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Abstract

We investigate the U.S. experience with macroprudential policies by studying the interagency guidance on leveraged lending. We find that the guidance primarily impacted large, closely supervised banks, but only after supervisors issued important clarifications. It also triggered a migration of leveraged lending to nonbanks. While we do not find that nonbanks had more lax lending policies than banks, we unveil important evidence that nonbanks increased bank borrowing following the issuance of guidance, possibly to finance their growing leveraged lending. The guidance was effective at reducing banks' leveraged lending activity, but it is less clear whether it accomplished its broader goal of reducing the risk that these loans pose for the stability of the financial system. Our findings highlight the importance of supervisory monitoring for macroprudential policy goals, and the challenge that the revolving door of risk poses to the effectiveness of macroprudential regulations.

Key words: macroprudential regulation, leveraged loans, banks, enforcement, supervision, shadow banking

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1 Introduction

Following the global crisis of 2007-2009, many countries expanded the tools available to regulators to include macroprudential instruments in an attempt to improve their ability to promote financial stability. Macroprudential policies were widely praised for giving regulators both the opportunity to influence selected parts of the banking industry and the ability to do so in a more-timely manner than is possible with new regulations. These assertions, however, depend critically on the efficacy of macroprudential tools. In this paper, we investigate the response of financial institutions to U.S. leveraged lending guidance. We use data on syndicated loan originations which allows us to observe lending activity across types of banks and nonbanks. We are particularly interested in investigating whether the leveraged lending guidance triggered a migration of risk out of the banking system, and if so, whether exposure to that risk finds its way back to banks through a different channel, possibly undermining the macroprudential goals. To that end, we examine the role supervision plays to ensure compliance with the guidance by comparing the response of large domestic banks to small banks and foreign banks. We also investigate to what extent leveraged lending migrated to nonbanks, which were not subject to the guidance, and how these institutions funded their lending surge.

Prompted by an increase in leveraged lending and an apparent easing of credit standards, in March of 2013 the OCC, the Fed and the FDIC issued guidance to banks on the appropriate origination of leveraged lending.¹ In response to inquiries, the agencies issued a responses to “frequently asked questions” on November 7th.² In sum, the guidance and FAQ outlined minimum expectations on a wide range of topics related to leveraged lending, including underwriting and valuation standards, pipeline management, risk ratings and problem credit management. While components of the guidance were microprudential in nature, the stated goal of the interagency guidance was macroprudential: to ensure that federally regulated financial institutions conduct leveraged lending activities in a safe and sound manner so that these activities do not heighten risk in the banking system or the broader financial system through the origination and distribution of poorly underwritten and low-quality loans.

Notwithstanding the subsequent clarifications, the leveraged lending guidance was susceptible to interpretation and lacked clear penalties for noncompliers which fueled questions about its efficacy. As a general matter, failure to comply with formal guidance can result in increased supervisory scrutiny and other costs, including a downgrade of the bank’s supervisory ratings. However, this hinges on the assumption that it is feasible to identify whether an institution complies with the guidance, which may be challenging in the case of the leveraged

¹The full details of the guidance can be found at <https://www.federalreserve.gov/bankinforeg/srletters/sr1303a1.pdf>.

²See <https://www.federalreserve.gov/newsevents/press/bcreg/bcreg20141107a3.pdf>

lending guidance. For example, in contrast to the CRE guidance issued on January 2006, which contained specific numeric limits describing the concentration levels at which supervisory attention would be heightened, the leveraged lending guidance had no specific numeric thresholds. Additionally, it lacked specificity in some critical areas. For example, it did not include a definition of what constitutes a leveraged loan. Instead, it recognized that market participants use many alternative definitions and therefore gave banks the opportunity to adopt their own definitions. Indeed, some market participants identify leveraged loans off the borrower's leverage; others use the loan (or borrower) rating; others rely on the purpose of the loan (i.e. loans for buyouts, acquisitions or capital distributions); and others yet use the spread at origination.

We start by investigating whether the interagency guidance had an effect on banks' leveraged lending activities and whether that effect varied with supervisors' monitoring and enforcement. To that end, we begin with a difference-in-difference approach that compares leveraged lending activity by banks to those of nonbanks, which were not subject to the guidance, before and after March 2013. To account for the differences in the length of time in the before and after periods, we focus on banks' average monthly number and volume of leveraged loans. In some specifications, we break the post-guidance period into two subperiods: one bounded by the issuance of the guidance and the answers to frequently asked questions and the other after the FAQ in an attempt to ascertain the importance of the clarifications. Given that the efficacy of the guidance will likely depend on supervisory monitoring efforts, we compare the reaction of the banks overseen by the Large Institution Supervision Coordinating Committee (LISCC), arguably the most closely supervised banks, from non-LISCC banks and nonbank lenders.

We classify leveraged loans as syndicated term loans that have an all-in-drawn spread over LIBOR at origination equal to or greater than 200 bps. We do not include credit lines in this exercise because leveraged loans tend to be dominated by term loans. We use a 200 bps threshold, as opposed to the 150 bps threshold used by some market participants, because more than 90% of the term loans originated during our sample period have spreads equal or larger than 150 bps. Further, using a 150 bps cutoff would lead to the classification of loans from investment grade rated borrowers as leveraged loans.

The results of this part of our investigation show that banks did not respond to the interagency guidance when it was first issued in 2013. To the contrary, their leveraged lending activity went up in the year and a half immediately after the guidance was issued. Banks' response, however, changed when regulators issued the clarifications to the guidance in late 2014, but the responses varied significantly across banks. While LISCC banks cut their leveraged lending activity significantly, bringing it down to levels lower than the pre-guidance period,

non-LISCC banks did not adjust their leveraged lending business even after regulators issued the clarifications. Throughout this period of time nonbank lenders increased their leveraged lending business.

These findings are indicative of the potential impact of the leveraged lending guidance but they could be the result of contemporaneous changes in the demand for leveraged loans. To alleviate concerns with this alternative explanation, we undertake two tests. First, we repeat our analysis but this time we scale banks' and nonbanks' leveraged lending activities by the volume of their total lending business over the same time period which accounts for the overall demand for credit. Second, we compare the likelihood of leveraged borrowers switching out of banks, in particular LISCC banks, to nonbanks in the pre-guidance period with the similar likelihood in the post-guidance period.

Scaling leveraged lending by total lending does not alter the key insights of the first part of our analysis, particularly with regards to LISCC banks' and nonbanks' responses, suggesting that our findings are bank driven rather than borrower driven. Our investigation of leveraged-loan borrowers' switching decisions corroborates this conclusion. We find that borrowers are not more likely to switch the type of lender for their leveraged loan in the period after the interagency guidance and before regulators issued the clarifications to that guidance, which is consistent with our finding that lenders did not respond to the guidance when it was first issued. In contrast, after those clarifications, borrowers whose previous loan was from a LISCC bank are more likely to switch to a different lender type (in particular nonbank lenders). Interestingly, we do not find a similar result if the borrower's previous loan was from either a non-LISCC bank (regardless of whether that bank was domestic or foreign) or a nonbank. This finding adds further support to our thesis that the supervisory attention applies monitoring enforcement to particular institutions that are necessary to ensure the guidance binds.

The effect of the guidance on LISCC banks' leveraged lending business was meaningful. Compared to the pre-guidance period, the market share of these institutions in the post clarification period declined by 11.0 and 5.4 percentage points depending on whether it is measured by the number or volume of leveraged loans, respectively. This decline is meaningful, particularly if one takes into account that it happened over about one year (November 2014 – December 2015). Nonbank lenders appear to have been the main beneficiaries of this response, as their market share based on the number of loans increased by more than 50 percent while their market share based on the volume of lending more than doubled over that period of time.

These findings show that the guidance achieved its narrow objective of reducing banks' leveraged lending business, albeit with a delay. However, they are not sufficient to ascertain the guidance's broader goal of reducing the risk that leveraged lending poses to the financial system. This requires an evaluation of both the funding choices and leveraged lending policies

of nonbanks to account for the potential risks associated with the migration of leverage lending to nonbanks.

Our investigation into nonbanks' funding choices shows no evidence of an increase in bond financing. In contrast, we find that nonbanks increased bank borrowing following the introduction of the leveraged lending guidance. Our investigation of banks' and nonbanks' leveraged loans based on borrowers that switched from banks to nonbanks following the guidance produces mixed results with regards to the risk nature of these institutions' lending loan policies. For example, nonbanks are less likely to require that the loan is collateralized, but in contrast they are more likely to impose dividend restrictions on borrowers and to extend loans with shorter maturities.³

Altogether, our findings show that the guidance was effective at reducing leveraged activity among banks. However, that reduction did not lead to a commensurate decline of risk in the banking sector because some of the leveraged lending business migrated to nonbanks which in turn resorted to banks to raise funding for this activity. Further, while the guidance achieved its goal of reducing banks' leveraged lending business, the migration of leveraged loans to nonbanks makes it less clear that the guidance accomplished its broader goal of reducing the risk that these loans pose for the stability of the financial system.

Our findings also have two important insights with regards to macroprudential policies. The first one is about the design of these policies. Our evidence that banks responded to the guidance only after regulators issued clarifications highlights the importance of clarity in designing macroprudential policies. Clarity alone may not be sufficient for the policy to be effective, though, because even after regulators' clarifications only the most closely supervised banks responded accordingly. The importance of supervisors was likely critical because the leveraged lending policy was implemented as supervisory guidance rather than a regulation. While guidance can be issued in a timely manner, it necessarily foregoes the rule-making process that refines rules and reduces ambiguity, and may not carry the same weight as a regulation. This suggests that the effectiveness of macroprudential policies is closely linked to supervisors' monitoring and enforcement efforts.

The second insight is about the effectiveness of macroprudential policies. Our evidence that the main providers of leveraged lending, the LISCC banks, reduced this activity, even if only after a delay, can be viewed as a positive outcome of the guidance. However, our

³It is well established that banks are more likely to demand riskier borrowers to pledge collateral (Berger and Udell 1990), but since our evidence is within borrower demanding collateral should indicate lower risk. Our insight on maturity derives from the well-known result in banking theory that shorter maturity protects banks against realization of adverse risk on the borrower side (Flannery (1986), Diamond (1991), Hart and Moore (1994), and Berglof and von Thadden (1994)).

evidence that these banks' response triggered a migration of leveraged lending to nonbanks which increased their borrowing from banks, possibly to finance their growing leveraged lending activity, indicates that the reduction in banks' leveraged lending did not necessarily reduce risk equivalently. Therefore, any evaluation of the effectiveness of macroprudential regulations needs to take into account these unintended consequences. More generally, the easiness with which risk migrates in and out of the banking sector, highlighted in our findings, suggests that it is critical to consider the stability of the entire financial system, and not just that of the banking system, when deciding macroprudential policies.

