Foreign Banks, Liquidity Shocks, and Credit Stability*

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Abstract

This paper investigates whether foreign banks help mitigate the effects of domestic liquidity shocks by exploiting a policy-induced shock to the U.S. wholesale market for liquidity and matched bank-syndicated loan data. We find that, following the 2011 Federal Deposit Insurance Corporation (FDIC) regulatory change to the cost of wholesale liquidity, foreign banks, which faced a relatively positive liquidity shock, accumulated more reserves by engaging in liquidity hoarding, but did not expand their lending. These responses are more pronounced for foreign banks affiliated with complex global bank holding companies and whose parent banking systems experienced distress at the moment of the shock. (*JEL* G21, G28, E44)

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Over the past 20 years, interest in the impact of multinational banks on the business activity of host countries, alongside a rise in global banking, has been growing. In the early days of bank globalization, it was often maintained that multinational banks could enhance the resilience of host economies to domestic liquidity or capital shocks. This stabilizing role would be made possible by banks' ability to tap into internal markets for liquidity, their use of sophisticated lending technologies and securities holdings, and their access to capital markets at lower cost than domestic banks. Indeed, foreign banks have been frequently found to maintain credit amidst negative shocks to the host countries (see, e.g., Cetorelli and Goldberg [2012a] and the references therein).[1] Yet, after the 2008 global financial crisis (GFC), concerns have been growing about foreign banks' capacity to perform a stabilizing role. It has become increasingly evident that banks' lending and liquidity allocation goals can be conducive to the amplification, rather than the mitigation, of shocks (Buch and Goldberg 2020; Goulding and Nolle 2012). Following shocks, for example, multinational banks can pursue goals of arbitrage and also engage in complex activities of liquidity management to the benefit of their entire global conglomerate, rather than supporting the local economy. They may also be reluctant to expand liquidity provision to local businesses of which they could have limited experience. The financing of local businesses is in fact a relatively new activity for global banks, which mostly focused on funding sovereigns in the early days of bank globalization.

The uncertainty about the stabilizing or destabilizing behavior of foreign banks emerges clearly when one considers domestic liquidity shocks. Liquidity shocks are increasingly viewed as a primary driver of business fluctuations (Bigio 2015; Farhi and Tirole 2012) and, in the wake of the great financial crisis, concerns have grown especially on liquidity disruptions originating in markets for banks' wholesale liquidity.[2] Holmstrom and Tirole (2002) show that global banks can tap larger sources of liquidity than domestic banks, and this allows them to partly offset domestic liquidity shortages. On the other hand, they also show that global banks can have limited understanding of local collateral, and this can prevent them from replacing domestic banks in the financial intermediation process (see also Cao et al. 2021). Further, recent studies (Buch

[1] However, shocks originating abroad have been shown to propagate through foreign banks that recall funds to their home offices and contract the credit supply in host countries (Peek and Rosengren 2000).

[2] In this paper, we indeed focus on shocks to funding liquidity. Shocks to collateral asset liquidity have also received growing attention in the literature.

and Goldberg 2020; Cetorelli and Goldberg 2016) show that the complex liquidity management and goals of global banks can lead to attenuated responses ("too low responsiveness") to local liquidity conditions, limiting their ability to substitute for liquidity-stricken local banks. Due to these contrasting forces, the role of foreign banks in response to domestic liquidity shocks is ultimately an empirical question.

In this paper, we aim at contributing to this unsettled debate. Studying the response of foreign banks to liquidity shocks that hit host countries encounters natural challenges. There can be confounding macroeconomic effects that influence the demand for credit of foreign and domestic banks. Further, liquidity shocks can be correlated across countries, and the response of foreign banks that operate globally could then reflect changes in liquidity conditions in foreign countries. We address these issues by exploiting a unique policy-driven domestic liquidity shock that hit the U.S. bank funding market, namely, the new Federal Deposit Insurance Corporation (FDIC) balance sheet assessment enacted in 2011. This shock significantly increased the cost of wholesale liquidity for insured domestic banks, while reducing the cost for uninsured foreign banks (Kreicher, McCauley, and McGuire 2014). The asymmetric impact on the cost of wholesale funding for the two subgroups of banks then can be interpreted as an increase in the cost of liquidity for domestic banks and a reduction in the cost of liquidity for uninsured foreign branches.[3] We assess the impact of this policy-induced liquidity shock by using data from the syndicated loan market hand-matched with data on banks' balance sheets. We show that foreign banks that benefited from the favorable funding shock reacted by increasing their holdings of reserves, but did not participate more actively in syndicated loans. In fact, ceteris paribus, we find evidence of reduced syndicated lending by foreign banks on both the intensive and extensive margins.

More precisely, in the empirical analysis we use a difference-in-differences approach and study differences in the reaction to the policy shock of uninsured and insured banks. Because we estimate our approach based on the FDIC change, we include time, firm, bank, and country-time fixed effects to alleviate any lingering concerns for common shocks, like other absorbing factors

[3]The traditional bank lending channel of monetary policy works through an analogous mechanism: if following a contractionary shock, banks cannot substitute more expensive deposits with other external sources, such as certificates of deposits (CDs) or money market funds, then the shock is transmitted to the asset side of their balance sheets. Similarly, in the current setting insured (assessed) banks face a higher cost associated with wholesale funding, while uninsured (exempted) foreign banks experience easier access to wholesale liquidity.

contained in the Dodd-Frank Act, and time-invariant demand- and supply-side omitted factors.[4] We examine banks' lending activity as recorded on their quarterly balance sheet statements, and through a hand-matched syndicated loan-level database based on DealScan data.[5] We find that uninsured branches of foreign banks reduced their participation in syndicated loans, despite their improved access to wholesale liquidity. This occurred both on the extensive margin, through a decrease in the number of loans extended and of their client borrowers, and on the intensive margin, through smaller portions of total loan facilities and a lower propensity to act as lead arrangers of the loans. That is, foreign banks, faced with greater access to wholesale liquidity, reduced their lending in favor of liquidity hoarding (building up reserves). Indeed, our estimates reveal that the foreign bank holding companies that were more reliant on wholesale funding before the shock, and hence plausibly benefited more from the funding shock, were those that curtailed more substantially their participation in syndicated loans. Our results are in line with the evidence in Kreicher, McCauley, and McGuire (2014) that U.S. branches of non-U.S. banks went from being net lenders to net borrowers.

Overall, our analysis confirms that foreign banks' ability to stabilize host economies hit by liquidity shocks is ambiguous a priori. We also take a first step toward examining the forces that led uninsured foreign banks to hoard liquidity, rather than expand lending. We uncover evidence that this behavior was especially pronounced for foreign banks affiliated to relatively more complex bank conglomerates, in line with the hypothesis of "too low responsiveness" put forward by Cetorelli and Goldberg (2016). We also find preliminary evidence that liquidity hoarding was more pronounced for foreign banks whose parent banking systems faced larger capital shortfalls, suggesting that liquidity hoarding stemmed from a precautionary motive.[6] Altogether, these results call for a better understanding of both global banks' liquidity management and their ability to supplant domestic banks in the local credit markets. This can also enhance the design of policy responses in the aftermath of liquidity shocks.

[4]We control for a rich set of bank-specific characteristics, including a liquidity ratio to account for different preferences among banks in liquidity hoarding. We also control for the funding model of the banks, entering the shock period, as measured by their reliance on wholesale or retail funding.

[5]In our sample, syndicated loans represent, on average, around 9% of U.S. foreign banks' total assets and around 13% in terms of total loans.

[6]In unreported results, we find no evidence that larger investment opportunities in the parent country motivated liquidity hoarding.

Before proceeding, we believe it is worth clarifying what the paper is not about. It has been frequently observed that foreign banks' behavior can differ quite sharply between advanced and developing countries. Thus, we recommend caution, for example, in drawing inferences from our analysis for the possible responses of foreign banks to liquidity funding shocks in the context of developing countries.

1 Prior Literature

This paper relates to two strands of literature. The first strand investigates how foreign banks affect credit provision and the stability of host economies amidst negative capital or liquidity shocks. Kashyap and Stein (1995, 2000) investigate the impact of a liquidity shock via monetary policy on bank lending and find that smaller banks are less resilient to the bank lending channel than larger banks. Cetorelli and Goldberg (2012a) find that the presence of foreign banks during adverse liquidity shocks can be a stabilizing force in the host economy. In fact, they argue that what makes large banks resilient to a contractionary monetary policy shock is not their access to external credit, as argued by Kashyap and Stein (1995, 2000), but rather the presence of foreign offices.

Large multinational banks can withstand liquidity shocks better than large domestic banks by allocating liquidity across borders through internal capital markets. De Haas and Van Lelyveld (2006) find for emerging Europe that during local crises lending by foreign banks has typically been more stable than lending by domestic banks. Haselmann (2006) provides evidence that foreign banks act as stabilizers in Central and Eastern European countries. Also, Kamil and Rai (2010) show for Latin America that multinational bank subsidiaries were a relatively stable credit source during the great financial crisis. By contrast, De Haas and Lelyveld (2014) conclude that during the crisis the subsidiaries of multinational banks curtailed credit growth more than domestic banks.[7]

The second related strand of studies examines the response of banks to domestic liquidity shocks. The liquidity shock considered in this paper consists of an increase in the cost of wholesale funding for domestic banks and a corresponding decrease for foreign banks. The literature has

[7] See also De Haas and Van Lelyveld (2010).

established that retail and wholesale funding are imperfectly substitutable, so that the increase in the cost of one source raises the overall cost of funding for banks. For example, the bank lending channel literature stresses that, since large-denomination CDs are not federally insured, in the presence of asymmetric information between banks and investors, adverse selection problems will make the marginal cost of wholesale liquidity an increasing function of the amount raised (Romer and Romer 1990; Kashyap and Stein 1995; Stein 1998).[8] In our setting, the funding cost shock is akin to the shock generally studied in the bank lending channel, when the cost of retail deposits increases and, due to limited substitutability between retail and wholesale funds, banks' overall cost of funding rises. Here, due to the FDIC regulatory shock, it is the cost of wholesale funding that rises and, due to imperfect substitutability, this increases the overall cost of funding for domestic banks.

Finally, the paper also loosely relates to the literature that investigates the role of foreign banks in transmitting shocks (e.g., Peek and Rosengren 1997, 2000; Claessens and Van Horen 2014). Analyzing the syndicated lending market in the aftermath of the GFC, Giannetti and Laeven (2012) find that banks with relatively worsened capital positions shifted their lending toward borrowers in their home countries ("flight home"), and that the banks most adversely affected by the crisis were those that cut their lending most severely. Correa, Sapriza, and Zlate (2013) offer an example of foreign banks propagating a liquidity shock from abroad by looking at how U.S. branches of foreign banks responded to liquidity shocks stemming from the European debt crisis.

2 Institutional Background and Hypotheses

In this section, we discuss the regulatory-driven domestic liquidity shock that hit the U.S. banking sector in April 2011. We then lay out testable implications.

[8] Adverse selection is not the only source of imperfections. Froot, Scharfstein, and Stein (1993) demonstrate how a costly state verification model leads to a convex cost function for external funds. Further, potential investors in a bank's nondeposit liabilities may not be aware of the return opportunities offered by the bank. The bank may, therefore, have to spend in advertising or raise its rates relative to those of alternatives (e.g., Treasury bills).

