigate the balance sheet effects from higher funding costs during crisis times, the ratio of undrawn commitments to the sum of assets and commitments as well as the liquid asset ratio are used to investigate the liquidity channel. Since banks finance illiquid assets with short-term liabilities, a rise in short-term funding costs, as it was the case during the financial crisis, can lead to fire sales and deleveraging. The liquid asset ratio is supposed to capture exactly this channel: confronted with important funding shortages, banks can liquidate part of their assets to keep on financing profitable long-term investment projects. The commitment ratio works in a similar way: ceteris paribus, unused commitments reduce *new* credit supply as previously unused commitments may reduce new credit origination if banks are experiencing a funding shock.

4.1 Bank-level regressions

We start by running regressions on the bank-level where we do not control for demand effects. Tables 3 (including bank fixed effects) and 4 (excluding bank fixed effects) show that changes in foreign lending are not affected by any of the balance sheet variables in our sample. In addition, none of the balance sheet variables make banks sensitive to aggregate liquidity risk with regards to adjustments in foreign lending during crisis times. This holds for both categories of foreign lending (cross-border and affiliate lending).

With regards to domestic loans, we do not find any of the balance sheet variables to have an impact on the adjustment of this type of lending in reaction to an aggregate liquidity risk shock. This result is in line with Xiao (2009) and IMF (2013) who describe domestic retail banking activities in France to have been stable and profitable over the last years. The universal banking model helped French banks to mitigate losses during the recent crisis. Increases in overall credit (which comprises foreign and domestic loans as well as commitments) are driven by banks with a high capital ratio; however, we cannot detect a differential effect during times of aggregate liquidity risk.

In tables 3 and 4, we also ask whether balance sheet variables and their interaction with aggregate liquidity risk are affecting banks' decision to increase their holdings of liquid assets. The results show that an increase in a bank's core deposit ratio is associated with an increase in liquid assets, possibly representing differences in risk attitudes which are associated with adjustment on both sides of the balance sheet (more stable funding and better ability to liquidate assets). However, there is no significant differential effect in times of crisis. Both regression specifications (with and without fixed effects) show that a higher capital ratio during crisis times (which represents a smaller bank-specific vulnerability to aggregate funding shocks) is associated with less of an increase in liquid asset holdings: Banks which are experiencing a more pronounced funding cost shock are more inclined to build up a stronger liquidity buffer.

4.2 Bank-country-level regressions

The regression results in tables 3 and 4 do not show any impact of balance sheet variables on domestic or foreign lending, neither during crisis nor tranquil times. Despite the fact that the financial crisis of 2008–09 was global in nature, substantial differences across countries and sectors were observed. In a similar vein, the European debt crisis affected some countries to a larger extent than others. As demand effects certainly played an important role during recent episodes of financial market stress, we turn to regressions exploiting the geographical breakdown of foreign lending in order to control for cross-country changes in demand as in Khwaja and Mian (2008).

Balance sheet vulnerabilities to aggregate liquidity risk. The regression results displayed in tables 5 and 6 are *a priori* better able to identify the supply side effects generated by aggregate liquidity shocks. We do indeed find a significant effect of balance sheet variables and their interaction with aggregate liquidity risk on foreign lending. The results show that a higher capital ratio in crisis times is conducive to higher foreign lending growth. This is in line with the bank capital channel alluded to above. In times of aggregate liquidity risk and high risk aversion, better capitalized banks are able to provide better collateral for their borrowing and thus face lower funding costs.

We do not find any differential effect of liquid asset holdings on foreign lending growth during times of market distress. The financial crisis of 2008–09 as well as the European sovereign debt crisis emphasized the importance of banking liquidity for the functioning of financial markets, the banking sector and the real economy. The Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) will be introduced in order to ensure that banks maintain an adequate level of high-quality liquid assets and present a sustainable maturity structure of assets and liabilities. However, it is important to note that a regulatory liquidity ratio has been in force in France since 1988 and has been reviewed in 2010. Banks have anticipated these regulatory changes which are likely to alter their balance sheet structure and to have an impact on their ability to expand lending activity. However, the narrow definition of our liquid asset ratio (which only includes cash, balances with central banks and financial assets designated at fair value through profit or loss) might not capture these tendencies.