Our paper is related to a recent, but fast growing, literature attempting to evaluate the efficacy and implications of macroprudential policies.⁴ A strand of this literature focuses on macroprudential policies adopted in foreign countries. Aiyar, Calomiris, and Wiedlak (2014) assess the impact of time-varying capital requirements on credit provision and document evidence that efficacy is attenuated by leakage to unregulated entities. Jimenez et al. (2015) study the effectiveness of dynamic provisions in smoothing the credit cycle in Spain while Dassatti, Peydro, and Tous (2015) study the efficacy of reserve requirements in controlling bank credit supply in Uruguay. Akinci and Olmstead-Rumsey (2015) and Kuttner and Shim (2013), in turn, investigate the impact of macroprudential policies on housing credit and real estate prices using data from a large set of countries. Lim et al. (2011), Dell' Ariccia et al. (2012) and Cerutti, Claessens, and Laeven (2015) also rely on cross-country samples, but their focus is on whether macroprudential policies reduce the procyclicality of credit. Relative to this literature our analysis makes two novel conclusions: first that monitoring and enforcement are necessary to ensure compliance even among the regulated institutions; and second, that unregulated institutions not only counteract macroprudential objectives but can undermine microprudential goals when they seek funding from regulated entities.

Another strand of the literature investigates the impact of macroprudential polices in the U.S.⁵ Lopez (2007), Pana (2010), Friend et al. (2013)], and Bassett and Marsh (2014) investigate the effectiveness of guidance on CRE lending issued in 2006. Flannery, Hirtle, and Kovner (2015) and Calem, Correa and Lee (2016), in turn, analyze banks' balance sheet adjustments in response to stress tests. Calem, Correa and Lee (2016) also investigate banks' responses to the 2013 interagency guidance on leveraged lending.

Our paper is closest to Calem, Correa and Lee's (2016) in that we both investigate the impact of leveraged lending guidance, but it differs from theirs in many important respects. They rely on banks' internal ratings while we use the loan spread to identify leveraged loans;

⁴See Claessens (2014) for a review of this literature.

⁵See Elliott, Feldberg, and Lehnert (2013) and Zdzienicka et al. (2015) for investigations of historical uses of macroprudential policies in the US.

thus, our measure is immune to differences in banks' rating scales. They use data from the Shared National Credit (SNC) program while we primarily rely on data from Dealscan.⁶ Both datasets focus on syndicated loans, but the SNC program covers only syndicated loans above \$20 million that are held by at least three supervised institutions. Smaller credits, and perhaps more importantly, credits extended by nonbank lenders (e.g. private equity companies) will not be captured in the SNC database, but will appear in Dealscan. The broader focus allows us to consider unequal enforcement between banks, but also leakage of leveraged lending to the nonbank sector. Lastly, we broaden our investigation to include banks' and nonbanks' leveraged lending standards and the way nonbanks fund their surge in leveraged lending business. Both of these issues are important to understand the migration of risk induced by the leveraged lending guidance.

The remainder of the paper is organized as follows. Section 2 provides background on leveraged lending. Section 3 presents our data and methodology, and characterizes our sample. Section 4 discusses our results on the effect of the guidance on banks' and nonbanks' leveraged lending business. This section also presents the results of our investigation into these institutions' market shares and leveraged lending standards as well as the results of a set of robustness tests that we undertake. Section 5 compares banks' and nonbanks' leveraged lending polices and investigates how nonbanks funded their surge in leveraged lending business. Section 6 concludes with some final remarks.

2 Background on leveraged lending guidance

Citing the rapid post-crisis growth in the volume of leveraged lending, a large increase in the participation of unregulated investors, a deterioration in loan underwriting standards, and an awareness of how similar developments in the mortgage market in the years leading up to the financial crisis subsequently led to a foreclosure epidemic with record losses to banks, the OCC, the Fed and the FDIC issued guidance on leveraged lending in March 2013.⁷ The stated goal of the interagency guidance was to ensure that federally regulated financial institutions conduct leveraged lending activities in a safe and sound manner so that these activities do not heighten risk in the banking system or the broader financial system through the origination and distribution of poorly underwritten and low-quality loans. To that end, the agencies outlined in the guidance a set of minimum expectations on a wide range of leveraged loan issues, including underwriting and valuation standards, pipeline management, risk rating of leveraged loans, credit analytics, problem credit management, credit review, and stress testing.

⁶See Bord and Santos (2012) for a detailed comparison of both databases.

⁷The full details of the guidance can be found at <https://www.federalreserve.gov/bankinforeg/srletters/sr1303a1.pdf>.

Subsequently, on November 7th, citing many inquiries about the interpretation and implementation of the initial guidance, the agencies issued a set of responses to “frequently asked questions for implementing the March 2013 guidance.”⁸ The stated aim of their answers was to foster industry and examiner understanding of the guidance and supervisory expectations for safe and sound underwriting and to promote consistent application of the guidance. Among other things, the agencies clarified that the guidance applied to leveraged lending activities of both bank and nonbank subsidiaries of bank holding companies, to new loans as well as loans acquired in the secondary market, and to loans originated to hold as well as to loans originated for complete distribution to other lenders.

The guidance sought to achieve both microprudential and macroprudential objectives. From a microprudential standpoint, the leveraged lending guidance was designed to reduce the riskiness of banks’ balance sheets. Typically leveraged loans are underwritten, implying that even if the bank retains no long-term interest in the loan that there is a period before the loan is fully syndicated where the originating bank has substantial exposure to the credit. From a macroprudential standpoint, the guidance sought to limit the degree to which firms could obtain significant leverage and through this adversely affect the stability of the financial system.

The guidance only applied to entities regulated by the OCC, the Fed and the FDIC (i.e. banks). Therefore, the guidance did not apply to nonbank lenders unaffiliated with regulated institutions. In addition, foreign banks that originate loans out of unregulated entities were not subject to the guidance. Hence, there was substantial opportunity for leveraged lending to migrate to unregulated entities. Even for regulated entities, the guidance was complicated and potentially subject to different interpretations. For example, it lacked a specific definition of leveraged lending, and it did not specify the consequences of non-compliance. Consequently, the outcome is reliant on supervisors to interpret, monitor and enforce the guidance for regulated institutions. We investigate the importance of the leveraged lending guidance by comparing the response of banks overseen by the Large Institution Supervision Coordinating Committee (LISCC), which is in place to ensure that the largest banks receive supervisory scrutiny, to the response of small banks, foreign banks, and nonbanks.

⁸See https://www.federalreserve.gov/news_events/press/bcreg/bcreg20141107a3.pdf

3 Data, methodology and sample characterization

3.1 Data

The data for this project come from the Loan Pricing Corporation’s Dealscan database (LPC), the Shared National Credit (SNC) program run by the Federal Deposit Insurance Corporation, the Federal Reserve Board, and the Office of the Comptroller of the Currency, and Mergent. We use LPC’s Dealscan database of business loans to gather information on leveraged loan originations and the identity of the lenders. We also use it to investigate how nonbank lenders fund their leveraged lending activity.

Dealscan is dominated by syndicated loans. It contains detailed information on individual loans, including the loan’s spread over LIBOR, maturity, seniority status, purpose and type; the borrower, including its sector of activity and its legal status (private or public firm); and finally, the lending syndicate, including the identity and role of the banks in the syndicate.

The vast majority of borrowers of leveraged loans are privately held corporations. For this reason, we cannot rely on criteria that identify leveraged loans off borrowers’ balance sheet data, such as the leverage ratio, since this information is not readily available nor can we use forecast information, like debt pay-down rates.⁹ Instead, we rely on loan spreads at origination to classify leveraged loans. Not only is this measure readily available in the LPC data, but spreads serve as an index for the perceived riskiness of a loan which captures lenders’ perspectives on expected cash flows and leverage. Our leveraged loan criteria is that the facility is a term loan with spreads over LIBOR greater than 200 bps at the time of origination. We focus on this threshold because as we can see from Figure 1, borrowers rated below investment grade all have loans with spreads that are above 200 bps. Some market participants have suggested a leveraged loan classification based on spreads greater than 150bps; however, this definition would designate more than 90% of term loans in our sample as leveraged loans. The leveraged lending guidance was not constructed to capture such a broad swath of the loan market but rather to reduce the riskiest origination activity; therefore, we choose a cut-off that focuses the analysis on riskier, sub-investment grade term loans. As a robustness test, we also run our models using a more stringent criterion (>250 bps) and draw similar conclusions.

We complement the loan data from Dealscan with data from the expanded quarterly SNC program. This program gathers information on all syndicated credits for which a set of expanded reporters, a subset of the federally supervised institutions who report for the annual SNC program, act as agents. The set of expanded reporters increases from 17 to 20 throughout

⁹There is no unique definition of leveraged loans. Some definitions use cash flow ratios (e.g. debt-to-EBITDA), others use balance sheet ratios (e.g. leverage), and others yet use loan pricing (e.g. the spread on the loan over an index).

our sample period; however, to prevent any bias from this change, we limit the sample of credits to those reported by the original 17 from the beginning of the period. In contrast to Dealscan, which contains information on loans only at the time of their origination, the SNC program gathers information at the end of each quarter on new credits as well as credits originated in previous quarters, and it reports information on commitment amounts as well as the amounts that borrowers have already drawn down. Additionally, and also in contrast to Dealscan, the SNC program contains comprehensive information on credits' syndicates, including the identities of syndicate participants and the share of the credit that they each hold.¹⁰ This information allows us to investigate the extent to which nonbank lenders rely on bank funding to support their activities, including their leveraged lending business.

Finally, we use Mergent to complement our investigation of nonbanks' funding sources. Mergent contains detailed information on each bond issued in the US. Using this information, we track the volume of bond issuance by nonbanks before and after the implementation of the leveraged lending guidance.

