# Prudential policies and their impact on credit in the United States*

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**Abstract**

We analyze how two types of recently used prudential policies affected the supply of credit in the United States. First, we test whether the U.S. bank stress tests had any impact on the supply of mortgage credit. We find that the first Comprehensive Capital Analysis and Review (CCAR) stress test in 2011 had a negative effect on the share of jumbo mortgage originations and approval rates at stress-tested banks—banks with worse capital positions were impacted more negatively. Second, we analyze the impact of the 2013 Supervisory Guidance on Leveraged Lending and subsequent 2014 FAQ notice, which clarified expectations on the Guidance. We find that the share of speculative-grade term-loan originations decreased notably at regulated banks after the FAQ notice.

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## 1. Introduction

The global financial crisis of 2007-2009 led to a reassessment of the instruments available to limit financial instability (Claessens and Kodres, 2014; Claessens, 2015). Several countries have implemented regulatory reforms aimed at increasing the resilience of banking sectors and at providing policymakers with the tools necessary to limit financial imbalances. In this context, macroprudential instruments, such as countercyclical capital buffers and stress testing, have become increasingly popular additions to the supervisory toolkit. However, the impacts of these macroprudential instruments on financial stability, bank capital, and the supply of credit is still an open question (Svensson, 2016).

Our analysis focuses on two instruments, bank stress tests and supervisory guidance, with the aim of evaluating their impact on supply of credit. These instruments have been used by U.S supervisors in the past five years to inhibit excessive risk-taking or prevent growth in large banks' credit risk exposure from outpacing capital accumulation—objectives commonly referred to as "lean-against-the-wind." Stress tests in particular are credited with increasing capital buffers at systemically important financial institutions in the wake of the global financial crisis.[1]

Specifically, we assess the impact of the bank stress tests on the supply of residential mortgages and impact of the supervisory guidance on speculative-grade corporate lending. We select these two credit classes because they are two of the largest categories of balance sheet risk exposure at U.S. banks, and because of the availability of especially detailed, micro-level data for each category, indispensable for conducting a controlled analysis.[2] If, as argued by Eber and Minoiu (2016), banks tend to respond to stricter supervision by shrinking assets, then we would expect to observe declines in mortgage origination and leveraged lending as a result of the stress tests and supervisory guidance.

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[1] Since the crisis, U.S. policymakers have focused on increasing the resilience of the financial system by introducing structural regulations to limit financial instability (Tarullo, 2015), such as enhanced capital requirements for systemically important financial institutions, and new liquidity requirements. The use of macroprudential tools to moderate cyclical volatility has been less prominent. However, stress testing, which has come to dominate the post-crisis supervisory landscape and is typically thought of as microprudential, may also be used as a macroprudential, cyclical "lean-against-the-wind" tool.

[2] For instance, as reported in Board of Governors of the Federal Reserve System (2012), in the 2012 CCAR stress test, losses on domestic residential mortgage loans (the majority of which were first-lien losses) were the single largest loss category, at $117 billion, representing nearly 35 percent of total projected loan losses. Losses on commercial and industrial loans (which would be concentrated among below-investment grade loans), at $67 billion, were the third largest category (behind credit cards, at $91 billion).

For the analysis of stress test impacts, we use information collected as part of the Home Mortgage Disclosure Act (HMDA), which includes data on each home purchase and refinance loan application and origination reported by mortgage lending institutions. For analysis of the impact of the supervisory guidance, we use information from the Shared National Credit (SNC) program, a credit registry of syndicated loans maintained by U.S. bank supervisors capturing bank and non-bank holdings of this type of credit on a quarterly frequency.

Studies analyzing the use of macroprudential instruments for moderating the credit cycle (e.g., Lim et al., 2011) or mitigating financial vulnerabilities (International Monetary Fund, 2013) have mostly relied on cross-country analyses and macroeconomic data. Our study belongs to an incipient literature that examines the impact of macroprudential supervision using micro-level information (Jimenez et al., 2015). It is the first to use micro-level data to assess the impact of "lean-against the wind" instruments in the post-crisis period in the United States.

In the first exercise, we assess the impact of U.S. stress tests on the supply of U.S. residential mortgages. Stress tests translate forward-looking, adverse scenarios into conditional expected losses for banks' loan portfolios and trading books (Hirtle and Lehnert, 2014). They can potentially have an effect on the credit supply of stress-tested banks, to the extent that their capital buffers are inadequate to support ongoing credit growth in particular loan portfolios under the posited scenarios.

We restrict attention to the impact on mortgages that exceed the conforming loan size limit, which are commonly referred to as jumbo mortgages, in order to focus on a category of loans generally retained on the bank balance sheet.[3] These loans in principle should be impacted by bank stress tests and bank capital, whereas those originated for sale would be less directly impacted. Moreover, since the collapse of the private mortgage-backed securities market in the midst of the global financial crisis in 2008, the jumbo mortgage market has been dominated by the large banks that are required to participate in the stress tests.

We find that, among all of the stress tests conducted annually in 2011 through 2014, the 2011 Comprehensive Capital Analysis and Review (CCAR) stress test had the largest impact on the credit originated by participating banks. The state-level share of jumbo mortgage origination

[3] Jumbo mortgages are not eligible to be purchased by the government sponsored enterprises (GSEs) Fannie Mae and Freddie Mac. We further restrict attention to conventional mortgages (not insured by the U.S. government through the FHA or VA mortgage insurance programs), although most jumbo mortgages are also conventional.

volumes of stress tested banks decreased by almost 3.4 percentage points, on average, in the first three quarters of that year, roughly equivalent to $1.3 billion in jumbo mortgage originations at the CCAR banks over the three quarters for the average state. Moreover, also in 2011, the stress-tested banks with lower capital ratios lost a larger share of the jumbo mortgage market and had lower mortgage applications approval rates than similar banks with higher capital ratios. We do not find any consistently significant impacts for the more recent stress tests.

These results may be explained by the level of capital buffers the stress-tested institutions had in place, which may have been seen to be inadequate based on assessments drawn from the 2011 CCAR experience. By the time of the 2012 CCAR the banks had significantly higher capital ratios, which may have neutralized the impact of the stress tests.

The second exercise examines banks' responses to the Interagency Guidance on Leverage Lending (IGLL), published in 2013, and the follow-up, Frequently Asked Questions (FAQ) notice by U.S. bank supervisors in 2014. Supervisory guidance are official, written communications from the banking regulatory agencies on matters relevant to the safe and sound operation of supervised institutions, typically articulating minimum standards for safe and sound practices in a given area.[4]

The 2013 IGLL and 2014 FAQs were issued in the wake of strong growth in leveraged lending during the post-crisis period (Tarullo, 2014) with the aim of encouraging cautious underwriting and moderating banks' risk exposure. We test for changes in banks' originations of speculative-grade syndicated loans, our proxy for leveraged loans, after the publication of the IGLL and the FAQs.

We find that the IGLL had no impact on speculative-grade loan originations until publication of the follow-up FAQs in the last quarter of 2014. In the four quarters after the FAQs were published, the share of leveraged loans relative to the total syndicated credit originated by banks was about 27 percentage points below the longer-term, post-crisis average. The observed response to the FAQ notice is similar for banks subject to the 2015 stress tests versus those that were not (and for U.S. versus foreign banks) and, hence, is independent of the introduction into the 2015 stress tests of adverse scenarios related to leveraged lending.

[4] Supervisory guidance usually is directed both internally to agency staff and externally to supervised institutions, although some guidance is for internal agency communication only.

In sum, the two instruments evaluated in these exercises, bank stress tests and supervisory guidance, appear to have had an effect on credit supply in two important segments of the credit market. Although, these tools are primarily designed to meet microprudential objectives, our results suggest that they can function effectively as macroprudential, "lean-against-the-wind" instruments.

The remainder of the paper is organized as follows. Section 2 describes the contribution of the paper in the context of the extant literature. Section 3 presents a brief overview of the historical usage of macroprudential policies in the United States. Section 4 describes the data used in the empirical analysis. Sections 5 and 6 present the methodologies and results for the tests on the effect of the stress tests and IGLL on credit growth. Section 7 concludes.

## 2. Relationship to the Literature

This paper contributes to the developing literature that analyzes the impact of macroprudential policies.[5] The largest strand of this literature uses aggregate, cross-country information to determine the effectiveness of these instruments in reducing financial vulnerabilities. Most cross-country studies have focused on the impact of macroprudential policies on housing credit and real estate prices (Akinci and Olmstead-Rumsey, 2015; Kuttner and Shim, 2013). Others have taken a broader approach to assess whether these policies reduce the overall procyclicality of credit (Lim et al., 2011; Dell'Ariccia et al., 2012; Cerutti, Claessens, and Laeven 2015). Overall, the findings from these studies provide a mixed picture, with some instruments being more effective than others in moderating cyclical variation in mortgage lending and house prices.