As the coefficients on the non-interacted core deposit ratio show, banks that generally have a higher core deposit ratio are expanding their foreign lending less. We interpret

this finding in terms of risk aversion rather than the intended identification of a funding cost shock. A large amount of deposits is held by French cooperative banks which rely on a broad retail banking network. These banks generally engage in more traditional lending in line with their business models. As such, they lend relatively less cross-border compared to banks which are relying on more wholesale funding and more risky cross-border lending. Whereas this correlation pattern is stable across time for cross-border and total foreign lending, local lending growth by foreign affiliates is only associated with reliance on unstable funding during crisis times. In addition, important structural changes characterized the evolution of funding patterns in France. Prior to 2009, regulated bank deposits (i.e. "Livret A") were only allowed to be offered by three cooperative banks, but a change in regulation liberalized this type of private savings products to be offered by all banks. Also, the increase of the ceiling of these regulated savings passbooks in 2012Q4 further changed the funding patterns of French banks independently of market forces or the macroeconomic environment. All in all, our core deposit ratio might therefore capture behavior that is representative of more risk aversion during crisis times as well as the aforementioned structural changes, which could complicate the identification of a liquidity shock.

Types of lending and sectoral differences. The regression results displayed in tables 5 and 6 distinguish not only between cross-border and local lending by affiliates, but also show the sectoral breakdown of lending: financial institutions and non-financial borrowers as well as lending to public sector. Generally, we can expect decisions on cross-border lending to be primarily taken on the level of the parent bank. As such, the health of the parent bank is an important determinant of the supply of lending abroad. In contrast, local lending by foreign affiliates of French banking groups is only indirectly influenced by the balance sheet health of the parent. The aim of an analysis of the effect of liquidity conditions on foreign affiliates' local lending is to look at the second-round effects from a presumed (but not identified) change in intra-group funding.

We do indeed find that the identified effects are stronger for cross-border lending than for local lending of foreign affiliates. A higher capital ratio of the bank holding company is associated with higher foreign lending growth, particularly cross-border lending. In contrast, we cannot confirm these findings for local lending. As discussed above, these results are not surprising given that we expect lending decisions on cross-border activities to be decided upon on the group-level. The balance sheet variables we include in our regressions as explanatory variables capture exactly these forces. Local lending by affiliates, however, is influenced by other factors which we do not investigate in our framework, notably the balance sheet health of the affiliate.

With regards to sectoral differences, we find that our results are mainly driven by lending to the financial sector. Since most of the lending to the non-financial sector is done cross-border (as opposed to lending by foreign affiliates, see table 1), this result is in line with the idea that the parent bank's balance sheet is more relevant for cross-border than for affiliate lending. We cannot find any transmission of aggregate liquidity risk shocks to foreign lending to public institutions, let alone an impact of balance sheet variables in tranquil times to this sector. Lending to public institutions constitutes a particular type of lending; it is thus not surprising that the liquidity risk shocks are not transmitted abroad.

4.3 The role of public liquidity provisions

We now turn to the role of public liquidity provision which might complicate the correct identification of a bank-specific liquidity shock in the regressions in tables 3–6. We only display and discuss results from regressions with bank fixed effects as they do not differ greatly from the ones without bank fixed effects that exploit the cross-sectional dimension. More specifically, tables 7 (bank level) and 8 (bank-country level) show the marginal effects of the bank-specific liquidity shocks (interaction between the respective balance sheet variables and aggregate liquidity risk) depending on whether a bank accessed public liquidity at time t or not.

At first glance, the results show that controlling for public liquidity is essential for the identification of *outward* transmission of bank-specific liquidity shocks. Tables 3 and 4 did not show any transmission of liquidity shocks to domestic or foreign lending. Even when controlling for public liquidity provision, we do not find any effect on domestic lending or total credit. As already discussed above, French banks' domestic retail business proved to be quite stable during recent years which could explain why we do not find any significant effects.

Foreign lending in general and local lending by foreign affiliates is affected more severely by the liquidity shock that hits the parent bank through a high commitment ratio in times when public liquidity is not accessed. Whereas the allocation of credit lines can be associated with more lending growth in general, a liquidity shock has a more pronounced negative impact on new credit origination whenever a high amount of unused commitments potentially requires banks to use their available funding and liquidity to serve these credit lines. The provision of public liquidity dampens this effect: when banks have access to public liquidity, their foreign lending is not affected by an aggregate liquidity shock which materializes via a high commitment ratio. Interestingly, this effect can be found for affiliate lending but not for cross-border lending, indicating that parent bank shocks are transmitted to foreign affiliates.