3.2 Methodology

Our methodology has two stages. In the first stage we investigate the impact of the interagency guidance on leveraged lending. We begin by comparing lenders' monthly average number and volume of leveraged loan originations after the guidance with their leveraged lending activity prior to it. We are careful to estimate the reaction after the initial 2013 guidance as distinct from the reaction after regulators clarified the guidance in 2014. To help identify the effect of the guidance, we compare banks' response to the guidance with those of nonbank lenders. Additionally, we differentiate across types of banks based on the degree to which they are subject to supervisory scrutiny in order to assess the importance of enforcement.

Notwithstanding our use of nonbanks' leveraged lending activity to help us identify banks' response to the guidance and our investigation of banks' responses depending on their size, one concern with the findings is that differences may derive from changes in the general demand for leveraged loans rather than from a supply response to the interagency guidance. To address this concern, we repeat our analysis using measures of leveraged lending scaled by lenders' total lending activity over the same period of time. Scaling by overall lending controls for the overall demand for credit from an institution as well as the size of the institution. We also consider specifications where we focus on borrowers and investigate whether the borrowers of leveraged loans switched from the largest banks, which are arguably subject to more supervisory scrutiny, to smaller banks and nonbank lenders.

¹⁰See Bord and Santos (2012) for a more detailed comparison of Dealscan with the SNC program.

In the second stage of our methodology, we compare banks' and nonbanks' leveraged lending policies to ascertain whether the migration of leveraged lending to nonbanks induced by the guidance inadvertently increased the risk of leveraged loans. We also investigate how nonbanks fund their surge in leveraged lending activity following the interagency guidance. We are particularly interested in determining if nonbank lenders increase their borrowing from banks during the time period they expand their leveraged lending activity as this would suggest a return to the banking sector of some of the risk that left it with the migration of leveraged lending.

3.3 Sample characterization

To derive our sample we start by identifying all of the term loans in Dealscan originated between March 22nd, 2011 and December 31st, 2015. We restrict our sample to term loans because revolving credit facilities are typically undrawn at origination and need not reflect an actual increase in firm leverage.¹¹ We begin on March 22nd, 2011 so that we have a two-year control period before the announcement of the leveraged lending guidance on March 22nd, 2013. This criteria left us with a total of 30,528 term loans taken out over the entire period of our study. 10,595 of these loans were taken out during the control period, 12,219 were taken out between the guidance announcement on March 22nd, 2013 and the clarification to this guidance issued on November 7th 2014, and the remaining 7,714 loans were taken out after the issuance of that clarification.

To isolate the leveraged loans we identify the term loans with a spread over LIBOR at origination of at least 200 bps. Judging by the numbers reported in Table 1, the interagency guidance had only a limited impact on leveraged lending. Both the number and volume of leveraged loans increased after the guidance when compared to the pre-guidance period (Panels A and B). The monthly average number (volume) of leveraged loans before the guidance was 335 (\$36.6 billion). After the guidance, these numbers went up to 406 (\$45.9 billion), respectively. As Table 1 also shows, these post-guidance numbers mask how lending behaved in the period immediately after the guidance and before the issuance of the clarifications to FAQ versus the period afterwards. Leveraged lending grew significantly during the first of these two periods, but it declined significantly in the second period. The average monthly number (volume) of leveraged loans went up to 456 (\$52.9 billion), before coming down to 337 and (\$36.4 billion), respectively.

Looking at these numbers by lender type, we find a similar pattern among banks and nonbank lenders of leveraged loans but with an interesting difference. Both types of lenders

¹¹The impact of this restriction is small as almost all leveraged loans under our classification are term loans.

reduced their level of leveraged lending activity after regulators issued the clarifications to the guidance, but only banks cut this activity to a level lower than the pre-guidance period. The monthly average number (volume) of leveraged loans extended by banks before the guidance was 312 (\$35.1 billion). In the interim period after the guidance and before the issuance of the clarifications these numbers went up to 422 (\$49.6 billion), but they come down to 304 (\$33.7) in the post-clarifications period. With regards to nonbank lenders of leveraged loans, their average number (volume) of leveraged loans extended before the guidance was 23 (\$1.5 billion). In the interim period these numbers went up to 34 (\$3.3 billion) but declined to 33 (\$2.8 billion) in the post-clarifications period. As we mentioned above, in the case of nonbanks, the decline in leveraged lending activity in the post-clarifications period is much smaller, affording these lenders the opportunity to still have a level of leveraged lending activity higher than their pre-guidance period.

These comparisons highlight a second important fact: most of the leveraged lending is done by banks. Nonbank lenders, however, have been increasing their presence in this market. The number of leveraged loans they extend prior to the guidance is only 7.4% of the number extended by banks. In the period after the clarification to the guidance, that percentage rises to 10.9%. The increase is even larger when we compare the volume of loans as it increases from 4.3% to 8.3%.

Turning our attention to the banks, we see that LISCC banks behaved quite differently from non-LISCC banks. They both grow their leveraged lending business in the period immediately after the interagency guidance. However, once regulators issued clarifications to the guidance, only the LISCC banks cut their leveraged lending activity significantly. Non-LISCC banks reduced their number of loans only modestly and even managed to increase their volume of leveraged lending following regulators' issuance of the clarifications. This is somewhat surprising, but it could derive from the fact that not all of the non-LISCC banks are subject to the interagency guidance. For example, foreign banks that extend these loans out of their overseas offices are not be subject to the interagency guidance. Indeed, when we split the non-LISCC banks into the group of domestic banks (subject to the guidance) and foreign banks (some of which are subject to the guidance, e.g. if they have regulated subsidiaries in the US), we see from Table 1 that the latter banks are the main contributors to the increase in non-LISCC banks' leveraged lending activity that occurred after regulators issued guidance clarifications. Domestic non-LISCC banks have a more mixed response: they reduce their number of loans but increase their volume. This stands in sharp contrast to LISCC banks' reaction to regulators' clarifications.

In sum, this first analysis suggests that the interagency guidance did not meaningfully impact banks' leveraged lending businesses when it was first introduced in 2012. To the con-

trary, in the year and a half after the guidance, banks appear to have increased their leveraged lending, possibly in anticipation of more scrutiny. This additional scrutiny did in fact occur in the form of a followup clarification of the guidance in late 2014. After regulators' followup clarifications, banks appear to have cut their leveraged lending business. Their response, however, was not uniform across all bank types. While the most closely supervised LISCC banks lowered their leveraged lending business significantly, non-LISCC banks did not. Throughout this period, nonbank lenders appear to have capitalized on the guidance to increase their leveraged lending business. In the next section, we take a closer look at lenders' responses to the interagency guidance by estimating a model of leveraged loans and attempt to control for changes in the demand for leveraged loans over the same time period.

4 Did banks respond to leveraged lending guidance?

We start our investigation of the interagency guidance on leveraged lending by comparing lenders' monthly average number and volume of leveraged loans originated after the guidance with their leveraged lending activity prior to the guidance. To that end, we estimate the following model of leveraged lending:

$$LEVLENDING_{i,t} = c + \alpha BANK_i + \beta POST_t + \gamma POST_t \times BANK_i + \eta_i + \epsilon_{i,t}, \quad (1)$$

where $LEVLENDING$ is the monthly average number (volume) of leveraged loans originated by bank i during period t . $POST$ is a dummy variable that takes the value one if the leveraged loan was taken out after the interagency guidance. In some specifications, we split the post period into two subperiods: the period between the interagency guidance and the issuance of the answers to FAQ and the period after that clarification. $BANK$ is a variable for loans originated by banks. Implicitly, the control group is composed of loans originated by nonbanks. We consider a variant of the model where we replace the dummy variable $BANK$ with two dummy variables to distinguish the activity of LISCC banks ($LISCC$) from that of non-LISCC banks ($NON - LISCC$). Additionally, we consider a specification where we replace the latter dummy variable with two dummy variables to distinguish loans originated by non-LISCC domestic banks ($DNON - LISCC$) from loans originated by non-LISCC foreign banks ($FNON - LISCC$). η_i is a set of lenders' fixed effects.

Table 2 reports the results of this investigation. Panel A reports the results for the average number of loans that lenders originate each month while the bottom panel, Panel B, reports the results for the monthly average volume of leveraged loans. The number of observations in Table 2 differs somewhat from the numbers in Table 1 because we restrict our analysis to lenders that have extended at least three leveraged loans over the entire sample

period. In the robustness section, we discuss the implications of including the less frequent lenders in our analysis.

Focusing on the top panel of Table 2, we see that according to column (1), contrary to expectations, the monthly average number of leveraged loans increased in the post guidance period (March 24, 2013 through December 31 2015) when compared to the pre-guidance period (January 1 2012 through March 23 2013). In order to understand this result, column (2) splits the post guidance period in two subperiods: Period 1, which goes from the date the guidance was issued until the date regulators issued the answers to FAQ, and Period 2, which covers the part of the post-guidance period that happened after the issuance of those clarifying answers. According to column (2), the post guidance increase in leveraged lending is driven by what happened in the interim period (Period 1). After regulators clarified the guidance, the number of leveraged loans declined to the pre-guidance level.

In columns (3) and (4), we go a step further and try to distinguish the response of different types of lenders (as defined by the lead arranger of the loan) to the interagency guidance. Column (3) distinguishes banks from nonbanks. This distinction is important because nonbanks were not subject to the interagency guidance, hence they can serve as plausible counterfactual of leveraged lending in the absence of the guidance. Column (4), in turn, splits banks into two subgroups: the LISCC banks and non-LISCC banks. This distinction is useful for identifying the heterogeneous impact of the leveraged lending guidance because LISCC banks, by virtue of being systemically important, are subject to more stringent regulatory and supervisory scrutiny. Looking at column (3) we see that during Period 1, both nonbanks and banks increased their leveraged lending activity when compared to the pre-guidance period, though only the latter increase by an amount that is statistically different from zero. In Period 2, however, these two groups of lenders behave very differently: while banks lowered their leveraged lending activity to levels below the pre-guidance period, nonbanks increased this activity in comparison to their pre-guidance period and by an amount statistically different from zero.

Column (4) confirms the importance of looking at LISCC banks separately from non-LISCC banks. According to that model, LISCC banks first increased their leveraged lending activity in the year immediately after the guidance, but they reversed course after regulators issued the answers to FAQ and cut this activity to a level significantly lower than their pre-guidance level.