2.1 The FDIC assessment base change

The Dodd-Frank Act was signed into law in July 2010 with the goal of enhancing the FDIC's ability to manage its Deposit Insurance Fund (DIF). The law enabled the FDIC to use stronger tools to "maintain a positive fund balance even during a banking crisis and [maintain] moderate, steady assessment rates throughout economic credit cycles." Dodd-Frank raised the target reserve ratio (designated reserve ratio, DRR) and set a timetable by which the FDIC was to achieve specified increasing ratios through 2020. The act also required that the effect of this increased fund ratio not raise the assessment for insured depository institutions with total consolidated assets of less than $10 billion.[9]

The most important change—as it pertains to this study—came in the law's requirement that the FDIC redefine the assessment base used for calculating deposit insurance assessments. In April 2011, the FDIC enacted a change in the insurance fee levied on banks to fund the FDIC's Deposit Insurance Fund. Precisely, the FDIC previously assessed insured depository institutions based on domestic deposits. Beginning April 1, 2011, it would assess insured depository institutions based on average consolidated total assets minus tangible equity (defined as Tier 1 Capital). Thus, insured depository institutions would now be assessed based on their total liabilities, and wholesale funding became part of the assessment base. The amendment went into effect for the second quarter of 2011. The rule especially penalized large institutions, while the FDIC adjusted the assessment rate for smaller institutions in such a way that they would not suffer from the regulatory change. As such, the FDIC assessment base change sought to act as a corrective tax on large, complex institutions and decrease their exposure to wholesale short-term funding, a possible source of vulnerability to runs for these banks and, hence, of systemic instability (Shin 2010).[10] In Table A1 in Internet Appendix A, we show the estimated magnitudes ($ trillions) and changes (%) in the assessment base for a subsample of insured banks.

Importantly, all U.S. depository institutions are required to have FDIC insurance, but a group of around 200 branches of foreign banks in the United States is exempt from the new insurance assessment base. These foreign bank branches may not accept retail deposits from U.S. citizens

[9] In Internet Appendix A, we provide more information on the FDIC assessment base.

[10] Wholesale funding refers to a variety of borrowings, like repurchase agreements, federal funds, and foreign deposits, and is often done on large quantities and on a short-term basis. Table B4 in Internet Appendix B shows the composition of banks' balance sheets in the United States.

and residents, but take wholesale deposits and engage in a variety of other banking activities. These branches hold a high percentage of the total foreign banking assets in the United States, and a significant fraction of their lending takes the form of commercial and industrial (C&I) loans with representation in the syndicated loan market.

The policy change enacted by the FDIC can be considered a heterogeneous shock to the cost of bank funding. Insured banks that are assessed on the new fee face higher costs associated with raising nondepository funds. Whalen (2011) estimates that the impact was nearly the same as if the Fed were to have raised interest rates about 15 basis points (bps). In the current setting, insured (assessed) banks face a higher cost associated with wholesale funding, while uninsured (exempted) foreign banks experience easier access to wholesale liquidity.

A few finer but relevant points in the final rule warrant discussion. Insured branches of foreign banks are given no special treatment. They are to compute their assets and equity based on the consolidated branch without including those of a foreign parent bank. In the case that a parent bank and its subsidiary are both FDIC insured, the two entities are to compute their assessments separately, based only on the assets and equity of the individual institution.

What is important for the purpose of this study is the effect of the FDIC policy shock on wholesale funding rates and subsequently on credit creation. McCauley and McGuire (2014) argue that the "seemingly small regulatory differences" between insured banks and uninsured branches of foreign banks have incentivized these branches to make big adjustments in their balance sheet and hold a disproportionate share of reserves. These consolidated non-U.S. banks raised dollars to finance their cash holdings through increased deposits and swapping of other currencies, the authors claim. Afonso, Entz, and LeSueur (2013) reiterate the point that the FDIC assessment change has had a material effect on U.S. bank funding costs. In particular, they note that foreign banks have increasingly borrowed in the federal funds market.

2.2 Testable hypotheses

The policy change significantly affected banks' access to liquidity, as it can be gleaned from the behavior of wholesale funding rates. Kreicher, McCauley, and McGuire (2014) find that four overnight money market rates (the effective federal funds rate, Libor, eurodollar, and repurchase

agreements) all immediately fell on April 1, 2011, because of the lower bid for overnight funding from assessed banks. In fact, they note that trading was "especially turbulent" on the date of the policy change (Figure 1) and cite estimates from informed observers that the FDIC change cut overnight rates by 5–10 bps. This yields two important implications of the policy change. First, the demand for borrowing in this market by insured institutions fell. Second, this policy change also can be viewed as a positive funding shock for the uninsured institutions, as their funding costs on the wholesale liquidity market decreased.

The predicted impact of the liquidity shock on banks' liability side is clear. We expect that the assessed institutions (insured banks in the United States) will economize on the newly assessed wholesale funding, and increase their financing of assets with deposits and/or reduce their assets.[11] In spite of the possibility of substituting wholesale funding with retail funding, because of their imperfect substitutability, we expect the overall cost of funding to increase for insured banks. By contrast, we expect the cost of accessing wholesale funding and, hence, the overall cost of funding to drop for exempted banks, that is, uninsured branches and agencies of foreign banks.

The most interesting empirical question is in regard to the use made by the foreign unaffected banks of their easier access to liquidity. Do foreign banks take the opportunity to compensate for any contraction in loans by domestic banks or do they instead accumulate interest-bearing reserves at the Fed? The predictions of extant studies are ambiguous. The traditional bank lending channel view predicts that a liquidity shock, such as that induced by the FDIC policy change, should induce the unaffected branches of foreign banks to increase their lending relative to the affected insured banks. Holmstrom and Tirole (2002) investigate a similar point in a theoretical model where foreign banks can tap into cheaper sources of liquidity than can domestic banks, and this allows the latter to partly offset domestic shortages of liquidity. Under this view, we would then expect foreign banks to increase their lending, possibly in substitution of the domestic banks aggravated by the higher cost of liquidity. On the other hand, a growing number of theoretical and empirical studies stress that alternative forces can work in an opposite direction and lead to a decrease in lending from foreign uninsured banks. As discussed by Buch and Goldberg (2020),

[11] For example, say an assessed bank was paying a 10-bps premium to the FDIC on its domestic deposits before, and afterward has to pay 10 bps on both deposit and nondeposit liabilities. Before the wider assessment base, the regulatory costs of the two funding sources differed by 10 bps and afterward by 0 bps.

we can subdivide explanations of such a lending behavior of foreign banks based on two distinct forces: whether this relates to goals, structure and organization of global banks or instead it relates to global banks' (lack of) knowledge of local markets.

Cetorelli and Goldberg (2016) highlight that the complexity of a global bank conglomerate constrains the choices of its affiliates. A foreign bank part of a complex organization could react to a funding shock by factoring in needs and characteristics of the organization it belongs to. This would lead to lower lending sensitivity to changes in local market conditions than in the case of domestic banks.[12] This force also naturally relates to the management of liquidity within global banks and to the workings of their internal capital markets. Global banks manage liquidity, allocating funds across offices in their geographic locations based on relative needs (Cetorelli and Goldberg 2011, 2012a, 2012b). Cetorelli and Goldberg (2012b) suggest that, in the aftermath of a liquidity shock, a bank may not move funds indiscriminately in and out of its offices, but strategically reallocate liquidity from locations viewed as a funding source to locations viewed as investment sinks. Thus, active liquidity management could lead foreign banks (especially those affiliated to complex conglomerates) to accumulate liquidity rather than expand lending, in expectation of liquidity needs of other parts of the conglomerate. In our setting, such an incentive of global banks to hoard liquid assets could also have been strengthened by the opportunity to exploit the payment of interest on excess reserves (IOER) offered by the Fed.[13] During the FDIC policy change, in fact, the Fed paid interest on both required and excess reserves, at a rate of 25 bps. This created an arbitrage opportunity: depository institutions with accounts at the Fed (e.g., U.S. chartered banks and U.S. branches and agencies of foreign banks) could borrow cheap funds in the market from nonbanks like government-sponsored enterprises and then deliver those funds at the Fed, earning a risk-free profit. As shown theoretically by Martin, McAndrews, and Skeie (2013), large reserve balances can in turn crowd out bank lending in the presence of balance sheet costs and interest on reserves.[14]

[12] Ozbas and Scharfstein (2010) show that subsidiaries that are part of conglomerates respond less to investment opportunities than otherwise similar but stand-alone entities.

[13] In 2006, Congress passed the Financial Services Regulatory Relief Act, permitting the Federal Reserve to pay interest on reserves held by depository institutions at the Fed. The originally planned effective date was October 1, 2011, but was advanced to October 1, 2008, by the Emergency Economic Stabilization Act of 2008.

[14] A balance sheet cost can be interpreted as a cost increasing in the level of bank assets, but binding capital requirements also could be interpreted as such a cost.

A second force that can induce foreign banks to use less costly access to wholesale funding to hoard liquidity, instead of expanding loans, could be their limited ability to replace domestic banks in extending loans to local customers. Several studies stress that foreign banks may serve only large and transparent customers. According to Holmstrom and Tirole (2002) global banks can have limited understanding of local collateral, and this can prevent them from replacing domestic banks. In a similar vein, Cao et al. (2021) show that foreign banks can have limited ability to offset domestic liquidity shortages because of their limited knowledge of domestic collateral. Mian (2006) finds that foreign banks may avoid lending to opaque firms, especially if the cultural and geographical distance between the CEO and the loan officer is large (see also Berger, Klapper, and Udell 2001). Giannetti and Ongena (2012) investigate the lending patterns of multinational banks in Eastern European countries and obtain evidence that informationally opaque firms are penalized by multinational banks. Also, Gormley (2010) uncovers further evidence that foreign banks are less likely than domestic banks to lend to informationally opaque businesses.

The tendency of foreign banks to take a cautious attitude toward expanding lending may also manifest itself in increased "laziness" in loan monitoring. Manove, Padilla, and Pagano (2001) propose a model of "lazy banks" in which banks able to evaluate the quality of an investment project cease to do so if the collateral provided is abundant. In a related sense, in the presence of a positive liquidity shock, some banks might become "lazy": rather than make the effort required to participate in lending deals and monitor them, they could prefer to accumulate interest-bearing reserves.

3 Data and Measurement

3.1 Bank Call Report data

This study uses several sources of data. First, we obtain quarterly Call Reports from the Federal Reserve Bank of Chicago. These Call Reports are collected by the Federal Financial Institutions Examination Council (FFIEC). We use several specific reports: the FFIEC 031 and the FFIEC 041 are reported at the level of the consolidated bank, filled out by banks located in the United States with and without foreign offices, respectively. We rely on a separate report, the FFIEC

002, for data on U.S. branches and agencies of foreign banks.

We supplement these Call Reports with a Federal Reserve release that contains data on the structure and shareholdings of foreign banks. This so-called structure and share" data set contains more detailed qualitative information on the related foreign institutions of all foreign-owned banks. The data set consists of all U.S. offices of foreign banking organizations: U.S. branches and agencies, subsidiaries that are commercial banks and at least 25% owned by a foreign banking organization (FBO), foreign-owned Edge Act and agreement corporations, U.S. representative offices of foreign banks, and New York state investment companies owned by foreign banks. As noted, we choose to look only at foreign-owned branches and agencies, foreign-owned subsidiaries, and domestic banks. This data set allows us to link the Call Reports to information regarding ownership structure.