We find no effect of public liquidity provision for the transmission of shocks to cross-border lending (at least when demand effects are not controlled for), nor do we find an impact on domestic loans or overall credit provision. With regards to the built-up of a liquid asset buffer, better capitalized banks which accessed public liquidity during crisis times increased their liquid assets less than banks experiencing an equally weak funding shock that did not access public liquidity. However, we find exactly the opposite effect for the core deposit ratio, suggesting that we might be picking up differences in risk behaviour as already alluded to above.

We now turn to the bank-country level regressions which have already shown above to be better able to control for demand effects when identifying the outward transmission of liquidity shocks. As differences across the financial and non-financial sector were identified in the regressions in tables 3 and 4, we concentrate on these two sectors. Results are displayed in table 8 (including bank fixed effects). In tables 5 and 6, we identified the capital ratio as the balance sheet variable which transmits liquidity shocks abroad. However, when differentiating between times when public liquidity was accessed or not, we cannot find any effect that public liquidity provision dampens the transmission of these shocks. As in table 7, we find that a shock that materializes via the commitment ratio is not transmitted to lending to the financial sector in general if public liquidity is accessed. Local lending by foreign affiliates to the financial sector is higher if banks with a high core

deposit ratio (which we interpret as banks with higher risk aversion) access public liquidity, a similar effect can be detected for the liquid asset ratio. The results on local lending to the non-financial sector differ with regards to the ones found in other sectors. In general, the results in table 8 reveal a substantial amount of heterogeneity across sectors and types of lending.

5 Conclusion

This paper has presented key stylized facts and econometric evidence on lending patterns by French banking groups, with a focus on the behavior of foreign lending during times of aggregate liquidity risk. During the crisis, external lending has fallen, but important differences can be observed across sectors and counterparties. Regression results reveal that bank balance sheet factors play a significant role during crisis times. In particular, lending from banks with a higher capital ratio has typically been more resilient to aggregate liquidity risk. In the case of French banks, the results show that parent bank health matters in general as better capitalized banks increase their *cross-border* lending more. However, we cannot identify a specific parent bank balance sheet channel through which aggregate liquidity shocks are transmitted to *affiliates* abroad, which is in line with the idea that cross-border activities are decided on the group-level whereas affiliate lending is only indirectly affected by parent bank balance sheet health. However, when taking into account the differential effects of liquidity shocks depending on the provision of public liquidity, we find that some of the shocks are also transmitted via the affiliate network.

From a more general point of view, our analysis shows that our measure of core deposit ratio is not picking up the underlying dependence on wholesale funding. We rather interpret this measure as one of the underlying business model (banks with a large retail network and less foreign activities versus banks which engage in more international and investment banking) and banks' risk aversion. More importantly, we show that French banks' foreign lending was affected by funding cost shocks which materialized through the bank capital channel. In addition, we also find that domestic lending was not affected which is probably due to the comparatively stable performance of domestic retail activities in France.

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Appendix: Data sources

The dataset used in this paper is based on regulatory reports submitted to the Banque de France (BdF) and to the Autorité de Contrôle Prudentiel et de Résolution (ACPR) by major French banking groups. All data are consolidated – or represent an estimation of consolidated data – and refer to worldwide activities of French banks accounted in IAS/IFRS international standards. Raw data from the bank's regulatory reporting forms were collected at a biannual frequency for balance sheet variables, covering the balance sheets of the major French banks over the period 2005Q4–2013Q2 and adjusted as described below. International positions of these banks were collected at quarterly frequency for the time period 2004Q1–2013Q2. For the period 2004Q1–2012Q1, we make use of the database CCX collected by the Statistics Department of the BdF. For 2012Q2–2013Q2, we use the database SURFI (in particular "ENGAG-INT") collected by the ACPR. A full description of the variables used, together with the relevant reporting forms is provided in Table A1.

Data adjustment procedures. The raw data were adjusted to account for the following: i) breaks in time series associated with changes in reporting standards, ii) a merger between two French banks and iii) an estimation of domestic assets.

Changes in reporting standards. French banks have reported their first IAS/IFRS consolidated balance sheet through the 4990i regulatory reporting (BAFI framework). Since the implementation of the European common reporting standard in France (2007), banks report data through the FINREP reporting which is more detailed. This results in an important amendment to the reporting forms, some of which lead to breaks in individual series. This was adjusted for by using information from previous reporting forms and merging the codes of the old and new series, where relevant.