With regards to non-LISCC banks, it appears they did not respond to the guidance, as their leveraged lending business remained unchanged from the pre-guidance level. We further refine the degree of supervisory scrutiny in this group by separating domestic banks from foreign banks, many of which are not subject to U.S. supervision. The latter group has a

combination of banks that are subject to the interagency guidance and banks that are not subject to it. Looking at column (5) we see that these two sets of banks do behave differently after the guidance. While domestic non-LISCC banks cut their leveraged lending activity, albeit modestly, foreign non-LISCC banks expanded it. In both cases, however, the differences vis-à-vis the pre-guidance period are not statistically different from zero.

The bottom panel of Table 2 reports a set of models similar to that reported in the top panel but estimated on the monthly average dollar volume of leveraged lending. A quick look at the two panels of Table 2 reveals similar results whether we focus on the number of leveraged loans (top panel) or on the value of leveraged loans (bottom panel). There is only one minor difference in column (3). Both models suggest that banks increased their leverage lending activity immediately after the guidance. However, only the results based on the number of loans indicate an increase that is statistically different from zero.

Summing up, our first set of findings suggests that the interagency guidance produced the expected results of reducing banks' leveraged lending activity but only after supervisors clarified several issues that appeared to be unclear when they first issued the guidance on March of 2013. This effect is more pronounced for LISCC banks. Non-LISCC banks did not respond to either the initial guidance or the followup clarification notice. During the same period of time, and in particular after the clarification notice, nonbank lenders in the leveraged lending business increased their activity.

While it is possible that these changes in leveraged lending were induced by supervisors' intervention in this market, but it may be the case that they derive instead from changes in the demand for these loans from the various lenders. Also, by estimating levels we generate a simple description of changes in overall activity, but the analysis can fail to capture the heterogeneous response of institutions that vary in size and market presence. In the next section we address both of these concerns.

4.1 Attempting to disentangle supply from demand effects

The results we presented above which compare the leveraged lending activity of banks with this activity by nonbanks before and after the introduction of the leveraged lending guidance are useful at isolating banks' responses to the guidance from *overall* changes in the demand for leveraged lending over time. For, if there were an overall decline in the demand for leveraged loans, it should affect both banks' and nonbanks' leveraged lending activity. It is possible, however, that banks and nonbanks operate in different segments of the leveraged lending market and the difference in the response to the guidance that we unveiled derives from a difference in the relative growth of leveraged lending in these market segments. It is also possible that the difference in leveraged lending that we unveiled derives simply from a difference in banks'

and nonbanks' overall lending activity over time.

In this section, we undertake two tests to address these alternative explanations for our finding. The first test investigates what happened to the ratio of leveraged lending to the lender's overall lending activity over time. The second test investigates whether borrowers of leveraged loans switched lenders and if so in what direction they moved.

4.1.1 Scaling leveraged loans with total loans

To address concerns that our results may be driven by changes in banks' and nonbanks' overall lending activity over time rather than a response to the leveraged lending guidance, we repeat the analysis we undertook in the previous section, but this time we focus on the ratio of the number (volume) of leveraged loans to the total number (volume) of loans that lenders originate over the same time period. To that end, we reestimate the leveraged lending model we specified above, but this time we use the monthly average number (volume) of leveraged loans scaled by the monthly average number (volume) of total term loans originated by the lender. We consider in the denominator only term loans and leave out of the analysis lending activity done via credit lines to better capture the potential role of demand on lenders' leveraged lending activity since this activity is done mainly through term loans.

If an overall change in the demand for loans extended by banks and nonbanks drives our earlier results, then we should find that the introduction of the interagency guidance did not affect the ratio of leveraged loans to total loans. However, if banks cut only their leveraged lending activity in response to the guidance then we should observe a decline in that ratio. The results of this exercise are reported in Table 3. As in the previous section, the top panel of the table reports the results for the number of loans while the bottom panel reports results for the volume of loans.

Focusing at the top panel, we see that the number of leveraged loans relative to the number of total loans has declined after the announcement of the guidance (column 1) and this decline was larger after supervisors issued the answers to FAQ (column 2), but in neither case is the difference to the pre-guidance period statistically different from zero. However, when we separate the institutions that were subject to the guidance (banks) from those that were not (nonbanks) in column (3), we start seeing a picture consistent with our earlier finding. Compared to the pre-guidance period, nonbanks increased their number of leveraged loans (relative to their total number of loans), albeit by a number that is only statistically significant in the intermediate period, but banks cut their number of leveraged loans (relative to their total number of loans). Also, in contrast to nonbanks' response, banks' reaction both in the year immediately after the introduction of the guidance and in the period that followed the issuance of the answers to the FAQ is statistically different from zero.

Further, as we can see from column (4), the ratio of leveraged loans to total loans for LISCC banks declines after the guidance, particularly after supervisors' clarifications. Among the non-LISCC banks, it appears that only the domestic banks respond to the guidance. Non-LISCC foreign banks do not appear to reduce their leveraged lending business. Recall that in Table 2 we documented that these banks did not reduce their absolute levels of leveraged loan originations. The results of Table 3 show that they also did not lower their leveraged lending relative to total lending. As we noted before, it is possible that this difference arises because all non-LISCC domestic banks are subject to the guidance while non-LISCC foreign banks contain a combination of banks that are subject to U.S. supervision and banks which are not).

Looking at the bottom panel of Table 3, which reports results for the volume of leveraged loans scaled by the volume of term loans issued over the same time period, we see a similar picture to that presented in the top panel of that table. The results of our investigation of the ratio of leveraged loans to total loans are generally consistent with those we unveiled by looking at leveraged loans alone. This suggests that the decline in banks' leveraged lending activity, in particular by LISCC banks, which followed regulators' issuance of the answers to FAQ was likely bank driven and not the result of a change in the demand for leveraged loans. The response appears to be greatest for the set of institutions supervisors care most about, the LISCC banks, which suggests an important role for monitoring and enforcement. Further, nonbanks appear to have capitalized on banks' retreat from the leveraged lending business to expand their footprint in this market.

Of course, it is still possible that the difference in the response of LISCC banks vis-á-vis the responses of non-LISCC banks or nonbanks could derive from differences in the demand for leveraged loans faced by these three groups of lenders. We address this possibility in the next section we investigate whether borrowers of leveraged loans opted to continue borrowing from the same lender or to switch lenders, and if they did switch in which direction they switched following the introduction of the interagency guidance.

4.1.2 Borrowers' decision to switch lenders

To help us ascertain whether banks changed their lending policies following the introduction of leveraged lending guidance, we investigate whether leveraged-loan borrowers are more likely to switch away from impacted lenders after the guidance. To that end, we estimate the following model of lender switches:

$$SWITCH_{j,t} = c + \alpha LENDERTYPE + \beta POST_t + \gamma POST_t \times LENDERTYPE + \epsilon_{j,t}, \quad (2)$$

where $SWITCH$ is a dummy variable that takes the value one if the borrower, j switched lender type when it took out its most recent loan (compared to its previous loan) during sample period t . $POST$ is a dummy variable that takes the value one if the leveraged loan was taken out after the interagency guidance. As in our previous analysis, we also split the post period into two subperiods: the period between the interagency guidance and the issuance of the answers to FAQ and the period after that clarification. $LENDERTYPE$ is a dummy variable we use to control for the type of lender the borrower used in its previous loan. This specification conditions on borrowers of leveraged loans that are financed in the control period and after the guidance is issued.

To test whether borrowers that used to take out their leveraged loans from banks are more likely to switch to a different lender type following the introduction of the guidance, we set the $LENDERTYPE$ variable equal to $BANKS$ and consider a switch if the borrower took out the previous loan from a bank and borrows its current loans from a nonbank. Similarly, to ascertain if borrowers that used to borrow from LISCC banks are more likely to switch to a different lender type after the guidance, we set the $LENDERTYPE$ variable equal to $LISCC$ and consider it a switch if the borrower took out the previous loan from a LISCC bank but chooses to borrow the current loan from a non-LISCC bank. We ran our switch model to attempt to identify separately the role of each lender type we have considered in our analysis on borrowers' switching decisions. The results of this exercise are reported in Table 4.

Column (1) shows that the likelihood of borrowers switching lender types increased after the interagency guidance, but by an amount that is not statistically different from zero. Column (2) shows that when we split the post-guidance period into two subperiods, we find that borrowers were indeed more likely to switch lender types once regulators issued the answers to the FAQ on November 2014. Column (3), in turn, shows that borrowers that took out their previous leveraged loan from banks are not more likely to switch to nonbank lenders when they borrow again after the 2013 guidance or after the clarification issued in 2014.

Given that LISCC and non-LISCC banks appear to have responded differently to the guidance, in columns (4) through (6), we investigate whether borrowers having their previous loans from a LISCC bank, a domestic non-LISCC bank or a foreign non-LISCC bank affected whether borrowers are more likely to switch lender types after the introduction of the guidance. A careful examination of these columns shows two important results. First, regardless of the type of lender borrowers used in their previous loan, the relative effect on the likelihood of switching is more pronounced in the post clarification period than in the year immediately following the announcement of the guidance. $PERIOD2 \times LENDERTYPE$ is larger (in absolute terms) and more significant than $PERIOD1 \times LENDERTYPE$. Second, and more importantly for our purposes, after regulators clarified the terms of the guidance,

we see that borrowers whose previous leveraged loan was from a LISCC bank are significantly more likely to switch to a different lender type compare to the pre-guidance period (column 4). Note that $PERIOD2 \times PRIOR - LISCC$ is positive and highly statistically significant with a magnitude that implies borrowers that historically borrowed from LISCC banks are 18% more likely to switch than other borrowers in Period 2. Interestingly, we do not find a similar effect for borrowers whose previous loan was from either a domestic or a foreign non-LISCC bank (columns 5 and 6). To the contrary, borrowers whose previous leveraged loan was from either of these banks were less likely to switch to nonbanks after regulators clarified the guidance. Both $PERIOD2 \times PRIOR - DOM - NONLISCC$ and $PERIOD2 \times PRIOR - FOR - NONLISCC$ are negative and statistically significant.