For instance, Cerutti, Claessens, and Laeven (2015) find that instruments targeting borrowers, such as limits on loan-to-value (LTVs) ratios and debt-to-income (DTIs) ratios, and instruments focused on financial institutions, such as limits on leverage and dynamic provisioning, appear to be especially effective in reducing credit growth. This study also shows that these instruments are more effective when credit growth is very high, but provide less

[5] Claessens (2014) provides a comprehensive review of this literature.

supportive impact during credit busts. These effects seem weaker in more financially open economies with deeper and broader financial systems like the United States.

Evidence on the impact of macroprudential polices in the United States has been limited to broad historical studies using macroeconomic data. The most comprehensive study to date is Elliott, Feldberg, and Lehnert (2013), which looks at the historical usage of macroprudential tools in the country from the 1940s through 1992, and presents evidence that is broadly consistent with an asymmetric effect for macroprudential interventions, with tightening being more effective than loosening. Using data from the period between 1969 and 2008, Zdzienicka et al. (2015) find that macroprudential policy actions appear to have more immediate, but shorter-lasting, effects on credit and property prices than monetary policy shocks. They also find that tightening measures have larger effects than easing actions.

Some recent studies use country-specific, micro-level information to assess the effectiveness of particular macroprudential policies in moderating credit cycles. By their use of granular, loan-level information, these studies can more clearly identify shifts in the supply of credit resulting from policy actions, apart from potential changes in the demand for credit. For example, using information from the Spanish loan-level credit register, Jimenez et al. (2015) find that changes in dynamic provisioning contributed to a smoothening of the credit cycle in that country, with significant real effects on employment and firm survival. Dassatti, Peydro, and Tous (2015), using Uruguayan credit register data, find that changes in reserve requirements in significantly reduced the supply of credit by banks.

Our study belongs to the latter category and is the first in this developing literature to examine macroprudential instruments used post-crisis in the United States. We make use of granular, micro-level data from the U.S. residential mortgage and syndicated corporate lending markets, and from U.S. bank statements of financial condition, to identify the credit supply impacts of macroprudential polices.

We are also the first to focus specifically on stress testing as a "lean-against-the-wind" instrument. Most studies in the stress testing literature have focused on the market reaction to stress tests announcements (Morgan et al., 2014; Candelon and Sy, 2015), but only a few have analyzed banks' balance sheet adjustments as a result of the these exercises. One of those studies, Flannery, Hirtle, and Kovner (2015), tests whether aggregate loan growth at Bank

Holding Companies (BHCs) that underestimated the severity of the Federal Reserve's loan loss scenarios adjusted their lending portfolios more drastically. The authors find no significant results on the link between unexpected scenario stringency on loan growth. However, their estimations use only information on the 2013, 2014, and 2015 stress test, which as we will discuss later, were less impactful on the banks than the 2011 exercise.

## 3. Prudential policies in the United States

Macroprudential policies in the United States have a long history that dates back to the early 1900s. These instruments, including controls on underwriting standards, were used to prevent perceived excesses in specific markets or rapid credit expansions (Elliott, Feldberg, and Lehnert, 2013). Given the cyclical nature of some these tools, they were also used to provide support during weak economic periods. However, policymakers stopped using some of these instruments around the 1990s. The global financial crisis reignited the discussion about the usefulness of these tools to prevent financial instability and to enhance the resilience of the financial system.

As noted in the introduction, this study focuses on two instruments: supervisory guidance and bank stress tests. These tools can be considered microprudential in nature, as they are intended to increase the safety and soundness of regulated financial institutions. But they also share some features present in cyclical macroprudential tools, like the possibility of using them to curtail credit excesses.

### *3.1 Stress Testing*

The second supervisory instrument we analyze in the paper is bank stress tests, which over the past several years have become a central part of the U.S. supervisory and regulatory framework. This instrument has a history that dates back to the 1980s (Kapinos, Mitnik, and Martin, 2015), when it was introduced as a focused risk management tool. In 1995, an amendment to the Basel Capital Accord required large financial institutions to stress market and liquidity risks. However, it was not until after the global financial crisis that several countries implemented comprehensive balance sheet stress testing programs to enhance the resilience of large financial institutions and to make assessments of capital adequacy more dynamic.

The first of such exercises for banking organizations in the United States, titled the Supervisory Capital Assessment Program (SCAP), was conducted in 2009. The SCAP was considered "a success" (Kapinos, Mitnik, and Martin, 2015), as it served as the basis to recapitalize the 19 largest BHCs.[6] The current stress testing exercises are implemented under the CCAR and the Dodd-Frank Act Stress Testing (DFAST) regulatory programs.

This subsection describes the evolution of the methodology used to conduct the stress test exercises in United States, the schedule for each exercise covered in our study, and external considerations, such as the implementation of the Basel III agreement, that had an impact on the methodological framework. This institutional information serves as background for our modelling choices in our empirical tests.

### 3.1.1 The Evolution of CCAR and DFAST Stress Testing

The CCAR was initiated by the Federal Reserve in January 2011 to evaluate the capital levels, capital planning processes, and proposed capital actions of the 19 BHCs that participated in the SCAP exercise. In particular, the purpose of the 2011 CCAR was to assess whether institutions proposing to resume or increase dividend payments or other capital distributions had adequate capital and sufficiently robust capital planning processes to support the proposed actions (Flannery, Hirtle, and Kovner, 2015; Hirtle and Lehnert, 2014). Subsequently, the CCAR became the primary tool to evaluate the capital positions and capital planning processes of these institutions.

The 2011 stress test relied primarily on revenue and loss projections based on internal, "company- run" models. These were supplemented by benchmark calculations performed by the Federal Reserve to "test the sensitivity" of the internal model results "to alternative loss and earnings estimates."[7]

[6] The 19 participating bank holding companies were Ally Financial Inc.; American Express Company; Bank of America Corporation; The Bank of New York Mellon Corporation; BB&T Corporation; Capital One Financial Corporation; Citigroup Inc.; Fifth Third Bancorp; The Goldman Sachs Group, Inc.; JPMorgan Chase & Co.; Keycorp; MetLife, Inc.; Morgan Stanley; The PNC Financial Services Group, Inc.; Regions Financial Corporation; State Street Corporation; SunTrust Banks, Inc.; U.S. Bancorp; and Wells Fargo & Company.

[7] As described in Board of Governors of the Federal Reserve System (2011, p. 14), "To test the sensitivity of the bank holding companies' projected pro forma capital ratios to alternative loss and earnings estimates, Federal Reserve analysts substituted supervisory loss or revenue projections for certain bank holding company projections. Pro forma capital ratios under the supervisory stress scenario were re-calculated using these supervisory loss and revenue estimates and a supervisory capital estimation model. The resulting adjusted pro forma capital ratio estimates were used to inform our assessments of the analysis supporting the firm-submitted numbers."

The projections were conditional on "baseline" and "adverse" scenarios for economic variables that were supplied by the Federal Reserve. With respect to house prices, the primary driver of mortgage default, the adverse scenario assumed an 11 percent average U.S. home value decline over nine quarters through the end of 2012.

Beginning with the 2012 CCAR, the Federal Reserve incorporated projections of BHC losses, revenues, expenses, and capital ratios based on "supervisory" models developed or selected by Federal Reserve staff.[8] These supervisory projections were considered alongside the revenue and loss projections from the company-run models for evaluating the capital plans of the original group of 19 BHCs.

The 2012 CCAR projections were conditional on baseline and stress scenarios. However, the supervisory stress scenario used in 2012 was substantially more stressful than that used in 2011. With respect to house prices, the stress scenario assumed a 21 percent average U.S. home value decline over nine quarters through the end of 2013.

Additionally, the supervisory capital planning reviews were extended to U.S. BHCs with more than 50 million dollars in assets that were not among the original 19 SCAP BHCs. The new participants were required to submit a capital plan incorporating company-run stress tests and forward-looking capital projections; however, they were not subject to supervisory stress tests.[9] The Federal Reserve conducted qualitative reviews of their capital planning processes and assessed their stress test results using quantitative benchmarks, including historical performance and peer group comparisons, to determine the adequacy of their capital plans.[10]

Starting with the 2013 stress test cycle, the original group of 19 BHCs began implementing DFAST alongside of CCAR stress testing, with three sets of supervisory scenarios, referred to as baseline, adverse, and severely adverse.[11] Scenarios in the latter category were

[8] As described in Board of Governors of the Federal Reserve System (2012, p. 5), by applying its own supervisory models in a consistent manner, "the Federal Reserve was able to enhance its institution-specific analysis with information about peers, applying consistent assumptions and bringing a cross-firm perspective." The supervisory models are applied to input data provided by the 19 participating BHCs.

[9] These BHCs were required to utilize the CCAR supervisory scenarios (baseline and severely adverse), along with a BHC-developed baseline scenario and a BHC-developed stress scenario.

[10] See Board of Governors of the Federal Reserve System (2013, p. 10).