Treatment of mergers and acquisitions. Over the period analysed, there was a large merger between two major French actors. This merger was dealt with by creating a new merged series of the merging banks' data over the entire period.

Domestic assets and loans. An estimation of the domestic assets and loans by banking group is given through the total asset aggregation on a solo basis of the French entities of the banking group. This data series is an estimation; not only due to different accounting standards (French instead of IAS/IFRS), but also due to intra-group transactions not being cancelled.

Table A1: Data – definitions and sources

Variable	**Definition**	**Source**
Lending in country j	Consolidated loans in country j for different sectors (non-financial, financial institutions (banks) and public sector) and type of lending (cross-border and affiliate)	BdF
Total assets	Total consolidated assets (external and domestic)	ACPR
Core deposits	Consolidated customers deposits excluding financial institutions	ACPR
Commitments	Consolidated commitments	ACPR
Capital	Consolidated capital (including minority interests)	ACPR
Liquid assets	Consolidated cash, cash balances with central banks and financial assets designated at fair value through profit or loss	ACPR
Domestic loans	Sum of solo basis total loans of French entities	ACPR

Tables

Table 1: Foreign lending: no. of countries and amounts (in billions EUR)

No. of countries	Non-fin. sector			Fin. sector			Public institutions		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Local lending	47.3	26.5	65.2	33.8	21.7	44.9	22.5	16.2	34.4
Cross-border lending	126.0	106.7	163.6	74.5	56.7	97.2	57.6	49.6	69.2
Loan amounts	**Non-fin. sector**			**Fin. sector**			**Public institutions**		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Local lending	73.7	19.6	122.2	20.8	5.8	35.6	9.3	1.8	40.4
Cross-border lending	41.2	17.0	61.6	48.6	25.2	83.8	5.3	1.7	15.0

Notes: The table displays the mean as well as minimum and maximum values of the number of countries for which each of the categories of lending is non-zero as well as the amounts (in billions EUR) of outstanding loans (stocks) held by major French banking groups over the period 2004Q1 to 2013Q2.

Table 2: Summary statistics 2005Q4 – 2013Q2

	Before cleaning			After cleaning		
	Mean	Median	St. dev.	Mean	Median	St. dev.
(a) Dependent variables: Bank-level (in %)						
Δ Total foreign lending / assets	0.405	0.106	2.026	0.418	0.110	2.045
Δ Foreign local lending / assets	0.278	0.025	1.489	0.285	0.026	1.484
Δ Cross-border lending / assets	0.127	-0.004	1.271	0.133	-0.021	1.263
Δ Domestic lending / assets	0.551	0.506	1.196	0.586	0.486	0.900
Δ Total credit / assets	1.661	1.028	4.549	1.439	1.058	3.650
Δ Liquid assets / assets	0.552	0.234	4.473	0.185	0.224	2.464
(b) Dependent variables: Bank-country-level (in %)						
Total foreign lending growth	3.078	1.090	49.952	3.076	1.071	48.170
Foreign local lending growth	1.746	0.000	84.404	2.044	0.000	69.864
Foreign cross-border lending growth	2.668	0.000	71.181	2.971	0.000	63.499
(c) Independent variables						
Capital ratio	0.044	0.046	0.011	0.044	0.046	0.011
Commitment ratio	0.198	0.202	0.078	0.198	0.201	0.076
Core deposit funding ratio	0.392	0.354	0.207	0.391	0.354	0.201
Liquid asset ratio	0.291	0.295	0.158	0.295	0.297	0.159
Size (real assets in 100 billion EUR)	9.338	9.495	5.269	9.525	9.604	5.267

Notes: The table displays summary statistics for six major French banking groups over the period 2005Q4 to 2013Q2. With regards to "'cleaning", data observations were omitted from the regressions whenever the growth rate of real assets was greater than 10% in order to correct for outliers and to account for mergers.