The alignment of these results with our previous findings add support to the thesis that the heterogeneous impact of the guidance is consistent with supervisory efforts to enforce it. Banks did not respond to the interagency guidance when it was first issued, but they did so when regulators issued the clarifications to the guidance and then only LISCC banks appear to have reduced supply of loans to pre-existing borrowers. We tracked the borrowers that switched out of LISCC banks to ascertain which lender types gained leveraged lending business in connection with these switches. The results of this investigation are reported in Table 5. The top panel reports results based on the number of loans while the bottom panel reports results based on the volume of loans.

Looking at the top panel, we see that in the pre-guidance period, 19% of the borrowers that switched out of the LISCC banks went to nonbanks. During $PERIOD2$, the period when borrowers were most likely to switch out of LISCC banks, that percentage went up to 25%, an increase of 6 percentage points. By contrast, during $PERIOD2$ the percentage of borrowers that switched from LISCC banks to either domestic non-LISSLCC banks or foreign non-LISCC banks was smaller than the same percentage in the pre-guidance period. Therefore, the main beneficiaries of the additional borrowers that switched out the LISCC banks, possibly because of their attempt to comply with the interagency guidance, were nonbanks.

4.1.3 Leveraged lending guidance and lenders' market shares

Thus far we have documented that the guidance, in particular its follow-up clarification issued in November of 2014, had a statistically negative (positive) effect on the leveraged lending activity of LISCC banks (nonbanks). A natural question to ask is whether, however, these effects were economically meaningful. To get a sense about the importance of these lenders' responses to the guidance, we computed their shares of the leveraged loan market throughout

the sample period.¹² The results of this exercise are reported in Table 6. The top panel reports market shares computed based on the number of loans while the bottom panel reports these shares based on the volume of loans.

Table 6 shows that LISCC banks lost market share following the leverage lending guidance. LISCC banks continued to dominate the market for leveraged loans; however, their market share declined in the post clarification period by 11.0 and 5.4 percentage points based on the number and volume of loans, respectively. This decline is meaningful, particularly if we taken into account that it occurred over about one year (between November 2014 and December 2015). While all of the other lenders appeared to have benefited from this retrenchment, nonbank lenders evidently seized on this opportunity to expand their leverage lending business. Nonbank lender market share, based on loan counts, increased by more than 50% and their market share based on the volume of loans more than doubled.

4.2 Robustness tests

The results we have reported thus far build on our definition of leveraged loans as loans with a spread of at least 200 bps above LIBOR at the time of origination. We repeat the analysis using thresholds of 250, 300 and even 350 bps and draw similar qualitative conclusions. Table 7 reports the results when we use the 250 bps threshold. A comparison of with Table 2 shows that using a 200 or 250 bps points to identify leverage loans does not affect the thrust of our key findings on the impact of the leveraged lending guidance. When we further increase that threshold to 300 or 350 bps, the leveraged-loan sample is significantly smaller and our core findings persist.¹³

We restrict our analysis to banks and nonbanks that extend at least two leveraged loans over the sample period. We use this criterion to reduce the risk of our results being affected by “occasional” lenders of leveraged loans. Dropping this criterion and using all of the lenders of leveraged loans does not affect our key findings.

Lastly, in our investigation of borrowers’ switching decisions, we consider only borrowers for which we have information about their prior loan in the three-year period before the current loan. In other words, we do not include in our sample “new borrowers”. Adding these borrowers

¹²We thank Christa Bouwman for suggesting this analysis.

¹³The results when we use the 300 and 350 bps thresholds are available from the authors upon request. We have not considered the 150 bps points threshold, which is sometimes used in the market, because this would lead to the classification of loans from investment grade rated borrowers as leveraged loans (Figure 1). Further, it would imply that nearly all of the term loans originated during the sample period were leveraged loans (91.2% of the term loans originated between March 2011 and December 2015 have a spread over Libor of 150 bps or higher).

to the sample does not affect our main finding that borrowers which previously borrowed from a LISCC bank are more likely to switch out of LISCC banks when regulators clarified the terms of the leveraged lending guidance. Further, using a five-year window instead of a three-year window in this analysis does not impact this finding.

5 Was the leveraged lending guidance effective?

Our evidence that the primary providers of leveraged lending decreased their activity significantly, albeit with a delay, could be interpreted that the guidance was effective. Recall that the stated goal of the leveraged lending guidance was that federally regulated financial institutions conduct leveraged lending activities in a safe and sound manner so that these activities do not heighten risk in the banking system or the broader financial system through the origination and distribution of poorly underwritten and low-quality loans.

However, our finding that an important portion of that leveraged lending business migrated to nonbanks indicates that it is important to consider this migration in evaluating the effectiveness of the guidance. In particular, it is important to compare banks' and nonbanks' leveraged lending policies. Additionally, given nonbanks have no access to deposit funding, it is also important to consider how nonbanks fund their growth in leveraged lending. We attempt to shed light on these issues in this section.

5.1 Banks' and nonbanks' leveraged lending policies

If nonbanks use “easier” leveraged policies, then the migration of leveraged lending to nonbanks induced by the guidance could have an adverse effect on the stability of the financial system. Evaluating a lender's lending policy is not an easy task because it depends on the lender's screening efforts prior to granting the loan, the terms at which it extends the loan, and the lender's monitoring efforts during the life of the loan.

Notwithstanding these challenges, we attempt to get an idea about banks' and nonbanks' leveraged lending policies by comparing their loans to borrowers that switch from banks to nonbanks following the guidance. We focus on loans of borrowers that switch to nonbanks to reduce concerns with selection. To that end, we estimate the following model of loan features

$$LOANFEATURE_{i,j,t} = c + \alpha NONBANK + \beta LOAN_{i,j} + \gamma BORROWER_{j,t} + \epsilon_{i,j,t}, \quad (3)$$

where $LOANFEATURE$ is a feature of the loan. We consider three features that are believed to be good indicators of the loan risk. The first two features are the loan is secured with

collateral and whether the lender imposes dividend restrictions on the borrower, respectively.¹⁴ The third feature is the loan maturity.

Given that we compare loans provided by banks and nonbanks to the *same* borrower (though at different points in time), we expect loans that are secured, loans associated with dividend restrictions, and shorter maturity loans to be safer, and thereby, indicate a tighter lending policy. *NONBANK* is our variable of interest in the model as it compares the loan policies of nonbanks to those of banks. We attempt to identify these differences controlling for some other features of the loan, *LOAN*, including its size and purpose, borrower-specific factors, including its rating, and time fixed effects.

Table 8 reports the results of this investigation. The top panel compares, for borrowers that switch from banks to nonbanks after the guidance, their last term loan from a bank with the first term loan from the nonbank. The bottom panel repeats that exercise, but restricts to borrowers that switch from LISCC banks to nonbanks. Both panels suggest similar conclusions, although the results from the bottom panel are statistically weaker, possibly because of the smaller number of observations. According to our results, nonbanks are less likely to demand collateral but they are more likely to impose dividend restrictions on borrowers. Additionally, they tend to extend loans with shorter maturity when compared to banks. In the reported results, we do not control for the loan spread because this variable is jointly determined with those loan features. However, expanding our controls to account for the spread does not affect our findings.

These results, of course do not provide a complete characterization of banks' and non-banks' loan policies, but they suggest a mixed picture with regards to the risk nature of their policies. While a decline in the incidence of collateral suggests a higher risk-taking appetite, an increase in the incidence of dividend restrictions or a shortening of the maturity points in the opposite direction. Consequently, it is unclear whether the migration of leveraged lending from banks to nonbanks made leveraged lending riskier.

5.2 How did nonbanks' fund their surge in leveraged lending?

Our findings show that nonbanks increased both their number and volume of leveraged loans after the guidance in part by attracting firms that used to borrow from banks, in particular LISCC banks. Nonbank lenders appear to have resorted to banks to fund this surge in leveraged lending. In the pre-guidance period these lenders raised \$10.1 billion in bond financing and \$8.9 billion from banks (through term loans and credit lines). In the post-guidance period, these numbers went up to \$10.2 billion and \$20.2 billion, respectively. This implies that their

¹⁴We do not consider whether the loan is senior because virtually all of the leveraged loans are senior. Additionally, we do not consider other covenants because this information is very sparsely reported in Dealscan.

bond financing went up by 1% while their loan financing increased by 125%.

Figure 2 takes a closer look at nonbanks' funding choices by plotting for each nonbank the growth in bond (loan) financing in the post-guidance period relative to the pre-guidance period against the growth in leveraged lending it did in the post-guidance period relative to the pre-guidance period. From these two figures, we see remarkably different messages: on average, nonbanks that increase their leveraged lending business also increase the amount of funding they raise from banks but not the amount of funding they raise in the bond market.

One potential concern with relying on the volume of new term loans and credit lines taken out by nonbanks to ascertain to what extent they rely on banks to fund their businesses is that we do not know whether they draw down these credit lines. Borrowers take out credit lines and never use them or use only a small portion of the corresponding commitment amounts. As a result, using the size of credit lines, rather than the amounts borrowers draw down, has the potential to generate upward biased estimates for the importance of bank funding to nonbank financial institutions.

To address this concern, we use the Shared National Credit (SNC) Program to gather information on banks' exposure to nonbanks. These exposures derive from the term loans nonbanks took out and the drawdowns on their credit lines. In contrast to Dealscan which contains loan information only at the time of their origination and thus has no information about drawdowns borrowers make during the life of their credit lines, the SNC program tracks the loans at the end of each quarter, including the drawdown rates on each credit line.¹⁵ This gives us the opportunity to compute the amount each bank owes the "banking system" and how this amount varies over time. Figure 3 plots the time series exposure of the banking system to nonbanks. We plot both the "commitment" exposure (sum of term loans and credit line commitments) and the "utilized" exposure (sum of term loans and drawdowns on credit lines). Starting in mid-2013, soon after the introduction of the leveraged lending guidance, nonbanks began to increase the size of their credit lines with banks. However, they did not increase their drawdowns on these lines. This changes dramatically after the clarification of the leveraged lending guidance at the end of 2014. After that, nonbanks increase significantly both their credit lines and drawdowns. In December of 2014, nonbanks owed the banking system (as captured in the SNC program) \$5.7 billion. By the end of 2015, this number had gone up to \$15.0 billion, a 163% increase.