Foreign banking organizations that control or own an institution in the United States are required to complete the FR Y-7Q report, which contains limited information regarding total assets, risk-weighted assets, and regulatory capital levels of the FBO. FBOs with U.S. banking operations that have achieved status as financial holding companies complete this form quarterly; all other FBOs are required to complete the report once each year. As alluded to previously, these FBOs can be either banks or holding companies.[15]

We also obtain balance sheet data on domestic bank holding companies (BHCs), which report their financial statements with the Federal Reserve via the FR Y-9C form. Only BHCs with total consolidated assets of $1 billion or more file this report. If a holding company controls or owns another holding company, only the top-tier holding company must file the report. Currently, around 85 % of U.S. chartered banks are controlled by a holding company. Those that are not, and those whose top-tier holding company has less than $1 billion in total consolidated assets, are excluded from the portions of the study in which we consolidate all banks to the level of the holding company.

Our full data set spans from 2001Q1 through 2014Q2, though in parts of the analysis we opt to use a shorter time frame to avoid various problems, particularly those arising from the occurrence of the financial crisis. We combine these data sets into two forms, which we use for

[15]The report is available through the Federal Reserve via a Freedom of Information Act Request.

analysis in the coming sections. First, we look at the individual banks and branches of foreign banks alone. This unconsolidated data set yields roughly 432 thousand observations over the nearly 15-year time span. Next, we consolidate the entities to the level of the top-tier holding company. The vast majority of small domestic banks have no affiliated depository institutions, so we retain about 273 thousand observations. With the unconsolidated data set, we can identify whether or not the observation is FDIC insured. However, it ignores the relationship between related branches and banks, and comparing consolidated banks to branches could pose certain problems. In the consolidated data set, we measure the degree to which a foreign bank family is not FDIC insured by the ratio of its assets held by uninsured U.S. branches to total assets held in U.S. institutions. The differences are not qualitatively substantial, and so we present only the results from the consolidated data set.

Care should be taken regarding the timing of the policy change in our analysis. The FDIC assessment base change went into effect April 1, 2011, but was finalized just less than 6 months prior. In our base case, we use the second quarter of 2011 as the policy change. We have tried other implementation dates as checks for robustness and find that the results are not substantially changed.

3.2 Syndicated loan data

We provide a brief description of the syndicated loan market, as it already has been extensively analyzed in the literature (see, e.g., Sufi 2007; Giannetti and Laeven 2012; Delis, Kokas, and Ongena 2017). Syndicated loans are granted by a group of banks to a single borrower. Loan syndication allows banks to compete with capital markets in the generation of relatively large transactions that a sole lender would not otherwise be able (or willing) to undertake due to internal and regulatory restrictions. Syndicated loans account for a sizeable portion of total bank lending. This market is often used to assess bank lending policies and the interactions between lenders and borrowers (Ivashina and Scharfstein 2010; Chodorow-Reich 2014).[16]

We use Thompson Reuters' DealScan database to obtain data on U.S. syndicated loan deals

[16]Syndicated loans are an important funding vehicle for corporations. Ivashina and Scharfstein (2010) report that syndicated loan exposures in the United States represent about 26% of total C&I loan exposures of U.S. banks' balance sheet and about 36% for large U.S. and foreign banks. In addition, if we consider flows of new lending instead of the stock balance sheet measure, the overall fraction is higher.

enacted from banks that appear in FFIEC call reports to firms that operate in the United States.[17] This database provides detailed information on the loan deal's characteristics (amount, maturity, collateral, performance pricing, etc.), as well as more limited information on the members of the syndicate, the lead bank, the share of each bank in the syndicate, and the firm that receives the loan. We apply the following selection rules to avoid including bias in our sample and to provide a realistic insight into the structure of the syndicates. First, we categorize loans as credit lines and terms A, B, C, D, and E, and we exclude term loans B because banks hold none of these loans after syndication. Term loans B are structured specifically for institutional investors and almost entirely sold off in the secondary market. Second, following Roberts (2015), we drop loans that are more likely to be amendments to existing loans, because these are misreported in DealScan as new loans, but they do not necessarily involve new money. Finally, we exclude loans granted to utilities or to financial companies.

To obtain information for the financial statements of the banks, we match these data with the Call Reports. We hand-match DealScan's lender ID with the commercial bank ID (RSSD) from the Call Reports, because there is no common identifier between these data sets. Matching is initially performed using a fuzzy merge algorithm based on names and locations, and we manually review all matching results. This process yields a unique identity for each lender. Because these reports are available on a quarterly basis, we match the origination date of the loan deal with the relevant quarter. For example, we match all syndicated loans that were originated from April 1 to June 30 with the second quarter of that year of the Call Reports. Similarly, we obtain annual information for the financial statements of firms from Bureau Van Dijk's Osiris database. The final sample is a so-called "multilevel" data set, which has observations on banks and firms (lower level) and loan deals (higher level).

3.3 Measurement and summary statistics

3.3.1 Call Reports data. Without loss of generality, we discuss summary statistics in this section from the unconsolidated bank balance sheet data, presented in Table 1, panel A. Each of the variables refer to the total holdings in U.S. offices of a particular category. The capital ratio

[17] This includes domestic banks, subsidiaries of foreign banks, and U.S. branches and agencies of foreign banks. We do not consider syndicated deals of banks outside of this sample.

we use is Tier 1 capital divided by total risk-weighted assets. For branches and agencies of foreign banks, we use the capital ratio of their FBO. Liquid assets are given by interest-bearing balances, non-interest-bearing balances, currency and coin, and securities available for sale and held-to-maturity, less asset-backed and mortgage-backed securities. Nonperforming loans are loans that are reported as past due by 90 days or more and nonaccruing loans. The measure of cash used here closely tracks reserve balances held at the Fed, but reserves are only a component of all cash reported by banks, albeit the dominant one. In addition to reserve balances due from Federal Reserve banks, cash reported by banks includes cash items in the process of collection, unposted debits, currency and coin, and balances due from unrelated depository institutions in the United States.

A well-known facet of the U.S. banking system is that a small group of banks hold a large portion of assets. The mean asset size of a bank is nearly double that of the 90th percentile; indeed, a very large number of banks exist that have relatively few assets. Table 1, panel A, shows that uninsured branches are significantly larger than the average insured bank. The group of banks without foreign offices (those filing the FFIEC 041) composes roughly 95% of observations in this sample, but its median assets make up a small fraction of that of the group of branches (FFIEC 002) and those with foreign offices (FFIEC 031).

U.S. chartered banks filing the Call Reports do so at the level of the consolidated bank for all U.S. offices. In particular, the majority of observations in the sample do not report internal borrowing or lending. Those reporting this category are branches or agencies of foreign banks and U.S. chartered banks with affiliates in other countries. The sample of banks that reports internal lending and borrowing shrinks to about 20,000 observations, though most of the institutions that drop out are the smallest banks. Uninsured institutions were net lenders to their affiliates, while insured banks borrowed from their families, on average, in the years leading up to and immediately following the financial crisis. These positions reversed in 2011: insured foreign banks now rely more on deposits and have repaid their liabilities to their foreign affiliates, while uninsured branches have stopped sending liquidity abroad.

Figure 2 shows the shift between the holding of reserves and claims on own offices for uninsured foreign banks. The vertical lines represent the start of the financial crisis (end-Q2 2007),

the collapse of Lehman Brothers (end-Q3 2008), the announcement of the change to the FDIC assessment base (end-Q3 2010), and the implementation of the change (1 April 2011). When one breaks down the assets of foreign branches and agencies, it is evident that foreign banks, on aggregate, parked more liquidity in Fed reserves and reduced claims on their own offices. This is represented by the different behavior of the red line (balances due from Federal Reserve banks) and the blue line (sum of the net due from (asset side) and net due to (liabilities side) related depository institutions).

Also, Table 1, panel A, reveals that, while the U.S. chartered banks supply more loans than uninsured branches and agencies, uninsured branches and agencies are more focused on commercial and industrial (C&I) lending. They also have lower deposit to asset ratios than U.S. chartered banks primarily because of their restriction from taking retail deposits from U.S. residents. Finally, some foreign banks are specialized in managing liquidity in dollars at the group level.

3.3.2 Syndicated loan data. Table 1, panel B, lists the summary statistics from the DealScan data set. The database is missing information on the share of the deal that lenders take for a nontrivial proportion of observations. The dummy for whether or not the loan is secured is also sometimes unavailable. Nonetheless, we retain a large number of observations that are matched to information on a bank and a borrowing firm. Ninety-five percent of the borrowers in the sample are defined in the data set as corporations. DealScan describes all of the lenders as a U.S. bank, foreign bank, or financial institution.

The dependent variables we use when analyzing syndicated loans are intended to capture each lender's level of activity within a specific deal. First, we use a binary response variable corresponding to whether or not the bank is listed as the lead lender in this deal. This variable is denoted by *Lead*. We also look at the proportion of the total deal that the lender extends. The variable *Share* ranges from 0 to 100. We call lead share the interaction of these two variables. The fourth dependent variable we use is a measure that incorporates the concentration of other lenders in the deal. The so-called "share" index gives a higher weight to a lender who takes a large share in a deal with many other lenders. The share index for bank i lending in a deal with

n firms is

$$share\ index_i = (share_i - \frac{1}{n-1}\sum_{j \neq i} share_j). \quad (1)$$

We also look at the impact of the policy change to loan concentration. Several authors (for instance, Sufi 2007; Minetti and Yun 2015) use the Herfindahl index, which is generated as the sum of the squared shares by each lender in the deal. This measure is equal to 10,000 when one lender offers the full amount of the deal and lower when more than one lender is involved. Finally, we look at the logarithm of the dollar amount offered by each lender, which is simply the product of the loan share and the total size of the facility. We denote this variable amount.

Measures of the participation of a lender in a syndicated deal and of the concentration of the deal can capture the incentives of the lender to monitor the loan. Holmstrom and Tirole (1997) show that a lender has more incentives to monitor a borrower when it invests more of its own money in the borrowing firm. Building on this argument, Sufi (2007) measures creditors' monitoring incentives in syndicated loans by looking at the loan share held by lead arrangers and the concentration of the loans.

4 Empirical Methodology

In Figure 3, we take a first glance at banks' cash holding and lending patterns following the FDIC shock. The spider charts illustrate the growth rate of lending, syndicated lending, and cash holdings for insured and uninsured banks in the unconsolidated database. The charts suggest that the growth of lending was more pronounced for insured banks, while the growth of cash holdings was stronger for uninsured foreign banks.

Figure 3 is merely suggestive. In particular, disentangling the supply-side responses of foreign and domestic banks to domestic shocks runs into the difficulty of distinguishing such supply side responses from changes in credit demand. Our baseline regression follows the approach often employed by the literature on the bank lending channel to examine the effect of a shock to banks' cost of funding (Kashyap and Stein 1995). Indeed, as noted, there is a strong similarity between the cost of a funding shock triggered by the FDIC regulatory reform and the monetary policy shock studied in the literature on the bank lending channel.