Table 3: Bank-level, bank FE

	Foreign lending			Domestic loans	Total credit	Liquid assets
	All	CB	Local			
Core deposit ratio$_{t-1}$	0.006	−0.028	0.038	−0.018	−0.006	0.172**
Core dep. ratio$_{t-1} \times r_t$	0.033	0.034	0.001	−0.031	−0.098	−0.023
Commitment ratio$_{t-1}$	0.088	0.037	0.058	0.051	−0.028	0.024
Comm. ratio$_{t-1} \times r_t$	0.039	0.059	−0.016	−0.045	−0.069	0.060
Capital ratio$_{t-1}$	−0.084	−0.115	−0.026	0.171	1.909*	−0.911
Capital ratio$_{t-1} \times r_t$	0.740	0.536	0.197	−0.174	−0.799	−1.279**
Liquid asset ratio$_{t-1}$	0.081	0.021	0.058	0.000	0.149	
Liquid asset ratio$_{t-1} \times r_t$	0.028	0.036	−0.004	−0.040	−0.153	
Size$_{t-1}$	−0.044	−0.017	−0.028	0.000	0.049	−0.089***
Size$_{t-1} \times r_t$	0.012	0.006	0.005	0.002	0.015	0.024**
Constant	0.564	0.212	0.375	−0.008	−0.928	1.254**
Observations	143	143	143	143	139	143
R^2	0.37	0.39	0.28	0.53	0.31	0.63
Adjusted R^2	0.11	0.14	−0.01	0.34	0.03	0.49
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the coefficients from a regression of the variables listed in the headers of the table on balance sheet variables and their interaction with aggregate liquidity risk. The dependent variables are measured at the bank-level, i.e. lending by bank i at time t, and are computed as the difference of total foreign loans, cross-border loans, local loans by foreign affiliates, domestic loans, total credit and liquid assets, all scaled by total assets. Data of six major French banking groups were used for the period 2005Q4 to 2013Q2. Observations were omitted from the regressions whenever the growth rate of real assets was greater than 10% in order to correct for outliers and to account for mergers. The dependent variables are winsorized at 1% and 99%. Standards errors are robust. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Bank-level, no bank FE

	Foreign lending			Domestic loans	Total credit	Liquid assets
	All	CB	Local			
Core deposit ratio$_{t-1}$	−0.021	−0.027	0.007	0.009	0.070	0.000
Core dep. ratio$_{t-1} \times r_t$	0.030	0.032	−0.001	−0.028	−0.094*	0.004
Commitment ratio$_{t-1}$	0.033	0.007	0.030	0.002	0.073	−0.013
Comm. ratio$_{t-1} \times r_t$	0.016	0.053	−0.035	−0.020	−0.083	0.095
Capital ratio$_{t-1}$	0.037	−0.118	0.164	0.126	0.657*	0.483**
Capital ratio$_{t-1} \times r_t$	0.272	0.389	−0.109	−0.079	−0.713	−1.241**
Liquid asset ratio$_{t-1}$	0.019	−0.006	0.024	−0.003	0.056	
Liquid asset ratio$_{t-1} \times r_t$	−0.009	0.024	−0.029	−0.035	−0.124	
Size$_{t-1}$	−0.013	−0.009*	−0.004	−0.001	−0.008	−0.009
Size$_{t-1} \times r_t$	0.015	0.007	0.008	0.000	0.014	0.025**
Constant	0.093	0.093*	0.003	0.017	0.007	−0.031
Observations	143	143	143	143	139	143
R^2	0.35	0.38	0.27	0.49	0.29	0.60
Adjusted R^2	0.13	0.18	0.02	0.32	0.05	0.47
Bank FE	No	No	No	No	No	No
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the coefficients from a regression of the variables listed in the headers of the table on balance sheet variables and their interaction with aggregate liquidity risk. The dependent variables are measured at the bank-level, i.e. lending by bank i at time t, and are computed as the difference of total foreign loans, cross-border loans, local loans by foreign affiliates, domestic loans, total credit and liquid assets, all scaled by total assets. Data of six major French banking groups were used for the period 2005Q4 to 2013Q2. Observations were omitted from the regressions whenever the growth rate of real assets was greater than 10% in order to correct for outliers and to account for mergers. The dependent variables are winsorized at 1% and 99%. Standards errors are robust. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Bank-country level, bank FE