The rapid growth of banks' exposure to nonbanks coincides with the period when

¹⁵A limitation of the SNC program is that it covers syndicated loans only above \$20 million that are held by at least three supervised institutions. The \$20 million threshold is not likely to be very restrictive (the average loan size borrowed by nonbanks is \$700 million). The three supervised institutions requirement is not relevant for us because we are interested in the loans nonbanks borrow from banks.

banks, in particular LISCC banks, cut down their leveraged lending business and when we find evidence of a migration of leveraged lending borrowers to nonbanks. This raises an interesting and important question: are nonbanks' additional borrowing related to their expansion of leveraged lending? To see if there is any relationship between these changes, we compare for each nonbank the growth in the utilized bank credit after the introduction of the leverage lending guidance with the growth in its leveraged lending business over the same time period. The results of this exercise are plotted in Figure 4. As we can see from this figure and the fitted line plotted in it, there is indeed a positive relationship between the additional leveraged lending a nonbank does in the post guidance period and the additional borrowing it undertakes from banks over the same time period. This finding indicates that some of the risk that left the banking sector with the migration of leveraged lending to nonbanks induced by the guidance came back in the form of a bigger exposure to nonbanks.

In sum, our findings show that the guidance on leveraged lending was effective at reducing this activity among banks, in particular among the LISCC banks, which were the main originators of leveraged loans. That reduction, however, occurred with a delay; only after regulators issued a set of follow up clarifications to the initial guidance and reaffirmed their goal for banks to reduce the origination of these loans. Further, it did not lead to a commensurate reduction of risk in the banking sector because some of the leveraged lending business migrated to nonbanks which in turn resorted to banks to raise funding for this activity.¹⁶ While the guidance achieved its goal of reducing banks' leveraged lending business, the migration of leveraged loans that it triggered to nonbanks makes it less clear that the guidance accomplished its additional stated goal of reducing the risk that these loans pose for the stability of the financial system.

6 Final remarks

Our finding that only the largest, and most scrutinized, banks cut their leveraged lending activity significantly and that they did so only after regulators clarified the terms of the leveraged lending guidance and exerted closer scrutiny over banks' leveraged lending business suggests that clarity and supervisors' monitoring are critical to achieving micro- and macroprudential objectives. Our evidence on the migration of leveraged lending from large banks to foreign banks and nonbanks together with our evidence on nonbanks' increased use of bank funding to finance the growth of their leveraged lending business indicates that this migration was not accompanied by a similar reduction in risk in the banking sector. This finding is important

¹⁶The exposure to nonbanks is senior relative to direct exposure to leveraged borrowers, but it nonetheless undermines the goals of the guidance.

because it shows that to evaluate the effectiveness of macroprudential policies it is not enough to consider targeted institutions' responses to policies. Rather, one also needs to take into account the feedback effects that may be triggered by those responses.

The U.S. guidance on leveraged lending provides an opportunity to investigate the effectiveness of macroprudential policies. That guidance, however, is important for another reason: it gives us valuable information about shadow banking and the nature of the relationship that exists between banks and the shadow banks. That nonbank lenders took advantage of the guidance to increase significantly their market share in the leveraged lending business is not surprising. Nonbanks' volume of leveraged lending as well as their market share (by volume) after the guidance more than doubled when compared to the pre-guidance years.

That increase, despite being large, was accomplished predominantly by extending more loans rather than larger loans. The largest leveraged loan extended by nonbanks after the guidance was \$4.3 billion, only slightly higher than their largest leveraged loan in the pre-guidance period (\$4.0 billion). This suggests that nonbank lenders have a capacity limit, possibly associated with them facing higher distribution risks in loan syndications. Indeed, looking at the leveraged lending borrowers that switch out of LISCC banks in the post guidance period, we see that the maximum size of their subsequent loan is \$870 million if it is provided by a nonbank and \$2.1 billion if it is provided by a non-LISCC bank.¹⁷ This finding highlights shadow banks' limited ability to substitute for banks, an important factor in the debate on macroprudential policies.

¹⁷We get a similar picture if we do these comparisons at the deal level, after we aggregate all of the term loans that are part of the same deal.

Table 1 Monthly average leveraged loans over time^a

Lenders	Before	After	After Guidance	
	Guidance	Guidance	Period 1	Period 2
Panel A: Number				
All	335	406	456	337
Panel B: Volume (\$ Billion)				
All	36.6	45.9	52.9	36.4
Panel C: Number by lender type				
BANKS	312	372	422	304
LISCC	208	228	276	163
NON-LISCC	104	144	146	141
DNON-LISCC	47	59	61	57
FNON-LISCC	57	85	86	84
NONBANK	23	34	34	33
Panel D: Volume by lender type				
BANKS	35.1	42.8	49.6	33.7
LISCC	27.7	31.4	38.3	22.0
NON-LISCC	7.4	11.4	11.3	11.6
DNON-LISCC	2.5	3.4	3.4	3.5
FNON-LISCC	4.9	8.0	7.9	8.1
NONBANK	1.5	3.1	3.3	2.8

^a *PERIOD1* is a dummy variable for the period between the interagency guidance and regulators' issuance of clarifications to the guidance. *PERIOD2* is a dummy variable for the period after regulators' issuance of clarifications to the guidance. *LISCC*, *NON-LISCC*, *DNON-LISCC*, *FNON-LISCC* and *NONBANK* are dummy variables equal to one if the agent of the leveraged loan is a bank, a LISCC bank, a non-LISCC bank, a domestic non-LISCC bank, a foreign non-LISCC bank or a nonbank, respectively.

Table 2 Interagency guidance and leveraged lending^a

Variables	Panel A: Monthly average number of leveraged loans				
	1	2	3	4	5
Post	0.450*** (4.18)				
PERIOD1		0.899*** (4.69)	0.402 (1.66)	0.402 (1.65)	0.402 (1.64)
PERIOD2		0.001 (0.00)	0.337** (2.38)	0.337** (2.37)	0.337** (2.36)
PERIOD1xBANK			0.628* (1.87)		
PERIOD2xBANK			-0.425* (-1.76)		
PERIOD1xLISCC				5.220*** (4.40)	5.220*** (4.38)
PERIOD2xLISCC				-4.075*** (-3.67)	-4.075*** (-3.66)
PERIOD1xNON-LISCC				0.042 (0.16)	
PERIOD2xNON-LISCC				0.041 (0.24)	
PERIOD1xDNON-LISCC					-0.099 (-0.37)
PERIOD2xDNON-LISCC					-0.129 (-0.79)
PERIOD1xFNON-LISCC					0.167 (0.53)
PERIOD2xFNON-LISCC					0.190 (0.89)
constant	2.488*** (4.96)	2.488*** (4.95)	0.796** (2.52)	0.796** (2.51)	0.796** (2.50)
Observations	402	402	402	402	402
R-squared	0.001	0.005	0.027	0.632	0.632
Panel B: Monthly average volume of leveraged loans					
Variables	1	2	3	4	5
	59.564*** (4.45)				
Post					
PERIOD1		121.198*** (4.43)	64.291 (1.57)	64.291 (1.56)	64.291 (1.56)
PERIOD2		-2.070 (-0.10)	44.359** (2.11)	44.359** (2.10)	44.359** (2.10)
PERIOD1xBANK			71.940 (1.37)		
PERIOD2xBANK			-58.693* (-1.73)		
PERIOD1xLISCC				818.680*** (5.19)	818.680*** (5.17)
PERIOD2xLISCC				-516.087*** (-3.09)	-516.087*** (-3.07)
PERIOD1xNON-LISCC				-23.389 (-0.55)	
PERIOD2xNON-LISCC				-0.303 (-0.01)	
PERIOD1xDNON-LISCC					-45.140 (-1.08)
PERIOD2xDNON-LISCC					-21.950 (-0.98)
PERIOD1xFNON-LISCC					-4.248 (-0.09)
PERIOD2xFNON-LISCC					18.747 (0.63)
constant	272.778*** (4.18)	272.778*** (4.18)	54.032* (1.83)	54.032* (1.82)	54.032* (1.82)
Observations	402	402	402	402	402
R-squared	0.001	0.005	0.025	0.698	0.699

^a Models estimated with robust standard errors and lenders' fixed effects. The dependent variable in the top (bottom) panel is the monthly average number (volume) of leveraged loans. *POST* is a dummy variable equal to one for the post interagency guidance period. *PERIOD1* is a dummy variable for the period between the interagency guidance and regulators' issuance of clarifications to the guidance. *PERIOD2* is a dummy variable

for the period after regulators' issuance of clarifications to the guidance. $BANKS$, $LISCC$, $NON - LISCC$, $DNON - LISCC$ and $FNON - LISCC$ are dummy variables equal to one if the agent of the leveraged loan is a bank, a LISCC bank, a non-LISCC bank, a domestic non-LISCC bank or a foreign non-LISCC bank, respectively. The control group in all of the models are the leveraged loans that have a nonbank lender as an agent. Values in parenthesis are robust standard errors.

Table 3 Interagency guidance and leveraged lending over total lending^a

Panel A: Monthly average number of leveraged loans over total number of loans					
Variables	1	2	3	4	5
POST	-0.018 (-0.50)				
PERIOD1		0.018 (0.44)	0.194* (1.75)	0.194* (1.75)	0.194* (1.74)
PERIOD2		-0.055 (-1.35)	0.114 (1.16)	0.114 (1.15)	0.114 (1.15)
PERIOD1xBANK			-0.222* (-1.88)		
PERIOD2xBANK			-0.213** (-1.98)		
PERIOD1xLISCC				-0.204* (-1.76)	-0.204* (-1.76)
PERIOD2xLISCC				-0.268** (-2.60)	-0.268** (-2.59)
PERIOD1xNON-LISCC				-0.225* (-1.87)	
PERIOD2xNON-LISCC				-0.206* (-1.87)	
PERIOD1xDNON-LISCC					-0.255* (-1.92)
PERIOD2xDNON-LISCC					-0.299** (-2.37)
PERIOD1xFNON-LISCC					-0.198 (-1.56)
PERIOD2xFNON-LISCC					-0.124 (-1.07)
constant	0.599*** (19.65)	0.599*** (19.62)	0.585*** (7.08)	0.585*** (7.06)	0.585*** (7.03)
Observations	402	402	402	402	402
R-squared	0.001	0.008	0.044	0.082	0.103
Panel B: Monthly average volume of leveraged loans over total loans					
Variables	1	2	3	4	5
POST	-0.008 (-0.22)				
PERIOD1		0.038 (0.88)	0.212* (1.86)	0.212* (1.85)	0.212* (1.84)
PERIOD2		-0.054 (-1.32)	0.116 (1.18)	0.116 (1.17)	0.116 (1.17)
PERIOD1xBANK			-0.221* (-1.81)		
PERIOD2xBANK			-0.216** (-1.99)		
PERIOD1xLISCC				-0.262** (-2.27)	-0.262** (-2.26)
PERIOD2xLISCC				-0.287*** (-2.82)	-0.287*** (-2.81)
PERIOD1xNON-LISCC				-0.216* (-1.73)	
PERIOD2xNON-LISCC				-0.207* (-1.86)	
PERIOD1xDNON-LISCC					-0.262* (-1.91)
PERIOD2xDNON-LISCC					-0.293** (-2.28)
PERIOD1xFNON-LISCC					-0.175 (-1.32)
PERIOD2xFNON-LISCC					-0.131 (-1.13)
constant	0.587*** (18.75)	0.587*** (18.73)	0.573*** (6.85)	0.573*** (6.82)	0.573*** (6.80)
Observations	402	402	402	402	402
R-squared	0.000	0.011	0.046	0.082	0.099