Kashyap and Stein (1995) separate banks into five classes based on size measured by total assets. They use the growth rate of nominal total loans as the dependent variable, and a monetary policy indicator, seasonal dummy variables, nominal gross domestic product (GDP) growth, inflation, and four lags of the dependent variables as regressors. More recent studies have augmented this model, commonly by adding a set of bank-specific characteristics and other macroeconomic controls. The baseline specification used in this paper builds on this approach, employing a rich set of control variables:

$$\Delta L_{it} = \alpha_i + \beta_1 unins_{it} + \beta_2 FDIC_t + \beta_3 (unins^* FDIC)_{it} + \sum_{j=1}^{4} \theta_i \Delta L_{it-j} + \sum_{j=1}^{4} \gamma_j X_{it-j} + \sum_{t=1}^{T} \mu_t T_t + \varepsilon_{it} \tag{2}$$

where ΔL_{it} is a measure of the loan change of bank i in period t, $unins_{it}$ measures the degree to which a foreign bank family is not FDIC insured by the ratio of the assets held by uninsured U.S. branches to total assets held in U.S. institutions of bank i in period t; $FDIC_t$ is a dummy variable equal to one after the FDIC assessment base change in the second quarter of 2011, zero before; and $(unins^* FDIC)_{it}$ is the interaction of the two.[18] In the unconsolidated data set, we are able to identify whether or not the bank is FDIC insured (dummy variable). The differences are not qualitatively substantial, and so here we present only the results from the consolidated data set. β_3 is the key coefficient of interest, corresponding to the difference-in-differences result. β_3 can be interpreted as the difference in the reactions to the policy shock of uninsured banks (treated group) compared to insured banks (control group). A positive coefficient would suggest that uninsured foreign branches increased their lending following the funding shock relative to insured banks. X_{it} is a vector of bank-specific controls including the natural logarithm of total assets, the ratio of liquid assets to total assets, the ratio of Tier 1 capital to risk-weighted assets, and the ratio of nonperforming loans to loans for bank i in time t. T_t is a set of quarterly time dummy variables. The regression we run when analyzing cash holding is identical, except that we include four lags of the dependent variable instead of loans.[19]

The role of banks' funding models deserves special attention here. As noted, the FDIC assess-

[18] regulation affected the growth of banks' reserve holding.

[19] The inclusion of the liquidity ratio (including reserves) in the vector of (time-varying) bank-specific characteristics allows us to control (at least to some extent) for different preferences among banks in liquidity hoarding.

ment base change increased the cost of wholesale funding for insured banks. We thus also want to verify that our estimate of the β_3 coefficient is not picking up banks' heterogeneous reliance on wholesale funding methods prior to the change in the assessment. To put it differently, we want to account for the potential heterogeneity across banks in terms of their funding model before the FDIC assessment change. To this end, we include in the regression an indicator for the reliance of the bank on wholesale funding. Using banks' balance sheet data, we compute the ratio of exposure of a bank to the federal fund market over total assets (FFM). The augmented empirical specification thus controls also for the FFM variable, as well as for the interaction term $unins^*FFM$. A thornier issue - but potentially a fruitful one for sharpening our identification - is in regard to the possible differential response of banks to the FDIC shock depending on their funding model. We will return to this point below.

Analysis of loan-level data allows us to delve deeper into the transmission mechanisms and also to control for any additional unobserved heterogeneity. Whereas in the above regressions we include bank-specific controls, with the DealScan lenders and borrowers matched to bank Call Reports and the firm Osiris database, we include borrower-specific, lender-specific, and deal-specific controls. We continue to employ the difference-in-differences identification strategy, and our preferred specification includes borrower, lender, and time (quarter) fixed effects. Because of the granularity of the loan-level data set, we opt to use only the first lag of each of our controls. The level of observation is a borrower-lender pair for a given facility. The preferred regression specification for a loan from bank i to firm j at time t is

$$y_{ijt} = \alpha_i + \beta_1 unins_{it} + \beta_2 FDIC_t + \beta_3 (unins^* FDIC)_{it} + \Theta X_{it} + \Phi S_{jt} + \Pi Z_{ijt} + \mu_i + \gamma_j + \nu_t + \varepsilon_{ijt}. \quad (3)$$

As before, β_3 is the primary coefficient of interest. X_{it}, S_{jt}, and Z_{ijt} are vectors of lender-specific, borrower-specific, and deal-specific characteristics. μ_i, γ_j, ν_t are vectors of lender, borrower, and time fixed effects. The following borrower-specific characteristics are included: the natural logarithm of total sales; liquid assets to total assets; the natural logarithm of earnings before interest, taxes, depreciation, and amortization (EBITDA); a leverage ratio (total debt to EBITDA); net profit to assets; cash to assets; working capital to assets; the natural logarithm of the number of employees; the ratio of tangible assets to total assets; the natural logarithm of revenue; the

ratio of income to total assets; the natural logarithm of total debt; and a set of dummy variables corresponding to the borrower company's industry. The set of lender characteristics is the same as before: the natural logarithm of total assets, the ratio of liquid assets to total assets, the ratio of Tier 1 capital to risk-weighted assets, and the ratio of nonperforming loans to loans. The set of deal-specific controls include: a set of dummies corresponding to the primary purpose of the deal, the maturity of the loan in months, a dummy variable corresponding to whether the loan is secured, and the natural logarithm of the deal amount.

The above specification restricts our sample to banks that participate in syndicated lending. Thus, we are examining lending on the intensive margin, that is, the quality of the lenders' participation in the deal conditional on the lender participating. Additionally, we alter this data set to examine the lenders' participation on the extensive margin. We aggregate the loans by bank and use bank-quarters as our level of observation. This allows us to analyze banks that altered the number of deals in which they participated following the assessment base change, rather than examining their roles in the deals in which they participated. Our dependent variables in this portion of the analysis count the number of deals in which a bank participates, the number of deals in which a bank is listed as the lead lender, and the total amount of credit extended in a quarter.

5 Main Results

5.1 Bank Call Reports

We separate banks into groups based on their asset size because the expected effect of the FDIC change in the assessment base varies between large and small institutions. Recall that we expect smaller insured institutions to be unaffected, while the largest insured institutions should face significantly higher funding costs. Following Kashyap and Stein (2000) and Cetorelli and Goldberg (2012a), we classify any bank that is in the smallest 90% of banks sorted by asset size as "small" and the largest 5% as "large."[20] These asset sizes are based on the size of the bank in the fourth quarter of 2010, just prior to the policy change taking effect. Using a difference-in-differences

[20] As pointed out by Cetorelli and Goldberg (2012a), leaving out the intermediate group of banks between the 90th and 95th percentiles ensures a clean separation between small and large banks.

approach with uninsured banks as the treated group, we estimate the policy's effect on cash holding, total lending, and commercial and industrial (C&I) lending. For each dependent variable, we use three forms: the change in the natural logarithm, the absolute change scaled by assets, and the change in the fraction of the dependent variable to assets. Our main results show only the latter two forms. We use the system GMM estimator suggested by Arellano and Bond (1991) to account for the dynamic nature of the dependent. Each regression equation includes time fixed effects. Alternatively, we have used bank fixed effects and macroeconomic control variables instead of time dummies. Neither alternative specification yields substantially different results.

Tables 2 through 4 are based on the U.S. offices of the entire banking organization, consolidated to the top-tier holding company. Note that the left and the right panels report slightly different measures of the dependent variables. We also use three sets of time windows for each dependent variable: first, we use the entire 14.5-year series, and then 4- and 2-year windows surrounding the policy change. For the sake of brevity, we do not report the 2-year windows because the findings are similar to the 4-year time frame. In Table 2, we find that the largest uninsured banks began to accumulate a disproportionately large amount of cash (mainly in the form of reserves) following the assessment base change. Interestingly, in the full time span (Table 2, top panel), the smaller set of uninsured banks accumulates more cash according to the first measure (column 1). Restricting our sample to the 4-year window around the policy change, from 2009Q2 through 2013Q1, Table 2, bottom panel, shows that uninsured institutions increased their holdings of cash by about seven percentage points of their total assets (second column); as a share of assets, these branches increased their allocation of cash by about four percentage points (fifth column) relative to insured institutions.

The policy seems to have had no positive impact on the lending of these banks and a negative effect in some cases as reported on their balance sheet. Tables 3 and 4 show, in some cases, a reduction in loans by these institutions that increased their cash holdings as a result of the positive liquidity shock. Again, restricting our attention to the 4-year window around the policy shock, balance sheet allocation of total loans by uninsured branches fell by about two percentage points for both independent variables (bottom panel of Table 3, second column). Table 4 shows that the results are marginally significant at best when looking at commercial and industrial

loans specifically. Overall, these results for the lending responses vary between insignificant and suggestive of a reduction in lending by uninsured branches. These results are consistent with the results of the graphical analysis provided in Kreicher, McCauley, and McGuire (2014). In Table B1 in Internet Appendix B, we verify the robustness of our findings to further controlling for the insured banks' funding model before the FDIC assessment change. To this end, we augment the empirical specification with the aforementioned FFM variable and its interaction with ins variable. The results remain virtually unaltered.

As noted previously in the empirical methodology section, a somewhat thornier question in regard to the possible differential response of banks to the FDIC shock depending on their funding model before the shock. To probe this point, in Table 5 we include in the baseline regression a triple interaction term $unins^{*}FDIC^{*}FFM$ where FFM is defined as an indicator variable equal to one if the FFM ratio exceeds the 75% threshold (in the table, we focus on reporting the main coefficient of interest on the triple interaction). The estimated negative coefficient for the triple interaction term suggests that the contraction in lending following the FDIC shock was even more pronounced for those holding companies that overall relied more on wholesale funding before the FDIC shock. Notably, these were the foreign banks that should have benefited the most from the liquidity shock (due to the reduction in their cost of wholesale funding). Thus, finding that the lending contraction was even more pronounced for these banks appears to further strengthen the conclusion that foreign banks did not exploit their easier access to wholesale liquidity to expand lending.

5.2 Syndicated loans

Our preferred specification for estimation of Equation (3) includes both borrower and lender fixed effects. Using the same difference-in-differences approach, we find that uninsured banks reduced their roles within the syndicated deals in which they participated, as shown in Table 6 for nearly each of the six measures of loan activity. The uninsured banks became significantly less likely to be classified as the lead lender within the deals they made (first column), and took smaller portions of the total facilities (second column). As in the previous section, we estimate their roles over varying time spans. When restricting our sample to a 4-year window surrounding the

implementation of the policy change, we find that uninsured banks became about 10 percentage points less likely to be the lead lender following the policy change (bottom panel of Table 6, first column). The share of the total facility that these banks offered also fell by about 2.2 percentage points (second column). The results are qualitatively similar, though have a less straightforward interpretation when the dependent variable is the lead share or share index.[21]

The fifth columns of the top and bottom panels of Table 6 show that the deals became marginally more concentrated in the sense that fewer lenders may have entered into the deals when the uninsured branches participated. The effect is significant at the 10% level when the relationship is estimated for the entire time span and insignificant when restricting the sample to the 4 years surrounding the policy change. On the other hand, there appears to be a strong effect of the policy change to the total value of loans extended by uninsured foreign branches. The two estimates (sixth columns of the panels) imply that relative to their insured counterparts, these uninsured lenders cut their total offerings by around 23% or 37%. Both estimates are statistically significant.

Correa, Sapriza, and Zlate (2013) find that uninsured branches of foreign banks decreased their lending in this period due to a fall in deposits during the euro area debt crisis. However, they find no effect on the intensive margin, which we show U.S. branches of foreign banks generally exhibited here. The authors find that these banks cut the number of loans and borrowers to whom they lent, a reduction of lending on the extensive margin. We implement a similar specification (not shown here) including the change in deposits as an explanatory variable. Our results are virtually unchanged when controlling for this loss of deposits. In Section 7.1, we decompose the uninsured branches into European and non-European groups in order to examine the extent to which our results are driven by a reduction in lending caused by the European sovereign debt crisis.