	Total lending			Financial sector			Non-financial sector			Public institutions		
	All	CB	Local	All	CB	Local	All	CB	Local	All	CB	Local
Core deposit ratio$_{t-1}$	−0.620**	−0.809***	0.533	−0.739*	−1.022**	−1.324	0.097	−0.162	1.186*	−0.538	−0.982	−1.322
Core dep. ratio$_{t-1}$ × r_t	0.153	0.332	−1.311**	0.518	0.985*	−0.202	−0.200	−0.051	−1.344*	0.097	0.459	−0.710
Commitment ratio$_{t-1}$	0.284	0.287	0.061	0.220	−0.325	0.653	0.202	0.255	−0.203	−0.136	−0.178	1.311
Comm. ratio$_{t-1}$ × r_t	0.109	0.399	0.104	0.720	1.361	1.639	0.195	0.463	0.516	0.062	0.687	−3.173
Capital ratio$_{t-1}$	−1.599	−1.034	−4.030	−3.186	−5.049	8.232	−0.386	1.364	−2.093	3.000	4.088	21.494
Capital ratio$_{t-1}$ × r_t	5.682**	7.159***	11.449	14.412**	15.288**	18.570	−2.813	−2.679	4.848	−1.089	3.419	−26.547
Liquid asset ratio$_{t-1}$	−0.125	−0.122	−0.390	−0.296	−0.609	0.655	0.172	0.225	0.207	0.281	0.380	0.422
Liquid asset ratio$_{t-1}$ × r_t	0.206	0.440	−0.166	1.081	1.174*	1.408	−0.311	−0.121	−0.351	−0.133	0.439	−1.497
Size$_{t-1}$	0.010	0.051	−0.137	−0.035	0.115	−0.059	0.010	0.047	−0.305	0.189	0.412*	1.027**
Size$_{t-1}$ × r_t	0.079**	0.062	0.083	0.053	0.070	0.295	0.041	0.035	0.043	0.039	−0.002	−0.434
Constant	−0.586	−1.193	1.586	0.115	−2.077	−2.156	−0.441	−1.101	4.305	−3.215	−6.672*	−13.583**
Observations	17,557	17,331	6,664	9,713	9,175	4,172	16,520	16,225	6,396	7,626	6,482	2,733
R^2	0.28	0.28	0.46	0.37	0.36	0.47	0.31	0.32	0.46	0.45	0.49	0.55
Adjusted R^2	0.03	0.03	0.04	0.02	0.01	0.01	0.06	0.06	0.02	0.12	0.15	−0.05
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the coefficients from a regression of foreign lending growth on bank balance sheet variables and their interaction with aggregate liquidity risk r_t. The dependent variables are measured at the bank-country-level, i.e. lending by bank i in country j at time t, and are computed as the log difference of the respective types of foreign lending which are displayed in the headers of the table. "CB" stands fro cross-border lending and "Local" stands for local lending by foreign affiliates. Data of six major French banking groups were used for the period 2005Q4 to 2013Q2. Data observations were omitted from the regressions whenever the growth rate of real assets was greater than 10% in order to correct for outliers and to account for mergers. Observations were adjusted to control for demand effects in country j by only including countries to which at least two banks lend to at time t (Khwaja and Mian, 2008). The dependent variables are winsorized at 1% and 99%. Standards errors are robust and clustered at the bank-country level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Bank-country level, no bank FE