[11] Under the Dodd-Frank Act, all financial companies with more than $10 billion in total consolidated assets that are supervised by a primary federal financial regulatory agency are required to conduct an annual company-run stress test. Designated "covered companies" (any bank holding company with total consolidated assets of $50 billion or more and each nonbank financial company that the Financial Stability Oversight Council has designated for

comparable to the supervisory stress scenarios used in 2012. The primary difference between the DFAST and CCAR stress tests pertains to the capital action assumptions applied. Under CCAR, each individual BHC's stated, planned capital actions are used for evaluating the BHC's ability to maintain a capital cushion. Under DFAST, a standardized set of capital action assumptions specified in the Dodd-Frank Act (which may or may not be more conservative than those of a particular BHC) are used for this assessment.[12]

In 2014, CCAR and DFAST stress testing, inclusive of both the company-run and supervisory model-based projections, was extended to 12 other U.S. BHCs with assets greater than 50 billion dollars. For these institutions, the DFAST stress test essentially involves repeating the CCAR stress test capital calculations based on the required DFAST capital action assumptions.[13] Also in 2014, an additional 42 BHCs and 57 banks and thrifts with between $10 and $50 billion in assets initiated annual, company-run DFAST stress testing.

The mix of house price scenarios associated with the 2009 SCAP and the 2011 and subsequent CCARs are summarized in Table 1. Although the assumptions for house price decline in the 2009 SCAP were more severe than the various CCAR scenarios, the latter were set within the context of a stabilizing housing market, whereas the context for the SCAP was the ongoing, severe market downturn.

### 3.1.2 CCAR / DFAST Process and Supervisory Expectations

The annual stress testing cycle can be regarded as commencing when the Federal Reserve releases guidelines and supervisory scenarios for the upcoming cycle. For the first CCAR in

supervision by the Board) are subject to an additional mid-cycle stress test and the supervisory stress test. The Federal Reserve adopted rules implementing these requirements in October 2012. A phase-in period was specified such that in 2013, only the original 19 SCAP BHCs were subject to the additional DFAST requirements for covered companies.

[12] See http://www.federalreserve.gov/bankinforeg/stress-tests/dodd-frank-act-stress-testing.htm

[13] Following the 2013 CCAR, one of the original 19 BHCs, MetLife, shed its BHC status by selling its bank deposits (and soon after exited other businesses not related to its core insurance activities, including mortgage servicing.) Subsequently, MetLife no longer has been subject to CCAR or DFAST stress test requirements. TD Bank US Holding Company and BancWest Corporation were not subject to Dodd-Frank Act stress testing until October 1, 2015, under the Board's stress test rule, while Deutsche Bank Trust Corporation received an extension from compliance until June 30, 2014.

2011, the supervisory scenarios were released on November 17, 2010, accompanied by issuance of guidelines articulating the supervisory criteria for assessing BHC capital plans.[14]

For the 2012 CCAR, the supervisory scenarios were released on November 22, 2011, concurrently with the issuance of summary instructions and guidance and with the publication of the final CCAR rule. In addition to articulating the supervisory criteria for evaluating capital plans, the summary instructions and guidance outlined logistics for the capital plan submission and supervisory evaluation process and described the elements of a comprehensive capital plan.[15]

The final rule governing DFAST was published in October 2012. Publication of summary instructions and guidance, and release of the supervisory scenarios, for the 2013 stress testing cycle, occurred shortly thereafter, on November 9.[16] Summary instructions and guidance and supervisory scenarios for the 2014 cycle were published on November 1, 2013.[17] In each of the stress test cycles, an early January due date was set for BHC capital plan submissions inclusive of company-run stress test results.[18]

The Federal Reserve applies both quantitative and qualitative criteria in assessing BHC capital plans. Among the quantitative criteria, two core criteria have remained fairly consistent from year to year.

The first core quantitative criterion is "whether a BHC would be capable of continuing to meet minimum capital requirements (the leverage, tier 1 risk-based, common equity tier 1 risk-

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[14] See "Revised Temporary Addendum to SR letter 09-4: Dividend Increases and Other Capital Distributions for the 19 Supervisory Capital Assessment Program Bank Holding Companies," Board of Governors of the Federal Reserve System, November 17, 2010. http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20101117b1.pdf

[15] Two sets of instructions were issued, one for the 19 firms that participated in the CCAR in 2011, the other for 12 additional firms with at least $50 billion in assets that have not previously participated in a supervisory stress test exercise, reflecting the Federal Reserve's view that "the level of detail and analysis expected in each institution's capital plan will vary based on the company's size, complexity, risk profile, and scope of operations." See http://www.federalreserve.gov/newsevents/press/bcreg/20111122a.htm

[16] Again, two sets of instructions were issued, one for the 19 firms that participated in the CCAR in 2011, the other for 12 additional firms with at least $50 billion in assets that have not previously participated in a supervisory stress test exercise. See http://www.federalreserve.gov/newsevents/press/bcreg/20121109b.htm

[17] See http://www.federalreserve.gov/newsevents/press/bcreg/20131101a.htm

[18] For the 2011 CCAR, the 19 SCAP BHCs were "encouraged" to have their capital plans filed by January 7, 2011, as stated in Board of Governors of the Federal Reserve System (Nov. 17, 2010, p. 1, https://www.federalreserve.gov/newsevents/press/bcreg/bcreg20101117b1.pdf). Required due dates were set for the 2012, 2013, and 2014 stress test cycles (January 9th, 7th, and 6th, respectively.)

based, and total risk-based capital ratios) and a tier 1 common capital ratio of at least 5 percent throughout the planning horizon even if adverse or severely adverse stress conditions emerged."[19] This evaluation is conditioned on the BHC implementing its planned (under CCAR) or assumed (under DFAST) capital distributions.[20] For this evaluation, the Federal Reserve reviews the quantitative analyses supporting the BHC's capital plan, including the BHC's own stress test results. In addition, as described above, the Federal Reserve has progressively incorporated the use of supervisory estimates of losses, revenues, and post-stress capital ratios based on the Federal Reserve's internally developed supervisory models.

The second core quantitative criterion is whether, with the proposed capital actions, the BHC will maintain an adequate "path to compliance with the requirements of the Basel III regulatory capital rule as it is being phased in." In particular, the Federal Reserve expects the BHC to include, as part of its capital plan, "a transition plan that includes pro forma estimates under baseline conditions of the BHC's Basel III risk-based capital and leverage ratios." The transition plan should adhere to Basel III target ratios including "the fully phased-in 7 percent tier 1 common equity target (minimum plus conservation buffer)."[21] Although the formulation of this criterion has been mostly consistent from year to year, there were notable changes between 2011 and the later stress test cycles; we revisit this issue below.

Qualitative assessment is also a critical component of the CCAR review. The Federal Reserve might determine the BHC's capital plan to be unsatisfactory based on qualitative factors, even with stressed capital ratios remaining above regulatory minimums. The guidelines for the first CCAR in 2011 indicated that in assessing an institution's capital plan, the Federal Reserve will consider "the strength of management's internal capital assessment process as informed by recent supervisory examinations and existing supervisory knowledge of risk management or other weaknesses that may compromise a BHC's ability to effectively assess its capital needs."

[19] See http://www.federalreserve.gov/newsevents/press/bcreg/20131101a.htm
[20] The 2011 CCAR included the additional stipulation that "BHCs are expected to complete the repayment or replacement of any U.S. government investments in the form of either preferred shares or common equity prior to increasing capital payouts through higher dividends or stock buybacks."
[21] See http://www.federalreserve.gov/newsevents/press/bcreg/20131101a.htm

### 3.1.3 Supervisory Responses

The Federal Reserve disclosed neither the timing nor content of its responses to the individual BHC capital plan submissions for the 2011 CCAR. At the outset, however, the Federal Reserve committed to complete its assessment and contact a BHC with its response no later than 10 days prior to the end of the first quarter of 2011, conditional on receiving a complete and comprehensive capital plan from the BHC by the first week of the calendar year. Close to the end of the first quarter, Bank of America Corporation reported that a dividend increase planned for the second half of 2011 had been rejected and a revised capital plan would be submitted. The reasons for the rejection were not disclosed.[22]

In subsequent stress test cycles, the Federal Reserve committed to respond by specific dates in March (the 15th for the 2012 cycle and 31st for 2013 and 2014) and "either object or provide a notice of non-objection" to the submitted plan." This commitment was subject to the caveat that the Federal Reserve might require additional information to complete its analysis, or might request the BHC to revise and resubmit the plan, which could result in a delayed evaluation and response. An objection could be partial (a "conditional non-object"), in which case, the objection would target specific, proposed capital actions within the plan.[23]

Moreover, beginning with the 2012 CCAR and continuing through the subsequent stress test cycles, the Federal Reserve has published selected results from the CCAR supervisory stress tests, including BHC-specific, projected (9-quarter) minimum stress capital ratios (for leverage; tier 1 risk-based and total risk-based capital ratios; and the tier 1 common ratio.) The published results for the 2012 CCAR indicated that four BHCs, Ally Financial, Citigroup, MetLife, and SunTrust, had "failed" the supervisory stress test due to stressed capital ratios not consistently meeting regulatory minimums, but the Federal Reserve did not directly disclose its decisions on