^a Models estimated with robust standard errors and lenders' fixed effects. The dependent variable in the top (bottom) panel is the monthly number (volume) of leveraged loans scaled by the monthly number (volume) of all term loans agented by the lender. POST is a dummy variable equal to one for the post interagency guidance

period. *PERIOD1* is a dummy variable for the period between the interagency guidance and regulators' issuance of clarifications to the guidance. *PERIOD2* is a dummy variable for the period after regulators' issuance of clarifications to the guidance. *BANKS*, *LISCC*, *NON-LISCC*, *DNON-LISCC* and *FNON-LISCC* are dummy variables equal to one if the agent of the leveraged loan is a bank, a LISCC bank, a non-LISCC bank, a domestic non-LISCC bank or a foreign non-LISCC bank, respectively. The control group in all of the models are the leveraged loans that have a nonbank lender as an agent. Values in parenthesis are robust standard errors.

Table 4 Borrowers' decision to switch lenders^a

Variables	1	2	3	4	5	6
POST	0.005 (0.81)					
PERIOD1		-0.004 (-0.61)	-0.078 (-0.97)	-0.056* (-1.71)	-0.003 (-0.49)	-0.008 (-1.35)
PERIOD2		0.024** (2.22)	-0.057 (-0.65)	-0.121*** (-3.43)	0.011 (1.20)	0.025** (2.40)
PRIOR-BANK				-0.444*** (-7.80)		
PERIOD1xPrior-BANK			0.077 (0.96)			
PERIOD2xPrior-BANK			0.076 (0.87)			
PRIOR-LISCC					-0.330*** (-13.27)	
PERIOD1xPRIOR-LISCC					0.059* (1.76)	
PERIOD2xPRIOR-LISCC					0.186*** (4.79)	
PRIOR-DNON-LISCC						0.456*** (13.53)
PERIOD1xPRIOR-DNON-LISCC						-0.104** (-2.18)
PERIOD2xPRIOR-DNL						-0.116** (-2.16)
PRIOR-FNON-LISCC						0.530*** (11.13)
PERIOD1xPRIOR-FNON-LISCC						-0.093 (-1.59)
PERIOD2xPRIOR-FNON-LISCC						-0.123* (-1.66)
constant	0.178*** (3.50)	0.165*** (3.24)	0.422*** (5.67)	-0.118 (-1.29)	-0.198** (-2.39)	-0.101* (-1.78)
Observations	6029	6029	6029	6029	6029	6029
R-squared	0.019	0.022	0.198	0.133	0.234	0.253

^a Models estimated with robust standard errors clustered by lender. *POST* is a dummy variable equal to one for the post interagency guidance period. *PERIOD1* is a dummy variable for the period between the interagency guidance and regulators' issuance of clarifications to the guidance. *PERIOD2* is a dummy variable for the period after regulators' issuance of clarifications to the guidance. *PRIOR-BANK*, *PRIOR-LISCC*, *PRIOR-DNON-LISCC* and *PRIOR-FNON-LISCC* are dummy variables equal to one if the leveraged loan borrower took out its previous loan from a bank, a LISCC bank, a non-LISCC bank, a domestic non-LISCC bank or a foreign non-LISCC bank, respectively. The control group in all of the models are the leveraged loans that have a nonbank lender as an agent. Values in parenthesis are robust standard errors.

Table 5 Leveraged-loan borrowers the switch out of LISCC banks^a

Panel A: Borrowers that switch out of LISCC banks go to (% of number):		
DNON-LISCC	FNON-LISCC	NONBANK
	Pre-guidance	
35.9	45.7	18.5
	PERIOD1	
38.6	36.0	25.4
	PERIOD2	
31.3	43.5	25.2

Panel B: Borrowers that switch out of LISCC banks go to (% of volume):		
DNON-LISCC	FNON-LISCC	NONBANK
	Pre-guidance	
28.6	53.2	18.2
	PERIOD1	
36.3	38.9	24.8
	PERIOD2	
23.9	56.5	19.6

^a *PERIOD1* is a dummy variable for the period between the interagency guidance and regulators' issuance of clarifications to the guidance. *PERIOD2* is a dummy variable for the period after regulators' issuance of clarifications to the guidance. *DNON – LISCC*, *FNON – LISCC* and *NONBANK* are dummy variables equal to one if the agent of the leveraged loan is a domestic non-LISCC bank, a foreign non-LISCC bank, or a nonbank lender, respectively.

Table 6 Market shares over time^a

Lenders	Before	After Guidance	
	Guidance	Period 1	Period 2
Panel A: Shares computed based on number of loans			
LISCC	72.0	72.3	61.0
DNON-LISCC	14.2	13.2	19.2
FNON-LISCC	8.1	7.8	10.3
NONBANK	5.8	6.8	9.5
Panel B: Shares computed based on volume of loans			
LISCC	91.0	90.8	85.6
DNON-LISCC	4.0	3.5	5.5
FNON-LISCC	3.3	3.0	5.2
NONBANK	1.7	2.7	3.7

^a *PERIOD1* is a dummy variable for the period between the interagency guidance and regulators' issuance of clarifications to the guidance. *PERIOD2* is a dummy variable for the period after regulators' issuance of clarifications to the guidance. *LISCC*, *DNON – LISCC*, *FNON – LISCC* and *NONBANK* are dummy variables equal to one if the agent of the leveraged loan is a LISCC bank, a domestic non-LISCC bank, a foreign non-LISCC bank or a nonbank, respectively.

Table 7 Robustness test: Leveraged loans identified based on a 200 bps cutoff^a

Variables	Panel A: Monthly average number of leveraged loans				
	1	2	3	4	5
POST	0.395*** (2.93)				
PERIOD1		0.804*** (3.80)	0.422 (1.32)	0.422 (1.32)	0.422 (1.31)
PERIOD2		-0.014 (-0.07)	0.353* (1.93)	0.353* (1.92)	0.353* (1.91)
PERIOD1xBANK			0.488 (1.19)		
PERIOD2xBANK			-0.470 (-1.49)		
PERIOD1xLISCC				3.730*** (2.89)	3.730*** (2.87)
PERIOD2xLISCC				-3.950*** (-3.13)	-3.950*** (-3.12)
PERIOD1xNON-LISCC				0.014 (0.04)	
Period2xNON-LISCC				0.040 (0.18)	
PERIOD1xDNON-LISCC					-0.166 (-0.48)
PERIOD2xDNON-LISCC					-0.193 (-0.91)
PERIOD1xFNON-LISCC					0.212 (0.52)
PERIOD2xFNON-LISCC					0.296 (1.01)
constant	2.448*** (27.21)	2.448*** (27.15)	2.448*** (27.04)	2.448*** (26.94)	2.448*** (27.13)
Observations	360	360	360	360	360
R-squared	0.943	0.947	0.947	0.975	0.976
Panel B: Monthly average volume of leveraged loans					
Variables	1	2	3	4	5
	46.602*** (2.87)				
POST					
PERIOD1		102.058*** (3.54)	68.277 (1.26)	68.277 (1.26)	68.277 (1.25)
PERIOD2		-8.854 (-0.32)	47.293* (1.73)	47.293* (1.72)	47.293* (1.71)
PERIOD1xBANK			43.125 (0.68)		
PERIOD2xBANK			-71.678 (-1.63)		
PERIOD1xLISCC				549.574*** (3.20)	549.574*** (3.19)
PERIOD2xLISCC				-524.968*** (-2.94)	-524.968*** (-2.93)
PERIOD1xNON-LISCC				-30.989 (-0.56)	
PERIOD2xNON-LISCC				-5.342 (-0.17)	
PERIOD1xDNON-LISCC					-49.619 (-0.90)
PERIOD2xDNON-LISCC					-27.369 (-0.94)
PERIOD1xFNON-LISCC					-10.448 (-0.18)
PERIOD2xFNON-LISCC					18.943 (0.46)
constant	271.926*** (25.14)	271.926*** (25.09)	271.926*** (25.00)	271.926*** (24.95)	271.926*** (25.03)
Observations	360	360	360	360	360
R-squared	0.938	0.942	0.943	0.974	0.974

^a Models estimated with robust standard errors and lenders' fixed effects. The dependent variable in the top (bottom) panel is the monthly average number (volume) of leveraged loans. *POST* is a dummy variable equal to one for the post interagency guidance period. *PERIOD1* is a dummy variable for the period between the interagency guidance and regulators' issuance of clarifications to the guidance. *PERIOD2* is a dummy variable

for the period after regulators' issuance of clarifications to the guidance. $BANKS$, $LISCC$, $NON - LISCC$, $DNON - LISCC$ and $FNON - LISCC$ are dummy variables equal to one if the agent of the leveraged loan is a bank, a LISCC bank, a non-LISCC bank, a domestic non-LISCC bank or a foreign non-LISCC bank, respectively. The control group in all of the models are the leveraged loans that have a nonbank lender as an agent. Values in parenthesis are robust standard errors.