	Total lending			Financial sector			Non-financial sector			Public institutions		
	All	CB	Local	All	CB	Local	All	CB	Local	All	CB	Local
Core deposit ratio$_{t-1}$	−0.277	−0.334*	0.793**	−0.417	−0.696**	−0.073	0.085	0.046	0.859	−0.099	−0.180	0.450
Core dep. ratio$_{t-1} \times r_t$	0.064	0.226	−1.370**	0.308	0.781	−0.757	−0.157	−0.017	−1.330*	−0.053	0.303	−0.747
Commitment ratio$_{t-1}$	0.053	0.012	−0.414	−0.007	−0.171	−0.461	0.130	0.039	−0.290	−0.036	−0.104	0.321
Comm. ratio$_{t-1} \times r_t$	−0.026	0.242	0.626	0.179	0.721	1.937	0.262	0.559*	0.391	−0.286	0.198	−0.006
Capital ratio$_{t-1}$	−2.401*	−2.889**	−2.254	−3.553	−5.493*	0.985	1.188	1.335	2.977	−0.811	−2.176	0.166
Capital ratio$_{t-1} \times r_t$	5.212**	6.473**	14.308*	11.227*	11.661*	26.428	−1.504	−1.670	2.482	−3.848	0.645	−6.868
Liquid asset ratio$_{t-1}$	−0.118	−0.167	0.398	−0.446	−0.652**	0.197	0.240*	0.243*	0.636*	−0.086	−0.285	0.177
Liquid asset ratio$_{t-1} \times r_t$	0.109	0.318	0.019	0.692	0.884	1.334	−0.185	−0.039	−0.539	−0.351	0.239	0.178
Size$_{t-1}$	−0.100***	−0.099***	−0.076**	−0.101**	−0.101**	−0.199**	−0.069***	−0.069***	−0.063*	0.025	0.031	0.189
Size$_{t-1} \times r_t$	0.082**	0.064*	0.032	0.081	0.105	0.297	0.042	0.032	0.023	0.055	0.025	−0.341
Constant	1.213***	1.282***	0.664*	1.201***	1.194***	0.396	0.703***	0.747***	0.476	−0.502	−0.488	−0.909
Observations	17,557	17,331	6,664	9,713	9,175	4,172	16,520	16,225	6,396	7,626	6,482	2,733
R^2	0.28	0.28	0.46	0.37	0.36	0.47	0.31	0.32	0.46	0.45	0.49	0.55
Adjusted R^2	0.03	0.03	0.04	0.02	0.01	0.01	0.06	0.06	0.02	0.12	0.15	−0.05
Bank FE	No	No	No	No	No	No	No	No	No	No	No	No
Country-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the coefficients from a regression of foreign lending growth on bank balance sheet variables and their interaction with aggregate liquidity risk r_t. The dependent variables are measured at the bank-country-level, i.e. lending by bank i in country j at time t, and are computed as the log difference of the respective types of foreign lending which are displayed in the headers of the table. "CB" stands fro cross-border lending and "Local" stands for local lending by foreign affiliates. Data of six major French banking groups were used for the period 2005Q4 to 2013Q2. Data observations were omitted from the regressions whenever the growth rate of real assets was greater than 10% in order to correct for outliers and to account for mergers. Observations were adjusted to control for demand effects in country j by only including countries to which at least two banks lend to at time t (Khwaja and Mian, 2008). The dependent variables are winsorized at 1% and 99%. Standards errors are robust and clustered at the bank-country level. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Bank level, bank FE: Public liquidity

	Foreign lending			**Cross-border lending**			**Local lending**		
	No use	Use	Diff.	No use	Use	Diff.	No use	Use	Diff.
Core deposit ratio$_{t-1}$	−0.049	0.729	−0.778	0.116	0.044	0.072	−0.154	0.676**	−0.830*
Commitment ratio$_{t-1}$	0.022**	1.621	−1.599**	0.039	0.401	−0.362	−0.012**	1.276	−1.288**
Capital ratio$_{t-1}$	0.971	1.259	−0.288	−1.005	−0.795	−0.210	1.777	1.849	−0.072
Liquid asset ratio$_{t-1}$	−0.015	0.617	−0.632	0.037	0.009	0.028	−0.053	0.599	−0.652
Size$_{t-1}$	0.015	0.011	0.004	−0.011	0.007	−0.018	0.024	0.003*	0.021
Observations	143			143			143		
R^2	0.44			0.42			0.37		
Adjusted R^2	0.10			0.07			0.00		
Bank FE	Yes			Yes			Yes		
Time FE	Yes			Yes			Yes		
	Domestic loans			**Total credit**			**Liquid assets**		
	No use	Use	Diff.	No use	Use	Diff.	No use	Use	Diff.
Core deposit ratio$_{t-1}$	−0.041	0.114	−0.155	−0.200	0.456	−0.656	−0.367**	0.420**	−0.787**
Commitment ratio$_{t-1}$	−0.070	0.178	−0.248	−0.053	0.481	−0.534	0.089	0.447	−0.358
Capital ratio$_{t-1}$	0.003	0.603	−0.600	0.964	1.723	−0.759	4.066	−1.501**	5.567**
Liquid asset ratio$_{t-1}$	−0.057	0.135	−0.192	−0.179	0.504	−0.683			
Size$_{t-1}$	0.009	−0.014	0.023*	0.033	−0.006	0.039	0.060**	0.090**	−0.030
Observations	143			139			143		
R^2	0.58			0.36			0.69		
Adjusted R^2	0.33			−0.03			0.52		
Bank FE	Yes			Yes			Yes		
Time FE	Yes			Yes			Yes		