[22] See, for instance, http://www.foxbusiness.com/features/2011/03/23/fed-tells-bank-america-rein-dividend-plan.html

[23] An objection precludes the BHC from making any capital distribution "other than those capital distributions with respect to which the Federal Reserve has indicated in writing its non-objection." See Board of Governors of the Federal Reserve System (2011, pp. 19-20). Similar procedures were followed in the 2012, 2013 and 2014 cycles. However, in the two later cycles, BHCs were offered an opportunity to review the Federal Reserve's evaluation of its capital plan submission and allowed to make a one-time adjustment to their planned capital distributions, prior to Federal Reserve's final decision to object or not object.

full or partial objection.[24] In 2013 and 2014, the Federal Reserve disclosed summaries of its actions on the proposed capital plans of the individual BHCs (non-objection, conditional non-objection, or objection.) In 2013, objections were issued to Ally Financial (reflecting both quantitative and qualitative criteria) and BBT Corporation (based on qualitative weaknesses).[25] In 2014, objections were issued to Citigroup, HSBC, Santander, and RBS Citizens (due to qualitative weaknesses) and to Zions BanCorp (due to quantitative weaknesses.)

3.1.4 Basel III Considerations

As noted previously, the Federal Reserve evaluates consistency of a BHC's proposed capital actions with a reasonable path to compliance with the requirements of the Basel III regulatory capital rule. In particular, BHCs are expected to "maintain prudent earnings retention policies" toward meeting the fully phased-in Basel III requirements. BHCs are instructed to provide as part of their capital plan submissions a "transition plan that includes pro forma estimates under the baseline scenario of the BHC's regulatory capital ratios" in the Basel III regulatory framework.

Between the 2011 and later stress test cycles, the formulation of this criterion in the instructions for the stress tests underwent two notable changes. First, the 2011 guidelines stipulated that the transition plan should incorporate "due regard to the possibility that earnings or losses may be less favorable than anticipated." This stipulation is not found in the subsequent formulations.

Second, in November 2011, the Basel Committee on Banking Supervision (BCBS) published its methodology for assessing an additional capital buffer for global systemically important banks. This "SIFI surcharge" in effect extends the capital conservation buffer. Beginning with the 2012 CCAR, BHCs were instructed to incorporate their "best estimate of the likely SIFI surcharge that would be assessed under this methodology (and any updates published since that time)," and to "demonstrate with great assurance that, inclusive of a SIFI surcharge,

[24] Public statements put out by Ally and Citigroup indicated that the Federal Reserve had approved some elements of their capital plans and objected to others; see, for instance, http://www.huffingtonpost.com/2012/03/13/stress-tests-citibank_n_1342928.html

[25] JPMorgan Corporation and Goldman Sachs received conditional non-objections.

they can achieve the required ratios readily and without difficulty over the transition period, inclusive of any planned capital actions."[26]

*3.2 Supervisory guidance*

Supervisory guidance became more actively used during the 1990s, as a tool to address perceived credit excesses (Bassett and Marsh, 2015; Elliott, Feldberg, and Lehnert, 2013) following the deregulation phase of the 1980s. Often, supervisory guidance communicates or clarifies standards for underwriting or risk-management practices in response to a fast pace of activity in particular lending segments.

For example, supervisors have used this tool to warn of the risks of subprime lending and instruct examiners to expect larger capital allocations for these types of exposures. Also, in mid-2006, supervisors issued a supervisory guidance to limit the concentration of commercial real estate (CRE) exposures in banks' portfolios. Bassett and Marsh (2015) find that this guidance had a significant effect on the growth of CRE lending for the banks most affected by the guidance. This evidence suggests that this tool may potentially have a significant effect on the intensity of specific activities that may be targeted by macroprudential policymakers. We test for the impact of the IGLL that was released on May 21st, 2013, and the follow-up FAQ, published on November 7, 2014, on speculative syndicated term loan origination, our proxy for leveraged loans.[27] The IGLL, which updated and replaced a previous version released in 2001, describes expectations for sound risk management of leveraged lending activities (in the origination, distribution, and participation) at regulated banks.

The IGLL does not provide a regulatory definition of leveraged lending, but instead calls on individual institutions to specify definitional criteria appropriate for the institution, and notes the following to be common characteristics of leveraged loans:

- Loans used for buyouts, acquisitions, or capital distributions.

[26] In addition, "a BHC should, through its capital plan, demonstrate an ability to maintain no less than steady progress along a path between its existing capital ratios and the fully-phased in Basel III requirement." See http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20131101a2.pdf

[27] See https://www.federalreserve.gov/bankinforeg/srletters/sr1303a1.pdf and https://www.federalreserve.gov/newsevents/press/bcreg/bcreg20141107a3.pdf

- The borrower has total debt more than four times gross earnings (before interest, taxes, depreciation, and amortization) or senior debt more than three times gross earnings, or exceed other defined thresholds "appropriate to the industry or sector."
- The borrower is recognized in the debt markets as a highly leveraged firm as characterized by a high debt-to-net-worth ratio.
- The borrower's post-financing leverage ratios such as debt-to-assets, debt-to-net-worth, debt-to-cash flow, "significantly exceeds industry norms or historical levels."

The guidance spells out important risk management practices for leveraged lending, including consideration of "a borrower's capacity to "repay and to de-lever to a sustainable level over a reasonable period"; underwriting standards that define acceptable leverage levels; effective risk monitoring systems that "that enable management to identify, aggregate, and monitor leveraged exposures and comply with policy"; and "a credit limit and concentration framework consistent with the institution's risk appetite." Within these broad areas, the guidance articulates various specific practices viewed as comprising minimum standards.

Supervisory guidance does not necessarily have a significant impact on bank behavior—banks may already be implementing sound risk management practices; strong examiner follow-up may be lacking; the guidance may have arrived too late (after banks already had accumulated significant risk exposure); or it might be too limited scope (for example, guidance might address only risks held on balance sheet may simply promote risk transfer.) The leveraged lending guidance appears to have been well-timed, and it addressed risk transfer as well as balance sheet risk. Whether it was binding, in the sense of affecting banks' leveraged lending activity, would depend primarily on the extent to which it led bank regulators to more closely scrutinize bank practices or to seek stricter credit standards.

The publication of the extensive and detailed FAQ over a year after release of the guidance suggests that during intervening period, regulators engaged in active follow-up and may have identified weaknesses in banks' risk management practices. Publication of the FAQ might reflect an attempt by regulators to clarify their expectations regarding stronger risk management.

## 4. Data

This section describes the two main micro-level datasets used in our analysis: HMDA and SNC. We describe the background, coverage, and content of these sources. We also outline the process followed to prepare these data for the empirical analysis.

### *4.1 HMDA Data*

Our study examines the jumbo mortgage origination activity of the large banking organizations that have participated in the annual CCAR stress tests cycle since 2011, in relation to that of other banks and of non-bank mortgage companies, over the period January 2009 through December 2014. [28]

We focus on changes in market share and in comparative approval rates on mortgage applications, with particular attention to the responsiveness of these measures to the annual stress tests. We rely on the HMDA data of individual banking organizations to construct these measures of jumbo mortgage origination activity.

HMDA data are submitted annually in early spring by mortgage lending institutions, providing information on each home purchase and refinance loan application and origination of these institutions from the preceding year. HMDA filers include all commercial banks, savings and loan institutions, credit unions, and mortgage companies that meet minimum asset size thresholds and have a branch in a metropolitan area.[29] For institutions with mortgage subsidiaries that report separately, we combine the HMDA data of the parent institution and its subsidiaries.

HMDA data provide the action taken on each loan application (whether it was approved, denied, or withdrawn); the loan amount; the income of the applicant; whether the application is single or joint (with a co-applicant); the racial and ethnic classification of the applicant (and the co-applicant, if applicable); and the state, county, and census tract location of the subject

[28] As described in the introduction, we restrict attention to jumbo mortgages in order to focus on mortgages generally retained on the bank balance sheet. An additional reason for focusing on the jumbo loan market is the effect of the new Basel III rules on mortgage servicing rights (MSR), established in July 2013, limiting the use of MSR as bank capital. This change likely had an effect, on banks' incentives to originate conforming-size loans, but not jumbo loans. Gete and Reher (2016) analyze the effect of these new rules on house rents using information for a sample of owner-occupied mortgage applications.

[29] For details, see the Federal Financial Institutions Examination Council guidelines on HMDA reporting at http://www.ffiec.gov/hmda/pdf/DepCriteria0204.pdf

property. HMDA data also indicate whether an originated loan was sold prior to year-end, and the type of purchaser.[30] HMDA data also include the application and action dates, although these are not released in the public version of the data.