Table 8 Banks' and nonbanks' leveraged lending features^a

Panel A: Loans of borrowers that migrate from banks to nonbanks			
Variables	Collateralized	Dividend restrictions	Log of maturity
NONBANK	-3.918*** (-3.26)	3.661** (2.27)	-1.801*** (-4.81)
Constant	-2.445*** (-2.87)	1.223 (0.94)	4.870*** (24.27)
Observations	235	209	246
Pseudo-R-squared	0.090	0.256	
R-squared			0.364

Panel B: Loans of borrowers that migrate from LISCC banks to nonbanks			
Variables	Collateralized	Dividend restrictions	Log of maturity
NONBANK	-3.437* (-1.81)	3.305 (1.56)	-1.931*** (-3.77)
Constant	-1.658 (-1.33)	0.522 (0.31)	6.215*** (16.46)
Observations	113	102	119
Pseudo-R-squared	0.098	0.234	
R-squared			0.300

^a Models estimated with robust standard errors. Models 1 and 2 report probit results on whether the loan is collateralized or the borrower faces dividend restrictions, respectively. The dependent variable of model 3 is the log of loan maturity. All models in panel A (panel B) are estimated on the sample of loans of borrowers that switched from banks (LISCC banks) to nonbanks following the guidance. *NONBANK* is a dummy variable which is equal to one if the loan was extended by a nonbank financial institution. Included in the models, but not reported in the table are controls for size of the loan, the purpose of the loan, the rating of the borrower and year fixed effects. Values in parenthesis are robust standard errors.

Figure 1: Spreads for term loans originated between 2011(Mar) and 2015(Dec)

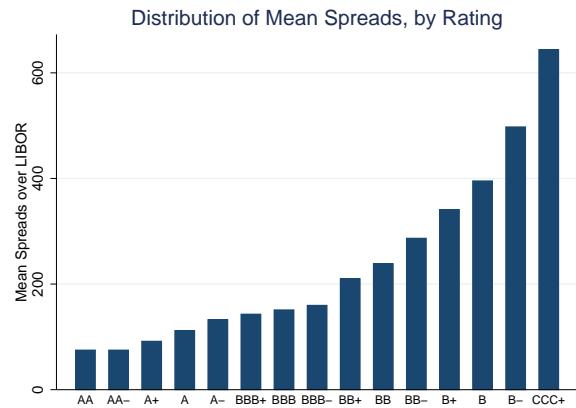


Figure 2: Nonbanks' leveraged lending and funding sources

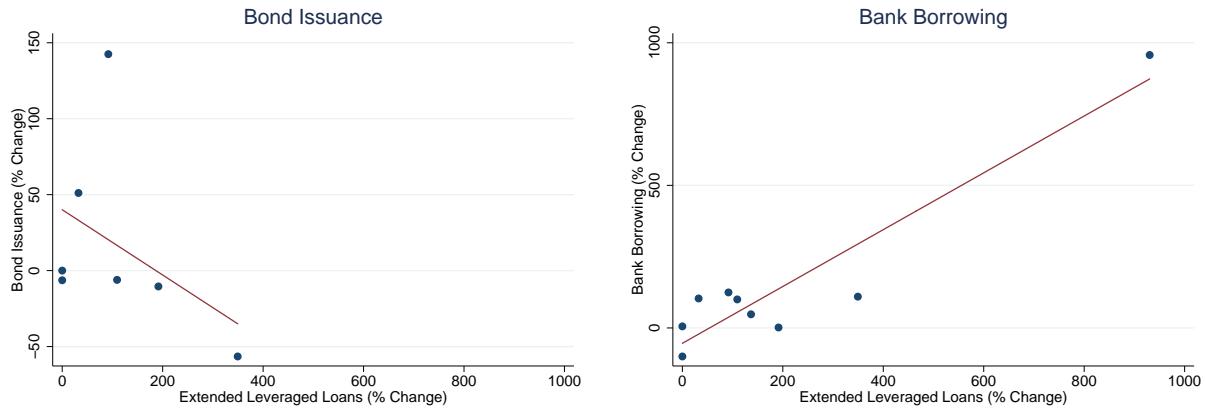


Figure 3: Banks' exposures to nonbanks over time

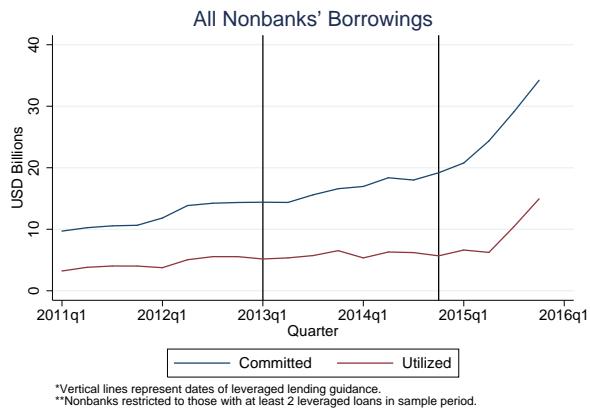
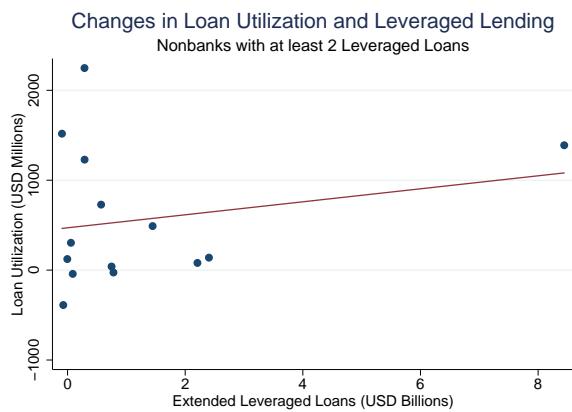


Figure 4: Nonbanks' leveraged lending on bank borrowing



References

- Akinci, Ozge and Jane Olmstead-Rumsey, 2015, How Effective are Macroprudential Policies? An Empirical Investigation, *Federal Reserve Board International Finance Discussion Papers* 2015-1136 (May).
- Aiyar, Shekhar, Charles W. Calomiris, and Tomasz Wieladek, 2014, Does Macro-Prudential Regulation Leak? Evidence from a UK Policy Experiment, *Journal of Money, Credit and Banking*, 46(1), 181-214.
- Basset, William F., and W. Blake Marsh, 2014, Assessing Targeted Macroprudential Financial Regulation: The Case of the 2006 Commercial Real Estate Guidance for Banks, FEDS Working Paper No. 2014-49.
- Berger, Allen N., and Gregory F. Udell, 1990, Collateral, loan quality, and bank risk, *Journal of Monetary Economics* 25(1), 21-42.
- Berglof, E. and E. Von Thadden. 1994, “Short-Term Versus Long-Term Interests: Capital Structure with Multiple Investors.” *Quarterly Journal of Economics* 109, 10551084.
- Bord, Vitaly, and Joao A.C. Santos, 2012, The rise of the originate-to-distribute model and the role of banks in financial intermediation, *Economic Policy Review*, Federal Reserve Bank of New York, issue Jul, 21-34.
- Calem, Paul, Ricardo Correa, and Seung Jung Lee, 2016, Prudential policies and their impact on credit in the United States, Unpublished, BIS CCA CGDFS working group.
- Cerutti, Eugenio, Stijn Claessens, and Luc Laeven, 2015, The Use and Effectiveness of Macro-prudential Policies: New Evidence, Forthcoming, *Journal of Financial Stability*.
- Claessens, Stijn, 2014, An Overview of Macroprudential Policy Tools, *Annual Review of Financial Economics* 7:10.1-10.26.
- Camors, Dassatti C., Jose-Luis Peydro, and Francesc R. Tous, 2015, Macroprudential and Monetary Policy: Loan-Level Evidence from Reserve Requirements, Unpublished.
- Dell’ Ariccia, Giovanni, Deniz Igan, Luc Laeven, Hui Tong, Bas Bakker, and Jerome Vandenbussche, 2012, Policies for Macrofinancial Stability: How to Deal with Credit Booms, IMF Staff Discussion Note 12/06.

Diamond, D., 1991, "Debt Maturity Structure and Liquidity Risk," *Quarterly Journal of Economics* 106(3), 709-737.

Elliott, Douglas J., Greg Feldberg, and Andreas Lehnert, 2013, The History of Cyclical Macro-prudential Policy in the United States, Finance and Economics Discussion Series Paper No. 2013-29, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board.

Flannery, Mark J., 1986, "Asymmetric Information and Risky Debt Maturity Choice, *Journal of Finance* 41(1), 19-37.

Flannery, Mark, Beverly Hirtle, and Anna Kovner, 2015, Evaluating the Information in the Federal Reserve Stress Tests, Federal Reserve Bank of New York Staff Reports No 744.

Friend, K., H. Glenos, and J.B. Nichols, 2013, An Analysis of the Impact of the Commercial Real Estate Concentration Guidance, Tech. rep., Federal Reserve Board and Office of the Comptroller of the Currency.

Hart, O., and J.Moore. 1994, "A Theory of Debt Based on the Inalienability of Human Capital," *Quarterly Journal of Economics* 109, 841879.

Jimenez, Gabriel, Steven Ongena, Jose-Luis Peydro, and Jesus Saurina Salas, 2015, Macroprudential Policy, Countercyclical Bank Capital Buffers and Credit Supply: Evidence from the Spanish Dynamic Provisioning Experiments, European Banking Center Discussion Paper No. 2012-011.

Kuttner, Kenneth N. and Ilhyock Shim, 2013, Can non-interest rate policies stabilise housing markets? Evidence from a panel of 57 economies, BIS Working Papers No 433.

Lim, Cheng H., Francesco Columba, Alejo Costa, Piyabha Kongsamut, Akira Orani, Mustafa Saiyid, Torsten Wezel, Xiaoyong Wu, 2011, Macroprudential Policy: What Instruments and How Are They Used? Lessons from Country Experiences, IMF Working Paper 11/238.

Lopez, J.A., 2007, Concentrations in Commercial Real Estate Lending, *FRBSF Economic Letter*, Number 2007-01.

Pana, E., 2010, Commercial Real Estate Lending Concentrations: New Evidence, *North American Journal of Real Estate Finance and Banking Research*, 4.

Zdzienicka, Aleksandra, Sally Chen, Federico Diaz Kalan, Stefan Laseen, and Katsiaryna Svirydzenka, 2015, Effects of Monetary and Macroprudential Policies on Financial Conditions: Evidence from the United States, IMF Working Paper No 15/288.