Notes: This table reports the marginal effects of public liquidity provision on balance sheet variables' effect of aggregate liquidity risk on the variables listed in the headers of the table. The underlying regression uses balance sheet variables and their interaction with aggregate liquidity risk as idiosyncratic realizations of shocks to banks' balance sheets and differentiates whether or not banks made use of public liquidity provisions (use of a dummy variable which equals one whenever a bank's liabilities vis-à-vis the central bank is larger than 2% of core deposits until 2011 and 1% of core deposits from 2012 onward). As such, the table reports the marginal effects of the interaction of balance sheet variables with aggregate liquidity risk depending on whether public liquidity was used. The difference of the marginal effects and their significance level is displayed as well. The dependent variables are measured at the bank-level, i.e. lending by bank i at time t, and are computed as the difference of total foreign loans, cross-border loans, local loans by foreign affiliates, domestic loans, total credit and liquid assets, all scaled by total assets. Data of six major French banking groups were used for the period 2005Q4 to 2013Q2. Data observations were omitted from the regressions whenever the growth rate of real assets was greater than 10% in order to correct for outliers and to account for mergers. The dependent variables are winsorized at 1% and 99%. Standards errors are robust. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Bank-country level, bank FE: Public liquidity

Financial sector		All			Cross-border			Local	
	No use	Use	Diff.	No use	Use	Diff.	No use	Use	Diff.
Core deposit ratio$_{t-1}$	0.160*	8.133	−7.973	1.268	−0.364	1.632	−1.293**	65.909	−67.202**
Commitment ratio$_{t-1}$	0.422**	12.873	−12.451**	1.401	5.637	−4.236	1.174	20.789	−19.615
Capital ratio$_{t-1}$	16.922	55.171	−38.249	12.606	−8.355	20.961	31.591	50.483	−18.892
Liquid asset ratio$_{t-1}$	0.733*	7.732	−6.999	1.442	−2.324**	3.766	0.148**	42.988	−42.840**
Size$_{t-1}$	0.039	0.041	−0.002	−0.077	0.209	−0.286	0.704**	−2.011**	2.715**
Observations	9,713			9,175			4,172		
R^2	0.37			0.36			0.48		
Adjusted R^2	0.02			0.01			0.02		
Bank FE	Yes			Yes			Yes		
Country-time FE	Yes			Yes			Yes		
Non-financial sector		All			Cross-border			Local	
	No use	Use	Diff.	No use	Use	Diff.	No use	Use	Diff.
Core deposit ratio$_{t-1}$	−0.364*	2.400	−2.764*	0.133**	3.022	−2.889*	−0.957	12.880	−13.837
Commitment ratio$_{t-1}$	0.786	1.110*	−0.324	0.887	2.571*	−1.684	0.828**	−15.091	15.919**
Capital ratio$_{t-1}$	5.444	13.039	−7.595	0.439	16.214	−15.775	7.549**	−181.121	188.670**
Liquid asset ratio$_{t-1}$	0.362	2.069	−1.707	0.530	2.450	−1.920	0.068	−0.994	1.062
Size$_{t-1}$	−0.017	0.090	−0.107	−0.071	0.078	−0.149	−0.041	−0.392	0.351
Observations	16,520			16,225			6,396		
R^2	0.31			0.32			0.46		
Adjusted R^2	0.06			0.06			0.03		
Bank FE	Yes			Yes			Yes		
Country-time FE	Yes			Yes			Yes		

Notes: This table reports the marginal effects of public liquidity provision on balance sheet variables' effect of aggregate liquidity risk on foreign lending growth. The underlying regression uses balance sheet variables and their interaction with aggregate liquidity risk as idiosyncratic realizations of shocks to banks' balance sheets and differentiates whether or not banks made use of public liquidity provisions (use of a dummy variable which equals one whenever a bank's liabilities vis-à-vis the central bank is larger than 2% of core deposits until 2011 and 1% of core deposits from 2012 onward). As such, the table reports the marginal effects of the interaction of balance sheet variables with aggregate liquidity risk depending on whether public liquidity was used. The difference of the marginal effects and their significance level is displayed as well. The dependent variables are measured at the bank-country-level, i.e. lending by bank i in country j at time t, and are computed as the log difference of the respective types of foreign lending which are displayed in the headers of the table. "CB" stands fro cross-border lending and "Local" stands for local lending by foreign affiliates. Data of six major French banking groups were used for the period 2005Q4 to 2013Q2. Data observations were omitted from the regressions whenever the growth rate of real assets was greater than 10% in order to correct for outliers and to account for mergers. Observations were adjusted to control for demand effects in country j by only including countries to which at least two banks lend to at time t (Khwaja and Mian, 2008). The dependent variables are winsorized at 1% and 99%. Standards errors are robust and clustered at the bank-country level. *** p<0.01, ** p<0.05, * p<0.1.

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