We aggregate the individual application and origination data in HMDA to form a panel dataset by lender and action date (year and month), specifically for the jumbo, home purchase loan category. The panel dataset includes total jumbo home purchase loan applications acted on and total amounts originated by the lender in each month.

Jumbo mortgages can be defined in two alternative ways, one more restrictive than the other. Under the broader definition, a jumbo loan is any residential mortgage with a loan amount exceeding the traditional, "base" conforming loan limit, which, since 2006, has been set at $417,000 (with the exception of Alaska, Hawaii, the Virgin Islands, and Guam, where it has been $625,000) for newly originated single-family, first-lien mortgages.[31] Prior to 2008, loans with balances exceeding this limit were ineligible for sale to Fannie Mae or Freddie Mac. We shall refer to this broader definition as "jumbo 1."

Since 2008, various legislative acts increased the loan limits in certain high-cost areas in the United States beyond the base conforming limit.[32] The narrower, jumbo loan definition excludes the mortgages that became eligible for sale to Fannie Mae and Freddie Mac as a consequence of these statutorily increased limits. These so-called "super-conforming" mortgages have loan amounts that exceed the base conforming limit but are within the higher limits set for the statutorily-designated "high cost areas." We shall refer to the narrower definition as "jumbo 2".

Although "super-conforming" mortgages technically are eligible for sale to Fannie Mae or Freddie Mac, both secondary market institutions consistently have placed significant constraints on such sales, including higher fees and explicit limits on the quantity purchased from a single seller.[33] Consequently, banks originate many such mortgages for their own

[30] The data distinguish among sold via private securitization; sold to non-affiliate commercial or savings banks; to non-affiliate insurance, mortgage, or finance company; or sold to other types of purchasers.
[31] Seasoned mortgages are subject to the conforming limit that was applicable in the year they were originated.
[32] While some of the legislative initiatives established temporary limits for loans originated in select time periods, a permanent formula was established under the Housing and Economic Recovery Act of 2008 (HERA).
[33] See http://www.freddiemac.com/singlefamily/mortgages/super_conforming.html and https://www.fanniemae.com/content/fact_sheet/high-balance-loan-matrix.pdf

portfolios. Hence, we prefer the broader ("jumbo 1") definition incorporating the "super-conforming" category.

Figure 1 describes some recent developments in the jumbo home purchase mortgage market as observed from the aggregated HMDA data (using the "jumbo 1" definition.) The top panel of Figure 1 indicates a steady rebound in jumbo mortgage originations, over the past several years, from the depths of the crisis period. In 2014, about $100 billion were originated, about double the amount originated in 2009. The middle panel describes the share of such originations by CCAR banks, non-CCAR banks, and nonbanks respectively. The shares are relatively stable, with the exception of 2011 when the share at CCAR banks dropped notably, while non-CCAR banks took up some of the slack.

The bottom panel of Figure 1 shows that approval rates on jumbo mortgage applications at CCAR banks has steadily increased; whereas other types of mortgage originators had relatively steady approval rates (with the exception of some seasonality observed in the first quarters of each year). That said, even with approval rates, there was a notable downward dip in the year 2011 at CCAR banks relative to non-CCAR banks and nonbanks.

*4.2 Shared National Credits*

Our study also analyzes the origination of syndicated leveraged term loans in the United States. As noted in the IGLL, the definition of a leveraged loan varies across individual financial institutions, but typically it is considered a speculative-grade credit. In general, leveraged loans comprise a major share of corporate speculative-grade term loans.

For our study, we rely on data collected by the Shared National Credits (SNC) Program, which was established in 1977 by the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency to provide an efficient and consistent review of large syndicated loans. Before 1999, information was gathered for loans with a committed or disbursed amount of at least $20 million shared by two or more unaffiliated supervised institutions. Currently, the program covers any loan in excess of $20 million that is shared by three or more supervised institutions.

Bank supervisors review a SNC loan based on information provided by a designated bank—usually an agent bank. One or more agent banks are generally responsible for recruiting a sufficient number of loan participants, negotiating the contractual details, preparing adequate loan documentation, and disseminating financial documents to potential participants. Once the loan is made, agent banks are also responsible for loan servicing, usually for a fee. These agent banks provide supervisors with a variety of information on the credit quality of the borrower and what percentage of the syndication has been originated by participant financial intermediaries such as banks and nonbanks.

The SNC program comprises two data collections. One is at an annual frequency; these data have been explored widely in the literature. The second is a quarterly collection, initiated in the fourth quarter of 2009, from the 18 banks with the most active syndicated loan businesses. These banks account for about 90 percent of the market and often play the role of agent bank.[34] For our empirical analysis, we use the quarterly database with loan information through 2015:Q3.

We restrict the sample to syndicated term loans. Syndicated deals generally include a revolving credit facility, funded by banks, which may be combined with one or more term loans involving participation by banks or by nonbank institutional investors. Leveraged loan syndications are especially likely to incorporate nonbank participation via a term loan facility.[35] Restricting attention to term loans enables us to incorporate nonbank institutional investors as a control group for the analysis of leveraged lending by banks.

Information captured in the SNC data include the agent bank's internal rating grade (credit quality) of the borrowing firm, the loan origination and maturity dates, the credit limit (for revolving facilities), and original loan amount (for term loans) and how it divides among the various participants. Since internal grades are not standardized across banks, we apply supervisory mappings between the internal rating grades and S&P external credit ratings, which

[34] The agent bank for a syndicated loan deal is generally responsible for recruiting a sufficient number of participants; negotiating the contractual details; preparing adequate documentation, and disseminating financial documents to potential participants. Once the deal is finalized, agent banks are also responsible for loan servicing, usually for a fee.

[35] As characterized by Nini (2016), "By the mid-2000s, the typical leveraged loan deal included an institutional term loan tranche, which is a fully funded term loan, intended to be purchased by nonbank institutional investors. In addition to a revolving line of credit that is common in most loan deals, a deal may also include a term loan intended for banks."

are available for 10 of the 18 sample banks. We then equate leveraged lending with issuance of speculative grade (S&P BB rating or lower) syndicated loans.

We drop a loan from our sample if the agent bank is one of the eight for which a supervisory mapping is unavailable, or if the internal grade is unreported.[36] The top two panels of Figure 2 show total dollar amount of syndicated term-loan credits, by quarter, before and after the these exclusions. The excluded loans account for a relatively small share of syndicated term loan volume; for example, they account for about 10 percent of the credits originated in 2015:Q3.

As seen in the top panel of Figure 2, the volume of term-loan originations at banks (both U.S. and foreign) has followed a positive trend since the start of the sample period. Origination volume at nonbanks has been more volatile and has not followed a steady trend, peaking in early 2013 when longer term interest rates were historically low.

Speculative-grade loan originations consistently account for more than 90 percent of syndicated loan originations by nonbanks, as depicted in the bottom panel of Figure 2.[37] At banks, the share of speculative-grade term loan originations fell from 2009 to 2012, but increased again in 2013 and 2014, after falling to very low levels in 2015, which coincides with the FAQ documentation period related to the IGLL.

*4.3 Other sources*

We use BHC financial information collected through the FR Y-9C form. These data include information on the income and financial condition of federally regulated bank and savings and loan and securities holding companies, and are filed quarterly with the Federal Reserve. These data provide detailed information on assets, liabilities, income, and expenses, including regulatory capital ratios and the components of profitability such as return on assets. For banks, we used a merger-adjusted Y-9C dataset that corrects for distortions that occur when banks merge. A similar dataset is not available for savings and loan institutions, so gaps and inconsistencies resulting from mergers had to be manually adjusted for these institutions.

[36] A few of the credits do not have internal ratings because they are in the trading account or held-for-sale account.
[37] Such behavior is consistent with the risk-taking channel of monetary policy (see Aramonte, Lee, and Stebunovs, 2015 and Lee, Liu, and Stebunovs, 2015).

We match the HMDA data to regulatory Y-9C data based on the identity of the HMDA reporting bank. Because HMDA data are submitted at year-end, whereas Y-9C data are quarterly, we aggregate the Y-9C data of institutions that merge during a year for those quarters where the Y-9C were filed separately (but only for the year when the merger occurred).

## 5. Bank stress tests and the jumbo mortgage market

In this section, we study the effect of U.S. stress tests on jumbo mortgage lending. We first describe the methodology used to analyze this relationship and then describe the main results.

### *5.1 Methodology*

The banking stress test program developed by U.S. supervisors after the global financial crisis is aimed at enhancing the resilience of large, systemically important banking institutions. However, the assumptions embedded in the exercise's scenarios and loss models may have an effect on banks' lending in particular sectors. In this section, we test whether the stress tests have had any effect on the supply of jumbo mortgages of BHCs required to participate.