Having established that these lenders took on a more passive role in the deals in which they participated, we next look at whether the banks adjusted the number of borrowers to whom they lent, the number of loans they gave, or the size of loans. Specifically, we use three dependent

[21] Comparing the banks in the syndicated sample with the largest 5% from the Call Reports, we observe that more than 70% of the banks in our sample overlap. Specifically, in the Call Reports sample, the number of the largest banks ranges from 266 to 358. In the syndicated sample, the number of largest banks ranges from 207 to 261.

variables: (1) the number of loans into which a lender entered in a given quarter, (2) the number of loans in which a lender was the lead arranger in a quarter, and (3) the total amount of credit extended by a lender in a quarter. We find that after the policy change, uninsured banks extended fewer loans each quarter, and acted as the lead arranger of credit less frequently (Table 7). Looking at the extensive margin in this manner requires bank-quarter level data, although we may continue to use borrower and lender fixed effects. However, we discard any observations for which a lender does not participate in any deals in a given quarter. The results are consistent with those from the previous section. The uninsured foreign lenders, despite facing a relatively positive funding shock, reduced the number of deals in which they participate and the gross amount of credit they extended, relative to insured lenders.

5.3 A look at the mechanisms

While fully disentangling the mechanisms that drive foreign banks' behavior in response to the policy-induced liquidity shock is beyond the scope of our data, in what follows we present preliminary evidence on such mechanisms. As noted in the discussion of the hypotheses, the propensity of foreign banks to hoard liquidity, rather than expand lending, following the FDIC liquidity shock may reflect two mechanisms. The first relates to the goals, structure, and organization of global banks. Foreign banks could be inclined to hoard liquidity due to the inherent complexity of their global bank conglomerates (Cetorelli and Goldberg 2016). Moreover, foreign banks could factor in the needs of their conglomerates when choosing how to utilize the increased availability of liquidity (Buch and Goldberg 2020).

In Table 8, we take a step toward isolating this mechanism. We first examine whether the lending behavior of foreign banks in response to the policy-induced liquidity shock depends on the complexity of their conglomerate. To this end, we compute the number of U.S. affiliates of the conglomerate, a proxy typically used to capture the complexity of a bank conglomerate.[22] We then reestimate our empirical model (3) by inserting this indicator of complexity, as well as its double and triple interactions with $unins$ and $FDIC$. To conserve space, Table 8 reports the key coefficient of interest on the triple interaction term $unins^{*}FDIC^{*}complexity$. The estimates

[22]We lack data on the composition of bank conglomerates abroad. We thus focus on the number of affiliates operating in the United States.

reveal that the propensity of uninsured foreign banks to retrench from their participation in syndicated loans is more pronounced when the foreign banks belong to a complex bank conglomerate. This appears to be in line with the argument put forward by Cetorelli and Goldberg (2016) on the role of complexity in inducing "too little responsiveness" to changing local conditions (see also Buch and Goldberg 2020).

To further investigate the role of the bank conglomerate characteristics in driving the response of foreign banks to the FDIC liquidity shock, we next exploit aggregate banking sector characteristics of the country of origin of the bank. Using this information, we are able to assign to each bank (data on) the capitalization of the banking sector of its origin country. To the extent that foreign banks hoard liquidity in order to support their fragile parent banks, we would expect this behavior to be more pronounced when the capitalization of their parent banking system is poorer. The estimates in Table B2 in Internet Appendix B support this hypothesis: the estimated coefficient for the interaction term $unins^{*}FDIC$ is negative and statistically significant when the capitalization of the parent banking system (capital over assets) is low (below the median). By contrast, the coefficient is not statistically significant when the capitalization of the parent banking system is above the median.[23]

The support of foreign bank affiliates to their parent banking systems could be motivated not only by the capitalization needs of their parent banks but also by the investment opportunities available in their origin country. Put differently, foreign banks could choose to hoard liquidity, rather than expand lending in the host economy, in the expectation of profitable investments to be funded by their conglomerate back home. A possible proxy for growth opportunities consists of the asset growth of banks in the parent country. However, we detect no evidence that the response of foreign banks to the FDIC liquidity shock is significantly different depending on the bank's asset growth in the origin country.[24]

[23] As noted in the discussion of the hypotheses, a second force that could induce foreign banks to use the less costly access to wholesale funding to hoard liquidity, instead of expanding loans to local businesses, could be their limited ability to replace domestic banks, because of their limited knowledge and experience with local customers (Holmstrom and Tirole 2002; Giannetti and Ongena 2012; Gormley 2010). However, because of data limitations, we cannot disentangle how this force influences our results.

[24] Results available on request.

6 Robustness Tests

In this section, we check the robustness of our results along various dimensions.

6.1 The European debt crisis

Our primary concern is the concurrence of the European sovereign debt crisis. Correa, Sapriza, and Zlate (2013) show that U.S. branches of European banks cut their lending, specifically in the market for syndicated loans, as a result of this crisis. To test the extent to which our results reflect the FDIC assessment base change rather than the European debt crisis, we separate our treatment group of uninsured banks into uninsured branches of European banks and uninsured branches of non-European banks:

$$\begin{aligned} y_{ijt} &= \alpha_i + \beta_1 Eur.\ unins_i + \beta_2 FDIC_t + \beta_3 (Eur.\ unins^* FDIC)_{it} + \beta_4 NonEur.\ unins._i + \\ &\quad \beta_5 (NonEur.\ unins^* FDIC)_{it} + \Theta X_{it} + \Phi S_{jt} + \Pi Z_{ijt} + \mu_i + \gamma_j + \nu_t + \varepsilon_{ijt}. \end{aligned}$$

In this manner, we are effectively comparing the effect of the shock on three different groups of institutions: branches of European banks, branches of non-European banks (for instance, branches of Asian or South American banks), and insured domestic banks.

Table 9 presents our results for the intensive margin of loan-level data. All columns employ lender fixed effects and borrower fixed effects. Panel A of the table shows similar results as before for the intensive margin of syndicated loans: all uninsured banks took on more passive roles in the deals in which they participated. The results lose some power, as expected, but neither the European nor non-European group of uninsured bank branches appears to dominate the effect observed when treated as one group like in the main specification. Panel B of Table 9 presents the results for the extensive margin using loan-level data. The results appear robust to the separation between European and non-European banks. In particular, neither group of banks appears to dominate the reduction in lending; the panel shows the effect of both groups to be significant at the 99% confidence level for the number of deals and the total amounts offered. We also perform (but do not present here) robustness checks for the bank balance sheet data after dividing uninsured banks into European and non-European subgroups and find that both groups report an increase

in cash holding and a mild reduction in lending.

6.2 More on the identification of the shock

In the second main robustness check, we distinguish between foreign insured banks and foreign uninsured branches to ensure that our results are indeed driven by the domestic liquidity shock triggered by the FDIC policy change. To this end, we estimate the following:

$$\begin{aligned} y_{ijt} &= \alpha_i + \beta_1 for.\ unins_i + \beta_2 FDIC_t + \beta_3 (for.\ unins^* FDIC)_{it} + \beta_4 for.\ ins_i + \\ &\quad \beta_5 (for.\ ins^* FDIC)_{it} + \Theta X_{it} + \Phi S_{jt} + \Pi Z_{ijt} + \mu_i + \gamma_j + \nu_t + \varepsilon_{ijt}. \end{aligned}$$

Here, we are testing whether foreign insured banks followed the behavior of foreign uninsured banks. If so, this would weaken our results. However, there is no evidence to support this notion. Table 10 displays the results. The main results are driven entirely by uninsured foreign banks. In fact, foreign insured banks tend to exhibit opposite (and statistically significant) behavior with respect to uninsured ones. These results confirm that it is the uninsured nature of these banks that drives their relative reduction in lending, and hence confirm that our results are indeed capturing the effect of the FDIC assessment base change. This robustness check appears to strengthen our main findings.

6.3 Foreign shocks

In the final and most strict robustness check, we insert home country-year fixed effects. This should effectively control for home country-specific shocks. Here, we are comparing foreign insured banks to foreign uninsured banks from the same country. This robustness test, therefore, is substantially stricter than the previous tables. Any uninsured branches from a country that does not also have unrelated insured banks will drop out of the estimation. Further, all banks whose ultimate parent is based in the United States (that is, all domestic banks) also drop out of the control group. That is, the variation in these results now comes from within-home country between uninsured branch and insured subsidiary bank. Table B3 in Internet Appendix B displays these results for the change in lending along the intensive margin. The results hold up remarkably well. When comparing variation within home country, the results carry through: uninsured branches

of foreign banks became more passive as lenders following the positive funding shock.

6.4 Further tests

We have experimented with a number of other modifications of our baseline regression and found no significant deviations from our baseline results. Some of these modifications that are not presented here for the sake of brevity, include the following. In addition to the two-time windows of 14 years and 4 years, we also examine a time window of 2 years "from 2010q2 through 2012q1" for each of the regressions presented in this paper. The results are qualitatively similar to those obtained from 4-year windows. In addition to aggregating the Call Reports to the level of the bank holding company, we run the same regressions using disaggregated bank-level data and find similar results. It is our view that aggregating to the level of the BHC is the more conservative approach as we avoid comparing branches of banks to consolidated banks. Finally, as noted, we have used macroeconomic controls instead of a set of time dummy variables. None of these alternative approaches produce qualitatively different results.

7 Conclusion

This paper studies empirically the behavior of foreign banks following a domestic liquidity shock that increases the cost of funding for domestic insured banks, while reducing it for foreign banks. We show in two complementary ways that foreign uninsured banks reduced their lending and, at the same time, they used their improved access to wholesale funding to increase their holdings of reserves. We find that foreign banks that acquired more reserves allocated a smaller proportion of their balance sheets to general loans and C&I loans. These banks also became more passive lenders in the syndicated loan deals in which they participated and entered into fewer of these deals.

The paper contributes to the literature that analyzes the reaction of foreign banks to negative liquidity shocks in host countries. In line with recent evidence on the behavior of foreign banks, the paper suggests that these may not necessarily have a stabilizing role, replacing liquidity-stricken domestic banks, but may instead exhibit too low lending responsiveness. The paper also takes preliminary steps in isolating the forces that can drive this low responsiveness. We find

preliminary evidence that foreign banks' propensity to hoard liquidity, rather than expand lending, is stronger the more complex their bank conglomerates and the larger the capital shortfalls in their parent countries. This points to a possible role of bank organizational complexity and liquidity management goals in attenuating the response of foreign banks to domestic liquidity shocks of host countries. We leave a further exploration of this and other relevant issues to future research.