Our empirical tests rely on the use of micro-level information on mortgage originations included in the HMDA dataset, which allows us to identify changes in the supply of jumbo mortgage credit tied to the stress tests from potential simultaneous changes in demand for jumbo mortgages. Our initial identification strategy relies on comparing the volume of jumbo mortgage originations of stress tested BHCs to that of other banks and non-banks at the state level. Assuming that each group of jumbo mortgage originators face the same, within-state pools of potential borrowers, the use of within-state shares allows us control for potential changes in the demand for jumbo mortgages at the state level (Calem, Covas, and Wu, 2013). To conduct this set of tests, we estimate the following specification:

$$jumboshare_{s,t} = \alpha_s + \beta_{2009} S_t^{2009} + \sum_{j=2011}^{2014} \beta_j C_t^j + X_{s,t}\gamma_X + \gamma_T time_{s,t} + \gamma_{T2} time_{s,t}^2 + \varepsilon_{s,t} \qquad (1)$$

where the dependent variable is the share of jumbo mortgage originations of stress tested banks, as defined above; $\alpha_s$ is a state fixed effect; $S_t^{2009}$ is an indicator variable that equals 1 in the first quarter of 2009 (or the first two, three, or four quarters of that year), which should capture the

effect of the SCAP, and zero otherwise; $C_t^j$ are similar indicator variables that equal 1 in the first quarter of the CCAR\DFAST stress test years between 2011 and 2014 (or the first two, three, or four quarters of those year), and zero otherwise; $X_{s,t}$ is a vector of state-specific macro-financial variables such as gross product growth, house price growth, and the unemployment rate; $time_{s,t}$ and $time^2_{s,t}$ are state-specific linear and quadratic time trends; *s* represents states and *t* time.[38] We apply robust standard errors double clustered by the cross section of states and by time, to account for possible, cross-sectional correlation of shocks that affect lending behavior at a given point in time.

It is worth noting that the stress test exercises relied on information provided by the banks as of the end of the year prior to the release of the stress test results. For example, the 2011 CCAR exercise was based on bank information as of end-2010. If banks decide to react to the potential results arising from the exercise and to plan ahead for the next stress test, they would likely start adjusting their balance sheets starting in the first quarter of the current stress test year. Thus, we expect that the indicator variables used in our specification should capture the effect of the stress test on the lending behavior of the banks for the credit segment analyzed, in this case, jumbo mortgages.

A second set of regressions disaggregates the origination activity of the group of stress-tested BHCs within each state by individual institution, and assesses whether the impact of the stress tests on an institution's share of jumbo mortgage originations depends on its ex-ante capitalization. This provides a cleaner identification strategy, as we are comparing origination activity across stress tested banks with different capital positions. For this analysis, we aggregate individual HMDA reporting subsidiaries of the stress-tested BHCs to the top-holder level.[39]

In one specification, we employ an indicator for whether a CCAR institutions ranks below the median among active mortgage originators in terms of projected ratio of tier 1 common equity to risk-weighted assets (TCE ratio) under the stress scenario.[40] We test whether CCAR results may have been binding for the set of banks with projected TCE ratio below the median projected ratio (where *median = 1*):

[38] The time trends are included to capture the steady recovery in jumbo mortgage lending by large banks since the collapse of the private securitization market.
[39] Presumably, were a stress test to have such an effect, it would impact the institution's aggregate jumbo mortgage origination activity, of both bank and non-bank subsidiaries.
[40] We thank Tim Clark for providing us with information from the 2011 CCAR used to construct this measure.

$$jumboshare_{b,s,t} = \alpha_{b,s} + \beta_{2009} S_t^{2009} + \beta_{2009}^{median} median_{b,t-1} S_t^{2009} + \sum_{j=2011}^{2014} \beta_j C_t^j + \sum_{j=2011}^{2014} \beta_j^{median} median_{b,t-1} C_t^j +$$

$$\beta^{TCE} TCE_{b,t-1} + \beta^{assets} \log(Assets)_{b,t-1} + X_{s,t-1}\gamma_X + \gamma_T time_{s,t} + \gamma_{T2} time_{s,t}^2 + \varepsilon_{b,s,t} \qquad (2)$$

In another specification, we include interaction terms between the stress test indicator variables and the lagged TCE ratio, which also enters the equation separately:

$$jumboshare_{b,s,t} = \alpha_{b,s} + \beta_{2009} S_t^{2009} + \beta_{2009}^{TCE} TCE_{b,t-1} S_t^{2009} + \sum_{j=2011}^{2014} \beta_j C_t^j + \sum_{j=2011}^{2014} \beta_j^{TCE} TCE_{b,t-1} C_t^j +$$

$$\beta^{TCE} TCE_{b,t-1} + \beta^{assets} \log(Assets)_{b,t-1} + X_{s,t-1}\gamma_X + \gamma_T time_{s,t} + \gamma_{T2} time_{s,t}^2 + \varepsilon_{b,s,t} \qquad (3)$$

We expect that institutions with lower lagged or projected TCEs would lose market share after a stringent stress test, as they may try to achieve a higher capital ratio level by reducing the pace of mortgage originations.

A last set of tests relies on the information collected in the HMDA dataset on overall mortgage applications submitted to banks. We estimate an institution-state level specification analogous to (3) but with the dependent variable being the individual institution's approval rate on mortgage applications received within the state.[41] Use of the application approval rate allows us to further identify a supply effect apart from demand driven changes in the origination of jumbo mortgages. We expect that banks with lower capital ratios would be likely to approve fewer jumbo mortgage applications than those that are better capitalized.

The results reported below are for regression equations estimated with "jumbo 1" as the dependent variable, preferred over "jumbo 2" for the reasons cited previously. We have obtained qualitatively similar results using the "jumbo 2" definition.

[41] Specifically, we calculate the approval rate as the ratio of originated mortgages to total mortgage applications in the state and quarter.

Also, the reported results are for estimations conducted using a balanced panel. Thus, North Dakota is excluded from the sample for (1) because in some quarters, jumbo mortgages were not originated in the entire state. The panel for (2) and (3) is restricted to institution-state pairs such that the institution originated at least one jumbo mortgage in that state each quarter, leaving 10 CCAR institutions operating in 33 states.[42] The results are robust to relaxing the latter restriction.

*5.2 Summary Statistics*

Tables 2 and 3, respectively, show summary statistics for the data used in our state level and institution-state level estimations. For example, the mean and median CCAR-banks' share of jumbo mortgage originations are both about 35 percent with a standard deviation of close to 16 percent. On average, CCAR institutions in the institution-state sample originated about 8 percent of a state's total jumbo loan originations, although the range across is wide across quarters, banks, and states, with the maximum share close to 60 percent. On average at CCAR institutions, more than 60 percent of all jumbo loan applications received are approved at, although again the range is wide.

The distribution of lagged TCE ratios at these 10 BHCs over the sample period also exhibits considerable variation, with a median of 9.1 percent and standard deviation of close to 2 percent. The time-series behavior of this distribution is shown in Figure 3. , and indicates considerable deleveraging during 2009 through 2011 with respect to TCE ratios. The deleveraging moderates in 2012, after which the distribution of TCE ratios exhibits only a marginal upward shift.

*5.3 Results*

Table 4 presents the results from the state-level regressions (1), using 12,000 state-quarter observations from 2009:Q1 to 2014:Q4. These regressions indicate the impact of the stress tests on the jumbo mortgage origination shares of the group of CCAR institutions relative to all financial institutions. Column (1) indicates whether each of the stress test exercises had one quarter effects. Columns (2), (3), and (4), indicate whether each of the stress tests had two, three, and four quarter effects, respectively.

[42] Ally, PNC Financial, and Capital One all had at least one quarter in which originations were zero for all states in the sample period.

We find strong evidence that both immediately and up to three quarters after the 2011 CCAR, the stress-tested banks' share of jumbo mortgage originations fell substantially relative to other periods, controlling for various time trends and state-specific economic variables. Our primary result is that whether we specify a one quarter effect or up to three quarter effects, we estimate that CCAR banks' share of jumbo mortgage loan originations are about 3 to 5 percent lower in a given state, on average, in the aftermath of CCAR 2011 compared to other periods, and these effects are statistically significant.

None of the other CCAR exercises appear to have had significant effects, with perhaps the exception of the CCAR 2013 for which the estimated one-quarter effect is significant at the 10 percent level. The lack of statistically significant effects related to the other CCAR episodes may be due to the fact that deleveraging at CCAR banks had largely been achieved by 2012 (see figure 3 again).

Nor do we observe any significant effects for the SCAP, although there is little reason to expect similarity between the SCAP and the later CCAR exercises, given the entirely different macroeconomic contexts and supervisory objectives. SCAP was implemented in the midst of the crisis, while CCAR was initiated post-crisis. SCAP was aimed at evaluating a BHC's capital needs and government support, whereas under CCAR supervisors began to analyze the validity of the banks' capital distribution plans.

The state-level macro variables do not appear to have significant effects on the share of jumbo-mortgage originations at CCAR banks, with the exception of the state-level unemployment rate in the specifications in columns 3 and 4. The other estimated relationships are robust to excluding the state-level macro variables.