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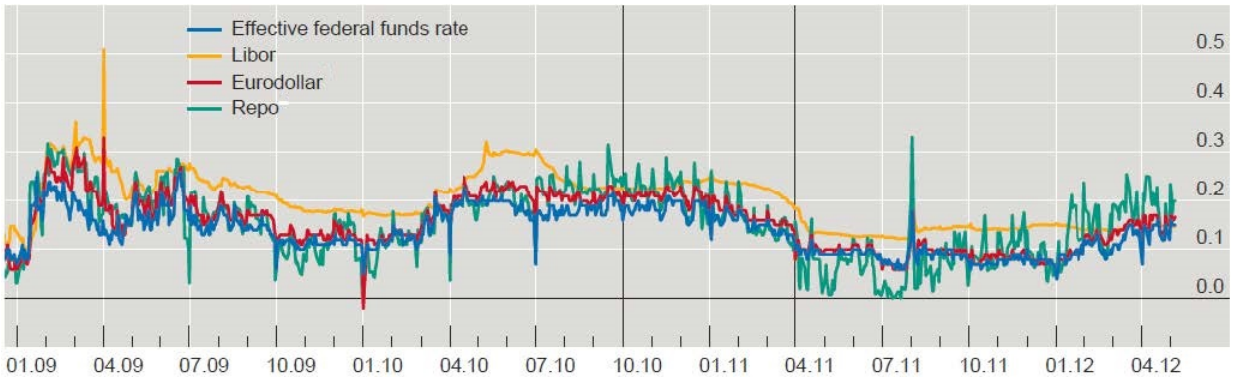
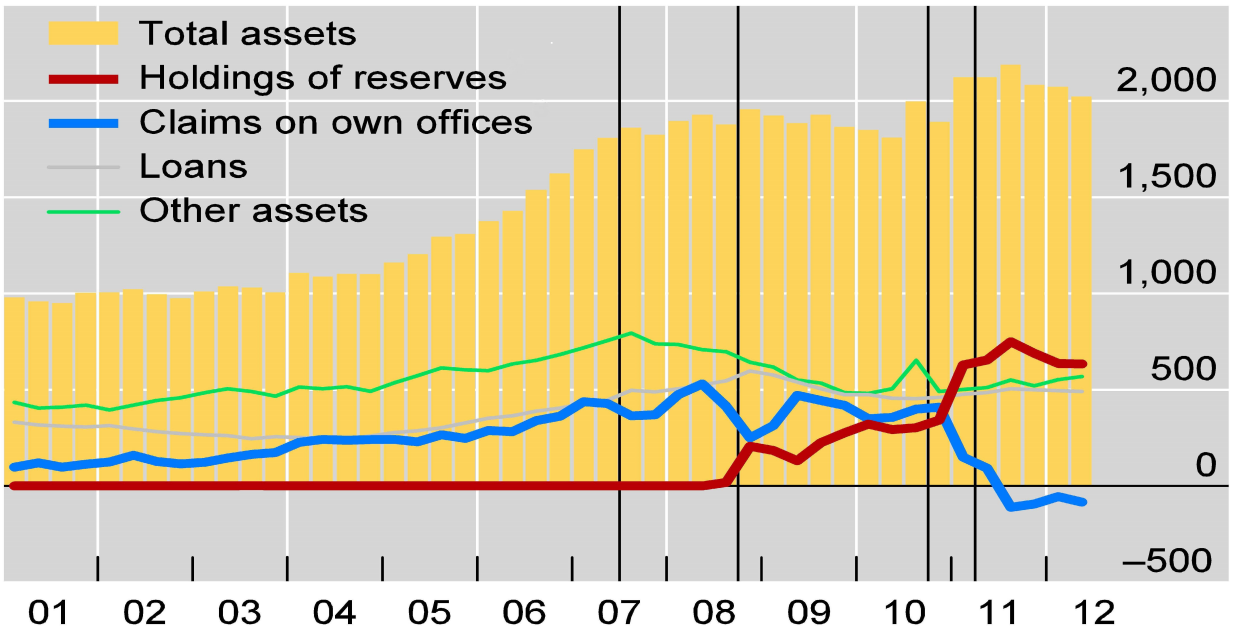
Figures

Figure 1: Overnight borrowing rates



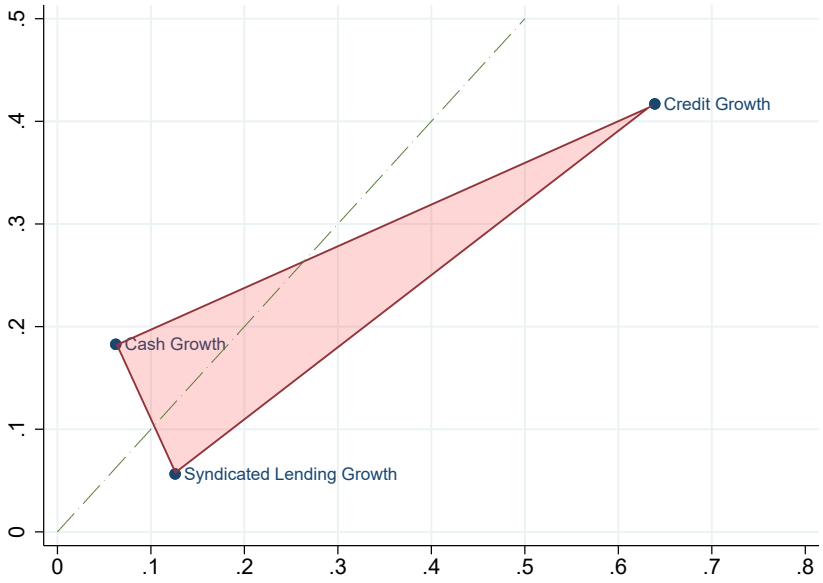
Source: Kriecher, McCauley, and McGuire (2014).

Figure 2: Foreign banks' uninsured branches in the United States ($ billions)

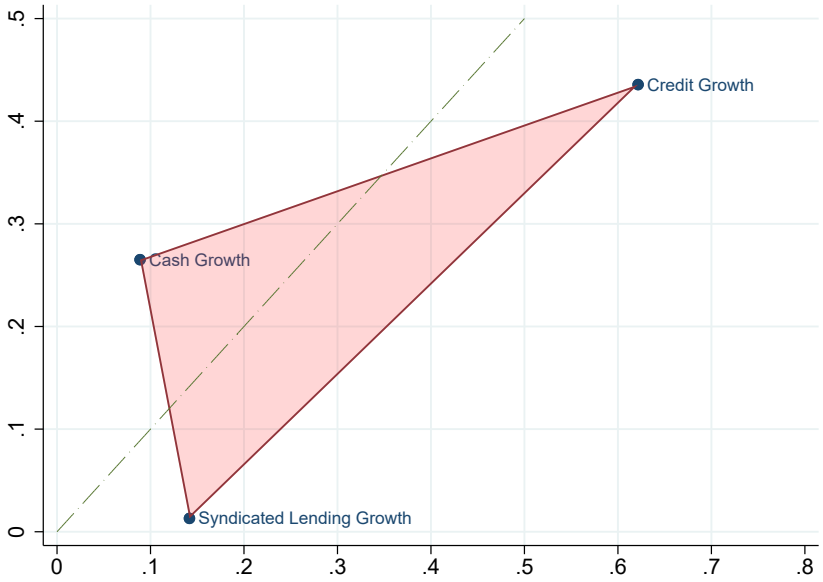


Source: Kriecher, McCauley, and McGuire (2014).

Figure 3: The growth rates of insured versus uninsured banks



(a)



(b)

Panel (a) splits our data between insured (x-axis) and uninsured (y-axis) banks from 2001Q1 until 2014Q2 and plots the average cross-section growth rates. The green reference line represents the 45-degree line. Panel (b) splits our data between insured (x-axis) and uninsured (y-axis) banks restricting our sample to the 4-year window around the policy change (2009Q2–2013Q1) and plots the average cross-section growth rates. The green reference line represents the 45-degree line. In the panels, we report three growth categories: $\Delta(Cash/Assets)_t$, $\Delta(Loans/Assets)_t$ and $\Delta(\text{Total Amount Offered})_t$. The horizontal and vertical axes show the growth ratio for the insured and uninsured banks, respectively.

Tables

Table 1: Summary statistics

A. Bank Call Report data

	Uninsured				Insured			
	N	Mean	Median	SD	N	Mean	Median	SD
Total assets ($ billions)	222	9.504	0.633	21.4	6,935	1.575	0.152	26.5
Cash ($ billions)	222	3.066	0.067	9.798	6,935	0.125	0.011	1.992
Cash (% of assets)	210	0.27	0.147	0.303	6,935	0.098	0.07	0.101
Deposits ($ billions)	221	4.982	0.22	12.4	6,935	1.056	0.128	17.2
Deposits (% of liabilities)	209	0.404	0.331	0.345	6,934	0.93	0.964	0.129
Loans ($ billions)	221	2.141	0.304	5.483	6,935	0.903	0.093	14.3
Loans (% of assets)	209	0.434	0.388	0.348	6,935	0.602	0.63	0.168
C&I loans ($ billions)	221	1.058	0.161	2.589	6,935	0.145	0.01	2.38
C&I loans (% of assets)	209	0.246	0.181	0.256	6,935	0.083	0.069	0.067
Net internal lending ($ billions)	222	0.691	-0.055	10.9	121	-2.71	-0.114	15.7
Liquid assets to assets (%)	207	0.488	0.457	0.338	7,010	25.413	21.923	15.804
Tier 1 capital ratio (%)	164	12.468	11.745	3.849	7,004	23.468	13.86	213.291
Nonperforming loans to loans (%)	77	4.058	1.554	7.367	6,500	3.27	1.996	4.113

B. Syndicated loan data

	Uninsured				Insured			
Outcome variables	N	Mean	Median	SD	N	Mean	Median	SD
Lead	4,202	0.168	0	0.374	70,283	0.272	0	0.445
Share	1,617	6.644	5	7.678	26,107	10.137	7	11.487
Lead share	1,616	1.467	0	7.398	26,103	4.278	0	11.774
Share index	1,617	0.804	0.15	6.848	26,107	2.302	0.489	9.891
Herfindahl	1,617	857.853	652.656	807.721	26,107	1,191.606	837.5	1,139.257
Amount offered	1,617	55	30	96.7	26,107	48	25	145
Deal characteristics								
Maturity (months)	4,146	47.005	60	23.083	69,552	46.7	60	20.674
Facility amount ($ millions)	4,201	993	500	1580	70,280	681	330	1200
Secured loan	2,905	0.526	1	0.499	46,793	0.563	1	0.496
Lender characteristics								
Total assets	4,203	37.6	33	36.4	70,289	323	125	388
Liquid assets to assets (%)	4,069	0.58	0.565	0.278	70,289	0.244	0.137	0.217
Tier 1 capital ratio (%)	1,726	0.109	0.111	0.021	70,083	0.114	0.091	0.176
Nonperforming loans to loans (%)	4,027	0.027	0.014	0.039	69,927	0.022	0.013	0.028
Borrower characteristics								
Age	3,296	29.729	16	37.08	53,517	27.437	16	31.198
Total assets	4,076	14.876	15.263	2.353	68,156	14.476	14.63	2.075
Total sales	4,091	14.233	14.564	2.349	68,495	14.043	14.181	2.093
Liquid assets to assets	4,075	1.546	1.247	2.098	68,087	1.75	1.393	2.625
Leverage ratio	4,074	7.311	6.211	73.792	68,139	5.342	5.355	111.424
Profits	4,076	0.272	0.136	2.158	68,135	0.341	0.139	5.08
Cash	4,074	0.226	0.172	0.197	67,950	0.227	0.167	0.209
Working capital to assets	4,076	0.076	0.043	0.153	68,146	0.018	0.072	15.768
EBITDA	4,026	12.584	12.994	2.409	67,492	12.278	12.48	2.09
Number of employees	3,882	9.228	9.367	1.812	64,491	8.762	8.814	1.845
Tangible assets to total assets	4,065	0.655	0.689	0.219	67,792	0.681	0.72	0.232
Revenue	4,107	14.24	14.573	2.349	68,698	14.049	14.195	2.093
Income	4,076	0.073	0.066	0.077	68,152	0.073	0.073	0.505
Debt	3,099	13.59	14.018	2.479	51,616	13.107	13.416	2.357
Misc.								
Number of deals (per lender)	72	58.375	10.5	201.772	441	159.386	7	605.895

Panel A reports summary statistics for the Call Reports data, and panel B reports statistics for a sample of syndicated loans originated in the United States from 1987h1 until 2016h1.

Table 2: Response of foreign and domestic banks' cash holdings

	Time period: 2001Q1–2014Q2					
Dependent variable:	$\Delta(cash_t)/assets_{t-1}$			$\Delta(Cash/assets)_t$		
Group:	Smallest 90%	Largest 5%	All banks	Smallest 90%	Largest 5%	All banks
FDIC	-0.00284	-0.00559	-0.0119**	0.00306***	0.0142*	-0.00803***
	(0.00575)	(0.0200)	(0.00540)	(0.000877)	(0.00855)	(0.00165)
Uninsured	-0.0161	-0.0185	-0.0118	0.00609**	0.00114	-0.000833
	(0.0178)	(0.0305)	(0.0139)	(0.00310)	(0.00586)	(0.00761)
Uninsured*FDIC	0.119**	0.0780**	0.0889***	-0.00299	0.0221***	0.00888**
	(0.0586)	(0.0361)	(0.0275)	(0.00561)	(0.00681)	(0.00405)
Bank controls	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	213,680	11,925	237,345	213,680	11,925	237,345
Number of holding companies	5,888	358	6,561	5,888	358	6,561
	Time period: 2009Q2–2013Q1					
Dependent variable:	$\Delta(Cash_t)/assets_{t-1}$			$\Delta(Cash/assets)_t$		
Group:	Smallest 90%	Largest 5%	All banks	Smallest 90%	Largest 5%	All banks
FDIC	-0.0161***	0.0296	0.00704***	-0.00578***	0.00884	0.00683***
	(0.00573)	(0.0191)	(0.00137)	(0.00108)	(0.00667)	(0.000855)
Uninsured	-0.0175	-0.0363	-0.0418	0.0151*	-0.0140	0.0112
	(0.0279)	(0.0380)	(0.0372)	(0.00834)	(0.0122)	(0.0112)
Uninsured*FDIC	0.101	0.0701*	0.0857**	-0.0103	0.0387***	0.00804
	(0.0782)	(0.0361)	(0.0425)	(0.0110)	(0.0123)	(0.00735)
Bank controls	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	68,763	3,662	76,240	68,763	3,662	76,240
Number of holding companies	4,708	266	5,240	4,708	266	5,240

This table reports the effects of the FDIC shock on banks' reserve holdings. Robust standard errors appear in parentheses. Equations are estimated using the Arellano-Bond GMM estimator. Each regression equation includes four lagged values from the following controls: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans. The unit of observation is a bank holding company in a given quarter. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment change (2011Q2). Uninsured is the ratio of uninsured assets to total assets under the bank holding company's control. *p <.1; **p <.05; ***p <.01.

Table 3: Response of foreign and domestic banks' C&I lending

	Time period: 2001Q1–2014Q2					
Dependent variable:	$\Delta(Loans_t)/assets_{t-1}$			$\Delta(Loans/assets)_t$		
Group:	Smallest 90%	Largest 5%	All banks	Smallest 90%	Largest 5%	All banks
FDIC	-0.0176***	0.0242***	-0.0208	-0.0169***	-0.00712	0.00124
	(0.00225)	(0.00617)	(0.0181)	(0.00102)	(0.00462)	(0.00124)
Uninsured	0.0180**	-0.0351	0.0330***	4.56e-06	-0.0116**	0.00209
	(0.00742)	(0.0414)	(0.0113)	(0.00255)	(0.00562)	(0.00416)
Uninsured*FDIC	-0.00927	-0.0152**	-0.00983	-0.00147	-0.00649*	-0.000900
	(0.0122)	(0.00615)	(0.00701)	(0.00457)	(0.00390)	(0.00270)
Bank controls	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	213,680	11,925	237,345	213,680	11,925	237,345
Number of holding companies	5,888	358	6,561	5,888	358	6,561
	Time period: 2009Q2–2013Q1					
Dependent variable:	$\Delta(Loans_t)/assets_{t-1}$			$\Delta(Loans/assets)_t$		
Group:	Smallest 90%	Largest 5%	All banks	Smallest 90%	Largest 5%	All banks
FDIC	-0.00294	0.00233	-0.00158	0.00128	0.000390	-0.00720***
	(0.00270)	(0.00717)	(0.00146)	(0.000795)	(0.00406)	(0.000717)
Uninsured	0.0313*	0.00492	0.00799	-0.00329	-0.00243	-0.00487
	(0.0177)	(0.0141)	(0.0114)	(0.00569)	(0.00851)	(0.00555)
Uninsured*FDIC	-0.0208	-0.0205**	-0.00999	-0.00281	-0.0164***	-0.00140
	(0.0299)	(0.00837)	(0.0137)	(0.00757)	(0.00556)	(0.00446)
Bank controls	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	68,763	3,662	76,240	68,763	3,662	76,240
Number of holding companies	4,708	266	5,240	4,708	266	5,240

This table reports the effects of the FDIC shock on banks' loans. Robust standard errors appear in parentheses. Equations are estimated using the Arellano-Bond GMM estimator. Each regression equation includes four lagged values from the following controls: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans. The unit of observation is a bank holding company in a given quarter. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment change (2011Q2). Uninsured is the ratio of uninsured assets to total assets under the bank holding company's control. *p <.1; **p <.05; ***p <.01.

Table 4: Response of foreign and domestic banks' C&I lending

	Time period: 2001Q1–2014Q2					
Dependent variable:	$\Delta(C\&Iloans_t)/assets_{t-1}$			$\Delta(C\&Iloans/assets)_t$		
Group:	Smallest 90%	Largest 5%	All banks	Smallest 90%	Largest 5%	All banks
FDIC	-0.000674	0.00510***	-0.000392	-0.00150***	-0.00296	-0.000104
	(0.000662)	(0.00149)	(0.00122)	(0.000528)	(0.00339)	(0.000636)
Uninsured	0.00942***	0.000526	0.0120***	0.00325*	-0.00545*	0.00499**
	(0.00237)	(0.00386)	(0.00317)	(0.00181)	(0.00290)	(0.00224)
Uninsured*FDIC	-0.00124	-0.00727***	-0.00347	-0.00244	-0.00138	-0.000587
	(0.00394)	(0.00170)	(0.00232)	(0.00287)	(0.00258)	(0.00185)
Bank controls	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	213,680	11,925	237,345	213,680	11,925	237,345
Number of holding companies	5,888	358	6,561	5,888	358	6,561
	Time period: 2009Q2–2013Q1					
Dependent variable:	$\Delta(C\&Iloans_t)/assets_{t-1}$			$\Delta(C\&Iloans/assets)_t$		
Group:	Smallest 90%	Largest 5%	All banks	Smallest 90%	Largest 5%	All banks
FDIC	0.00220***	-0.00135	0.000480	0.00343***	0.000632	7.41e-05
	(0.000606)	(0.00239)	(0.000372)	(0.000511)	(0.00292)	(0.000378)
Uninsured	0.00926	-0.00812*	0.00390	0.00280	-0.0108*	0.00177
	(0.00840)	(0.00427)	(0.00823)	(0.00388)	(0.00555)	(0.00389)
Uninsured*FDIC	0.00137	-0.00599*	0.00111	-0.000982	-0.00335	0.00346
	(0.00747)	(0.00323)	(0.00396)	(0.00525)	(0.00340)	(0.00334)
Bank controls	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	68,763	3,662	76,240	68,763	3,662	76,240
Number of holding companies	4,708	266	5,240	4,708	266	5,240

This table reports the effects of the FDIC shock on banks' C&I loans. Robust standard errors appear in parentheses. Equations are estimated using the Arellano-Bond GMM estimator. Each regression equation includes four lagged values from the following controls: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans. The unit of observation is a bank holding company in a given quarter. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment change (2011Q2). Uninsured is the ratio of uninsured assets to total assets under the bank holding company's control. *p <.1; **p <.05; ***p <.01.

Table 5: Heterogeneous effects: Lending and banks' funding model

	Time period: 2001Q1–2014Q2					
Dependent variable:	$\Delta(Loans/assets)_t$			$\Delta(C\&Iloans/assets)_t$		
Group:	Smallest 90%	Largest 5%	All banks	Smallest 90%	Largest 5%	All banks
Uninsured * FDIC * FFM	0.007	-0.032***	-0.018***	0.021	-0.012***	-0.008*
	(0.020)	(0.009)	(0.007)	(0.014)	(0.004)	(0.004)
Double-interaction terms	Y	Y	Y	Y	Y	Y
Bank controls	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	213,679	11,925	237,344	213,679	11,925	237,344
Number of holding companies	5,888	358	6,561	5,888	358	6,561
Dependent variable:	$\Delta(Loans/assets)_t$			$\Delta(C\&Iloans/assets)_t$		
Group:	Smallest 90%	Largest 5%	All banks	Smallest 90%	Largest 5%	All banks
Uninsured * FDIC * FFM	0.009	-0.025**	-0.012	0.008	-0.012**	-0.012*
	(0.030)	(0.011)	(0.011)	(0.018)	(0.006)	(0.006)
Double-interaction terms	Y	Y	Y	Y	Y	Y
Bank controls	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	68,763	3,662	76,240	68,763	3,662	76,240
Number of holding companies	4,708	266	5,240	4,708	266	5,240

This table reports heterogeneous effects of the FDIC shock on banks' lending with respect to their funding model. Robust standard errors appear in parentheses. Equations are estimated using the Arellano-Bond GMM estimator. Each regression equation includes four lagged values of the following controls: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans. The unit of observation is a bank holding company in a given quarter. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment change (2011Q2). Uninsured is the ratio of uninsured assets to total assets under the bank holding company's control. FFM is an indicator variable that equals one if bank's exposure to the federal fund market with respect to total assets is above the 75% threshold. *p <.1; **p <.05; ***p <.01.

Table 6: Participation in syndicated loans: Intensive margin

	Time period: 2001Q1–2014Q2					
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Lead	Share	Lead share	Share index	Herfindahl	ln(Amount)
Uninsured	0.110***	4.508***	0.243	6.331***	-661.3***	0.584***
	(0.0288)	(1.019)	(1.873)	(0.794)	(130.3)	(0.219)
FDIC	0.289	117.5	145.6	150.2	8,772	4.427**
	(0.556)	(136.8)	(160.3)	(151.8)	(9,588)	(1.743)
Uninsured*FDIC	-0.125***	-0.915	-1.412**	-1.818***	132.0**	-0.226**
	(0.0391)	(0.599)	(0.711)	(0.673)	(60.60)	(0.0908)
Borrower, lender, & deal controls	Y	Y	Y	Y	Y	Y
Lender & borrower fixed effects	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	27,358	11,798	11,795	11,798	11,798	11,786
R-squared	.328	.230	.176	.181	.132	.362
Number of lenders	335	263	263	263	263	263
Number of borrowers	1,296	820	820	820	820	820
	Time period: 2009Q2–2013Q1					
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Lead	Share	Lead share	Share index	Herfindahl	ln(Amount)
Uninsured	0.738***	-6.643***	-4.272	-13.56	1,075**	0.565
	(0.185)	(2.240)	(3.935)	-12.79*	(443.7)	(0.481)
FDIC	-0.0138	16.10*	16.63	(7.191)	1,415**	-0.387
	(0.100)	(8.886)	(11.34)	(7.890)	(636.8)	(0.483)
Uninsured*FDIC	-0.0971***	-2.212**	-2.588**	-2.244**	-68.19	-0.369***
	(0.0345)	(0.996)	(1.254)	(1.067)	(90.18)	(0.0988)
Borrower, lender, & deal controls	Y	Y	Y	Y	Y	Y
Lender & borrower fixed effects	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y
Observations	6,946	3,605	3,605	3,605	3,605	3,605
R-squared	.421	.342	.288	.319	.184	.412
Number of lenders	163	137	137	137	137	137
Number of borrowers	707	381	381	381	381	381

This table reports the effects of the FDIC shock on intensive margin measures of banks' participation in syndicated loans. Cluster robust standard errors at the level of the borrower and the lender in parentheses. Equations estimated using ordinary least squares. All equations contain lagged values of the following bank-specific characteristics: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans; lagged values of the following borrower-specific characteristics: the logarithm of total sales, liquid assets to assets, the logarithm of EBITDA, a leverage ratio, net profit to assets, cash to assets, working capital to assets, the logarithm of the number of employees, tangible assets to assets, the logarithm of revenue, income to assets, the logarithm of total debt, and a set of dummy variables corresponding to the borrower company's industry; and the following deal-specific characteristics: primary purpose dummies, maturity of the loan, secured loan, and the logarithm of the deal amount. The unit of observation is a borrower-lender pair for a given facility. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment base change (2011Q2). *p <.1; **p <.05; ***p <.01.