Table 5 and 6 show the results for the institution-state level regressions, equation (2). . These regressions indicate the impact of the stress tests on the jumbo mortgage origination shares of each individual CCAR institution relative to all financial institutions.

Table 5 presents results for the specification that employs the "below median" indicator for projected TCE ratio. This indicator interacted with the stress test indicators is significant for CCAR 2011 across all specifications except for the last. However, it is not statistically significant for any of the other stress tests. Thus, again it appears that CCAR 2011 may have

been the only stress test that had a dampening effect on credit supply expansion in the jumbo mortgage market, especially for the banks that had relatively less adequate capital ratios.

Table 6 presents results for the specification employing institution-specific observations of ex-ante capital positions. Here, we include the stress test indicator variables interacted with the actual lagged TCE ratios used in the stress tests, in addition to including the lagged TCE ratios themselves and lagged log of total assets as controls. As in Table 5, we find a statistically significant impact of the 2011 CCAR, whether we specify a one quarter effect or up to four quarter effects. The coefficients on other SCAP or CCAR episodes are not significant, with the exception of the 2012 CCAR, which are estimated to show the opposite effect for specifications (1) and (2) with marginal statistical significance.

We estimate that, on average, a CCAR institution's share of jumbo mortgage loan originations in a given state is 5 to 7 percentage points lower following CCAR 2011 than in other periods, and these effects are significant at the 1 percent level for three of the four specifications. Moreover, this effect is diminished for institutions with higher ex-ante TCE ratios, —each additional percentage point in TCE ratio reverses the negative effect of the CCAR 2011 on the institution's share of jumbo mortgage originations by nearly 0.7 percentage points. Given that the minimum ex-ante TCE ratio was 7.9 percent and the maximum was 11.8 percent, the effects of the 2011 CCAR range from a drop in almost 2 percentage points in the average statewide share of jumbo mortgage loan originations for the most poorly capitalized banks whether you assume one or three quarter effects and an increase in less than 1 percentage point in the share for the most capitalized.

Table 7 shows the results of regressions analogous to those shown in Table 6, for the same set of CCAR BHCs and states, but with the dependent variable as approval or acceptance rates on jumbo mortgage applications. Aside from the different dependent variable, the only difference in specification from Table 6 is the inclusion of state-specific quarterly dummies, which are utilized because approval rates exhibit significant seasonal behavior. In particular, approval rates are relatively high in the fourth quarter and low in the first quarter.[43]

[43] This may reflect timing effects tied to compensation schemes for loan originators, similar to timing effects related to employee compensation schemes that are discussed in the marketing literature. See, for example, Oyer (1998), Steenburgh (2007), and Larkin (2014).

Consistent with the findings in Table 6, approval rates at the stress-tested institutions are negatively impacted by the 2011 CCAR, whether we specify a one quarter effect or up to four quarter effects. —Their Approval rates on average are 23 to 36 percentage points lower in the quarters following the 2011 CCAR than in other periods. Again, the impact of the 2011 CCAR effect was mitigated if the CCAR institutions had better capital positions. Whereas the least capitalized CCAR institution is estimated to have about a 4 to 10 percent decrease in the approval rate (depending on the specification) following the 2011 CCAR, the most capitalized CCAR institution is estimated to have a an increase of 2 to 9 percent.

*5.4 Why only 2011 and not subsequent CCARs?*

In sum, we find strong evidence that CCAR BHCs changed their lending behavior following the 2011 CCAR, but find no comparable effects for the subsequent stress tests. What accounts, then for the singular impact of the 2011 CCAR?

As mentioned above, one probable factor is the level of capital buffers the stress-tested institutions had in place at the time of the 2011 CCAR. These banks were in the midst of a dramatic deleveraging process, which continued apace through the end of 2011, moderating thereafter, as shown in Figure 3. The continued deleveraging subsequent to the 2011 CCAR seems consistent with the stress tested BHCs concluding that they ought to slow the growth of their jumbo mortgage portfolios in order to further boost their capital ratios. The significantly higher capital ratios they had attained by the time of the 2012 CCAR may have been viewed as more adequate in relation to their ongoing jumbo mortgage origination activity.

However, already at the time of the 2011 CCAR, the stress-tested BHCs had ex-ante capital ratios well above regulatory minimums. The median, ex-ante TCE ratio was 8.2 percent, and all CCAR BHCs except Ally (which is excluded from the balanced panel samples) had TCE ratios at least 2 percentage points above the 5 percent regulatory minimum. Hence, the question remains as to why the 2011 CCAR would prove binding, given that the stress scenarios applied during that CCAR were relatively mild.

Two additional factors might explain the apparently binding outcome in 2011. First, the CCAR institutions knew that future stress tests would incorporate a third, potentially more severe scenario, as called for under the Dodd Frank Act. Second, as noted previously, BHCs were

directed to transition to Basel III targets, including the 7 percent tier 1 common equity ratio target (minimum plus conservation buffer). The guidelines for the 2011 CCAR contained the additional, rigorous stipulation that BHC transition plans should incorporate "due regard to the possibility that earnings or losses may be less favorable than anticipated," whereas subsequent guidelines tie such transition plans to baseline economic conditions. Considering this broader regulatory context, the CCAR institutions may have perceived a need to proactively boost their capital ratios consequent to their 2011 CCAR experience.

## 6. Leveraged lending guidance and the syndicated loan market

In this section, we study the effect on the syndicated term-loan market of the IGLL and subsequent FAQ notice by U.S. bank supervisors. We first describe the methodology used to analyze this relationship and then describe the main results.

### *6.1 Methodology*

The 2013 IGLL and the follow-up, 2014 FAQ were communications from policymakers to examiners and the institutions that are supervised, intended to enhance the underwriting standards of leveraged loans originated by banks and thrifts. In this section, we test whether the IGLL and FAQ impacted the supply of riskier, wholesale credits.

We assess the impact of this guidance by using syndicated loan information from the SNC program. The use of micro-level information on syndicated term-loan originations in the SNC dataset that allows us to identify changes in the supply of credit tied to the IGLL and FAQ notices apart from potential demand effects.

Our identification strategy relies on comparing the shares of speculative-grade syndicated term-loan originations at the institution level before and after the IGLL and FAQ notices. This approach assumes that the IGLL and FAQ notices purely impact the supply of credit to riskier borrowers, and not the demand-side risk composition of borrowers, controlling for economy-wide macro-financial variables. One key control variable we include is "junk bond appetite", which is measured as the market share of noninvestment-grade bond issuance as a share of total bond issuance in the United States and controls for demand factors that may shift through time.

The identification strategy further relies on comparing the responses by type of participants in the syndicated term-loan market; specifically, whether the response differs between U.S. banks that are directly subject to the guidance versus foreign banks and nonbanks that are not.[44] In theory, the IGLL could have some impact on most leveraged loans regardless of the types of participants in the syndication because banks are usually involved either as agent banks or participant lenders in the market, but the impact on foreign banks and nonbanks should be more muted. Differential response by lender-type would indicate that changes in the share of speculative-grade term-loans are not solely due to demand.

To conduct this set of tests, we estimate the following specification:

$$share_{i,t} = \alpha_i + \sum_{j=1}^{J} I_j \beta_j^S SLLG_t + \sum_{j=1}^{J} I_j \beta_j^F FAQ_t + \sum_{j=1}^{J} I_j X_t \gamma_j + \sum_{j=1}^{J} \sum_{q=2}^{4} I_i \sigma_{j.q} quarter_{q,t} + \varepsilon_{i,t} \quad (4)$$

where the dependent variable is the share of speculative-grade syndicated term-loan originations at each participant lender, as defined above; $\alpha_i$ is a lender fixed effect; $IGLL_t$ is an indicator variable that equals 1 in the first quarter of implementation in 2013:Q2 (or the first two, three, or four quarters after that), which should capture the effect of the IGLL, and zero otherwise; $FAQ_t$ is an indicator variable that equals 1 in the first quarter of implementation in 2014:Q4 (or the first two, three, or four quarters after that), which should capture the effect of the FAQ notice, and zero otherwise; $quarter_{q,t}$ are lender-type-specific quarterly dummies; and $X_t$ is a vector of economy-wide macro-financial variables. The latter set of variables includes the 10-year Treasury rate, the CDX index, high yield bond spreads, sovereign spread (proxied by the Italian bond rate-spread over German bonds), the S&P500 VIX, and junk bond appetite as defined above. With the exception of the lender-fixed effects, each of these variables have lender-type *j* specific coefficients, where J can be categorized into banks and nonbanks, or U.S. banks, non-U.S. foreign banks, and nonbanks, depending on the specification. As in the analysis of the effects of CCAR on the jumbo loan market, we employ robust standard errors double clustered by financial firm and time.

*6.2 Summary Statistics*

[44] See Aramonte, Lee, Stebunovs (2015) and Lee, Liu, Stebunovs (2015) for similar methodology.