Table 7: Syndicated loans response: Extensive margin

	Time period: 2001Q1–2014Q2		
	(1)	(2)	(3)
Dependent variable:	ln(Number of deals)	ln(Number of leads)	ln(Total amount offered)
Uninsured	-0.367**	-0.940**	1.962***
	(0.179)	(0.388)	(0.168)
FDIC	-0.596	2.318	-3.809
	(1.913)	(4.608)	(2.893)
Uninsured*FDIC	-0.832***	-1.052***	-0.921***
	(0.151)	(0.257)	(0.194)
Borrower, lender, & deal controls	Y	Y	Y
Lender & borrower fixed effects	Y	Y	Y
Quarter fixed effects	Y	Y	Y
Observations	27,361	23,366	26,699
R-squared	.882	.090	.277
Number of lenders	335	335	335
Number of borrowers	1,296	1,286	1,295
	Time period: 2009Q2–2013Q1		
	(1)	(2)	(3)
Dependent variable:	ln(Number of deals)	ln(Number of leads)	ln(Total amount offered)
Uninsured	1.214**	-1.249	-1.367***
	(0.482)	(1.077)	(0.362)
FDIC	1.440***	1.718**	1.835***
	(0.391)	(0.671)	(0.575)
Uninsured*FDIC	-0.583***	-0.743**	-0.462**
	(0.150)	(0.319)	(0.215)
Borrower, lender, & deal controls	Y	Y	Y
Lender & borrower fixed effects	Y	Y	Y
Quarter fixed effects	Y	Y	Y
Observations	6,978	5,848	6,861
R-squared	.941	.891	.992
Number of lenders	163	163	163
Number of borrowers	707	688	704

This table reports the effects of the FDIC shock on extensive margin measures of banks' participation in syndicated loans. Cluster robust standard errors at the level of the borrower and the lender in parentheses. Equations estimated using ordinary least squares. All equations contain lagged values of the following bank-specific characteristics: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans; lagged values of the following borrower-specific characteristics: the logarithm of total sales, liquid assets to assets, the logarithm of EBITDA, a leverage ratio, net profit to assets, cash to assets, working capital to assets, the logarithm of the number of employees, tangible assets to assets, the logarithm of revenue, income to assets, the logarithm of total debt, and a set of dummy variables corresponding to the borrower company's industry; and the following deal-specific characteristics: primary purpose dummies, maturity of the loan, secured loan, and the logarithm of the deal amount. The unit of observation is a borrower-lender pair for a given facility. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment base change (2011Q2). *p <.1; **p <.05; ***p <.01.

Table 8: Mechanism: Organizational complexity

Time period: 2001Q1–2014Q2			
	(1)	(2)	(3)
Dependent variable:	Share	Lead share	Share index
Uninsured*FDIC*Complexity	-0.546**	-0.560**	-0.783**
	(0.271)	(0.269)	(0.336)
Borrower, lender, & deal controls	Y	Y	Y
Lender & borrower fixed effects	Y	Y	Y
Quarter fixed effects	Y	Y	Y
R-squared	.638	.422	.411
Observations	11,246	11,243	11,246
Number of lenders	250	250	250
Number of borrowers	815	815	815
Time period: 2009Q2–2013Q1			
	(1)	(2)	(3)
Dependent variable:	Share	Lead share	Share index
Uninsured*FDIC*Complexity	-1.320**	-1.493**	-1.360**
	(0.600)	(0.675)	(0.639)
Borrower, lender, & deal controls	Y	Y	Y
Lender & borrower fixed effects	Y	Y	Y
Quarter fixed effects	Y	Y	Y
R-squared	.715	.540	.525
Observations	3,526	3,524	3,526
Number of lenders	132	132	132
Number of borrowers	379	379	379

This table reports the effects of the FDIC shock on intensive margin measures of banks' participation in syndicated loans. Cluster robust standard errors at the level of the borrower and the lender in parentheses. Equations estimated using ordinary least squares. All equations contain lagged values of the following bank-specific characteristics: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans; lagged values of the following borrower-specific characteristics: the logarithm of total sales, liquid assets to assets, the logarithm of EBITDA, a leverage ratio, net profit to assets, cash to assets, working capital to assets, the logarithm of the number of employees, tangible assets to assets, the logarithm of revenue, income to assets, the logarithm of total debt, and a set of dummy variables corresponding to the borrower company's industry; and the following deal-specific characteristics: primary purpose dummies, maturity of the loan, secured loan, and the logarithm of the deal amount. The unit of observation is a borrower-lender pair for a given facility. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment base change (2011Q2). For the complexity variable, we compute the number of U.S. affiliates of the conglomerate. *p <.1; **p <.05; ***p <.01.

Table 9: Robustness test: Participation of European and non-European banks in the syndicated market

	A. Intensive margin						*B. Extensive margin*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable:	Lead	Share	Lead Share	Share Index	Herfindahl	ln(Amount)	ln(Number of deals)	ln(Number of leads)	ln(Total amount offered)
European uninsured	-0.169	6.409*	6.351**	9.071***	-63.37	-0.332	0.122	-1.326**	4.243***
	(0.168)	(3.273)	(2.531)	(3.485)	(231.9)	(0.718)	(0.378)	(0.613)	(0.575)
Not European uninsured	0.106	5.373***	0.239	6.963***	-661.1***	0.588***	-.366**	-1.017**	1.957***
	(0.0729)	(1.791)	(1.883)	(1.878)	(130.3)	(0.220)	(0.178)	(0.404)	(0.165)
FDIC	0.259	112.8	151.4	148.3	8,766	4.315**	-0.615	2.681	-3.760
	(0.804)	(94.73)	(106.9)	(105.6)	(9,599)	(1.747)	(1.868)	(4.558)	(2.882)
European uninsured * FDIC	-0.117***	-1.489	-1.516	-2.763**	136.1	-0.150	-0.803***	-1.193***	-0.983***
	(0.0437)	(0.966)	(1.039)	(1.088)	(89.72)	(0.121)	(0.245)	(0.273)	(0.163)
Not European uninsured * FDIC	-0.136***	-0.325	-1.761**	-0.847	127.5	-0.309**	-0.843***	-0.540	-0.897***
	(0.0378)	(0.863)	(0.882)	(0.846)	(81.29)	(0.134)	(0.178)	(0.460)	(0.260)
Borrower, lender, & deal Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lender & borrower Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	27,358	11,798	11,795	11,798	11,795	11,798	27,361	23,366	26,699
R-squared	.328	.223	.174	.179	.132	.362	.882	.847	.866
Number of lenders	335	263	263	263	263	263	335	335	335
Number of borrowers	1,296	820	820	820	820	820	1,296	1,286	1,295

This table reports robustness tests for the effects of the FDIC shock on intensive and extensive margin measures of banks' participation in syndicated loans, differentiating between European and non-European banks. Cluster robust standard errors at the level of the borrower and the lender in parentheses. Equations estimated using ordinary least squares. All equations contain lagged values of the following bank-specific characteristics: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans; lagged values of the following borrower-specific characteristics: the logarithm of total sales, liquid assets to assets, the logarithm of EBITDA, a leverage ratio, net profit to assets, cash to assets, working capital to assets, the logarithm of the number of employees, tangible assets to assets, the logarithm of revenue, income to assets, the logarithm of total debt, and a set of dummy variables corresponding to the borrower company's industry; and the following deal-specific characteristics: primary purpose dummies, maturity of the loan, secured loan, and the logarithm of the deal amount. The unit of observation is a borrower-lender pair for a given facility. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment base change (2011Q2). The time period of estimation is 2001Q1–2014Q2. *p <.1; **p <.05; ***p <.01.

Table 10: Robustness: Participation in syndicated loans, insured and uninsured foreign banks

	A. Intensive margin						*B. Extensive margin*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable:	Lead	Share	Lead share	Share index	Herfindahl	ln(Amount)	ln(Number of deals)	ln(Number of leads)	ln(Total amount offered)
Foreign-owned uninsured	-0.00897	-1.438	-1.461	-1.762*	6.337	-0.145*	0.260	0.618	-0.179
	(0.0519)	(1.090)	(0.895)	(0.919)	(91.99)	(0.0877)	(0.253)	(0.561)	(0.387)
Foreign-owned insured	0.00109	-0.0694	0.260	-0.0463	-12.26	-0.00742	0.142	-0.0278	0.0961
	(0.0245)	(0.686)	(1.051)	(0.796)	(49.28)	(0.0529)	(0.102)	(0.147)	(0.122)
FDIC	0.214	105.8	145.0	139.3	8,827	3.789**	-0.163	4.903	-3.956
	(0.634)	(141.5)	(162.5)	(154.2)	(13,539)	(1.538)	(1.853)	(5.080)	(2.904)
Foreign-owned uninsured * FDIC	-0.123***	-0.765	-1.432**	-1.667**	137.2**	-0.216**	-0.896***	-1.037***	-0.916***
	(0.0401)	(0.640)	(0.723)	(0.695)	(61.59)	(0.103)	(0.152)	(0.268)	(0.196)
Foreign-owned insured * FDIC	0.0195	1.119**	1.394*	1.127**	49.13	0.0544	-0.268	0.0181	-0.0325
	-0.0434	-0.469	-0.745	-0.352	(43.09)	(0.0599)	(0.165)	(0.307)	(0.175)
Borrower, lender, & deal controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lender & borrower fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	27,358	11,798	11,795	11,798	11,795	11,798	27,361	23,366	26,699
R-squared	.328	.223	.174	.179	.132	.362	.882	.847	.866
Number of lenders	335	263	263	263	263	263	335	335	335
Number of borrowers	1,296	820	820	820	820	820	1,296	1,286	1,295

This table reports robustness tests for the effects of the FDIC shock on intensive and extensive margin measures of banks' participation in syndicated loans, differentiating between insured and uninsured foreign banks. Cluster robust standard errors at the level of the borrower and the lender in parentheses. Equations estimated using ordinary least squares. All equations contain lagged values of the following bank-specific characteristics: the dependent variable, the logarithm of total assets, the ratio of liquid assets to total assets, the tier 1 capital ratio, and the ratio of nonperforming loans to total loans; lagged values of the following borrower-specific characteristics: the logarithm of total sales, liquid assets to assets, the logarithm of EBITDA, a leverage ratio, net profit to assets, cash to assets, working capital to assets, the logarithm of the number of employees, tangible assets to assets, the logarithm of revenue, income to assets, the logarithm of total debt, and a set of dummy variables corresponding to the borrower company's industry; and the following deal-specific characteristics: primary purpose dummies, maturity of the loan, secured loan, and the logarithm of the deal amount. The unit of observation is a borrower-lender pair for a given facility. FDIC is a dummy variable equal to unity following the implementation of the FDIC assessment base change (2011Q2). The time period of estimation is 2001Q1–2014Q2. *p <.1; **p <.05; ***p <.01.