Tables 8 and 9 present the summary statistics for the dependent variable in (4), the share of speculative-grade relative to total syndicated loans, by participant-lender type in the syndicated loan market. Each lender is consolidated to top-holder for categorization into banks (U.S. and non-U.S. foreign) and nonbanks, whereby we assume that risk management decisions are primarily the purview of the parent financial institution. Table 10 presents summary statistics for the economy-wide macro-financial variables included in our regressions.

Table 8 summarizes the SNC data for the full sample. We find that nonbanks originate syndicated term-loans almost exclusively to speculative-grade borrowers, while for banks the mean share of speculative grade relative to all syndicated loans is 71 percent, with the mean share for U.S. banks somewhat higher relative to non-U.S. foreign banks.

Table 9 presents the same information for the 125 most active participant-lenders in our sample, defined as lenders having at least one origination of syndicated loans for every period in our sample from 2009:Q4 to 2015:Q3. The statistics are similar to the numbers in Table 8, although speculative-grade term-loan origination shares of banks are marginally smaller and the shares of U.S. and foreign banks are closer.

*6.3 Results*

We find little evidence that the IGLL had an effect on limiting speculative-grade term-loan originations for all types of lenders. However, the FAQ documentation marked a decisive decrease in such originations at banks.

Table 11 shows the results based on the regressions of speculative-grade syndicated term-loan origination shares relative each participant's total originations on the IGLL and FAQ periods, controlling for a variety of economy-wide financial and economic variables, using 56,712 lender-quarter observations from 2009:Q4 to 2015:Q3. In this regression, we allow for differential impacts on banks versus non-banks, but do not distinguish U.S. from foreign banks. Column (1) specifies that the IGLL and FAQ documentation had a one quarter effect, respectively. Column (2), (3), (4), specifies that the IGLL and FAQ had two, three, and four quarter effects respectively.

We find no robust evidence that the IGLL had a statistically significant effect on the share of speculative-grade term-loan originations in the syndicated loan market. For banks, there

is a statistically significant increase in the share of speculative-grade term loans during the first quarter of implementation, but this may have been reflective of a surge in such originations coincident with the IGLL being implemented. For nonbanks, there is also a weakly, statistically significant increase in the share of speculative-grade term loan originations when we specify a four-quarter effect of the IGLL.

In contrast, we find strong and consistent evidence that banks decreased their speculative-grade term-loan origination share in association with the FAQ notice, in which items in the IGLL were clarified.[45] Estimated coefficients of the FAQ indicator range from -26 to -15 percent, meaning that, on average, share of leveraged loans declined substantially after issuance of the FAQ.

One other relationship consistently observed regards nonbank behavior in response to a rise in the S&P 500 VIX. Nonbanks tended to decrease their share of speculative term-loan originations when the VIX was elevated (or volatility was high).

Table 12 shows similar results for the subsample of the 125 most active lenders in the syndicated term-loan market, defined as having originated at least one loan in every quarter in the sample.[46] The estimated responsiveness to the IGLL for banks is positive and statistically significant only when specifying a one quarter effect; whereas the responsiveness to the IGLL for nonbanks is marginally statistically significant in specification (4), similar to the results in Table 11. The estimated responsiveness of banks' to the FAQ documentation is generally more pronounced than in the full sample—banks are estimated to have decreased their share of speculative term-loan originations from 15 to 37 percent relative to all their syndicated term-loan originations regardless of risk and regardless of specification. The responsiveness of nonbanks to the S&P VIX is slightly more muted than in the full sample, but still statistically significant.

Next, we further differentiate types of banks by splitting the bank sample into U.S. banks and non-U.S. foreign banks. The results, shown in Tables 13 and 14, are broadly consistent with those in Tables 11 and 12. Specifically, for the full sample as reported in Table 13, the decline in speculative-grade term-loan origination shares at foreign banks subsequent to the FAQ documentation is more accentuated compared to U.S. banks. At foreign banks, the decline in

[45] One can also consider that the FAQ documentation was a culmination of active communication between the banks and regulators in clarifying the contents of the IGLL.

[46] These results are robust to further restricting the sample to banks originating at least two loans each quarter.

share ranges from 27 to 40 percent (depending on the specification), whereas at U.S. banks, it ranges from 4 to 16 percent, with some coefficients lacking statistical significance.

This greater responsiveness at foreign banks to the FAQ documentation may be related to the greater sensitivity of peripheral sovereign spreads (proxied by Italian bond spreads over German bond interest rates). Both findings may reflect foreign banks becoming more sensitive to supervisory pressures after the sovereign debt crisis in Europe. In addition, U.S. banks appear to be involved in substitution between bonds and syndicated loans, as their junk bond appetite is negatively related to speculative-grade term-loan share.

The results for the most active lenders in the syndicated term-loan market in Table 14 differ notably from the Table 13 results for the full sample. First, the difference in post-FAQ behavior of U.S. versus non-U.S. banks mostly vanishes. Second, the relationship between foreign banks speculative-grade term-loan origination share and peripheral sovereign spreads are no longer statistically significant. Third, the relationship between speculative-grade term-loan origination share and junk bond appetite at U.S. banks becomes less evident.

*6.4 Potential Impact of 2015 CCAR*

One potentially confounding factor that may have affected the origination of speculative-grade syndicated loans at around the same time as the FAQ documentation was the introduction in the 2015 CCAR of a scenario involving sharp deterioration in corporate credit quality. In particular, this scenario was characterized by a widening of corporate loan spreads that mostly affected the riskier, leveraged firms.[47]

To verify the robustness of our findings on responsiveness to the FAQ, we divide lender types into CCAR banks, non CCAR banks, and nonbanks and rerun our exercise. Tables 15 and 16 show, consistently across the various specifications, that both CCAR and non-CCAR banks reduced their share of speculative-grade, syndicated term loan originations following the issuance of the FAQ.

In sum, we find evidence consistent with the Leveraged Lending Guidance having an effect on regulated banks, but only after the FAQ notice which clarified supervisory expectations on the guidance. We find little impact on nonbanks, consistent with the fact that nonbanks

[47] See page 6 in Board of Governors of the Federal Reserve System (2014).

typically are specialized in speculative grade lending. The latter finding suggests some segmentation of the syndicated leveraged loan market, where unregulated nonbanks tend to participate in loan syndications where scope for bank participation (as either an agent bank or participant-lender) is more limited

Note that the guidance is indirectly applicable to originations of syndicated loans by banks that are quickly sold off to nonbanks (see Lee, Liu, and Stebunovs, 2015 for more details on the originate-to-distribute model of syndicated loans.) The guidance may have induced a shift in the risk composition of syndicated loans sold by banks to nonbanks, slowing the accumulation of speculative grade loans on the balance sheet of the nonbanks. Therefore, we supplemented our analysis by re-estimating (4) for nonbanks with the dependent variable replaced by the share of speculative-grade, term-loan outstanding balances. However, we still find no significant effect after the FAQ period.

As a final note, we have also conducted the analysis restricting attention to syndicated loans that map to S&P ratings of CCC or less, and find no effect associated with either the IGLL or the FAQ. Thus, we conclude that most of the reduction in origination share of speculative grade loans associated with the FAQ notice was tied to origination of BB- or B-rated syndicated term-loans.

## 7. Conclusions

The nascent interest on macroprudential instruments to limit the threat to financial stability has led to an assessment of the effectiveness of such tools. Most recent studies have focused on testing for the effect of these instruments on credit aggregates using cross-country information. This paper is located on the other side of the spectrum, that is, it uses micro-level data for one country, the United States. The benefit of this approach is that we are able to determine with better precision the impact of macroprudential tools on specific credit activities that may be of interest to policymakers.

The focus of our analysis is on two specific instruments recently used by U.S. policymakers to enhance the resilience of financial institutions and to ensure that growth in balance sheet credit risk exposure is commensurate with capital accumulation. Supervisory

guidance and stress tests have traditionally been used as microprudential tools with an objective to increase the safety and soundness of banks. However, some of their cyclical features may also have an effect on credit aggregates, which would make them useful to "lean-against-the-wind" during periods of expansive credit market conditions.

Our results show that stress tests only affect credit originations in the jumbo mortgage market if the assumptions on expected losses used in the scenario design are sufficiently stringent and if banks' capital buffers are not large. This finding evidences that stress tests are only an effective cyclical tool when certain conditions are satisfied. Similarly, we also find that supervisory guidance, in this case on leverage lending, is only effective in curtailing credit excesses if supervisors are sufficiently clear about the objective of the guidance.

These findings provide validation to the link between cyclical prudential policies and credit supply in specific, U.S. market contexts. It complements the cross-country studies that have provided confirmation of this relationship at a broad level. However, the exercise pertains to narrow market segments and only focus on use of the instruments analyzed to achieve a credit tightening objective. To further study the effectiveness of cyclical macroprudential policies, more work has to be done on the impact of instrument loosening on credit supply.

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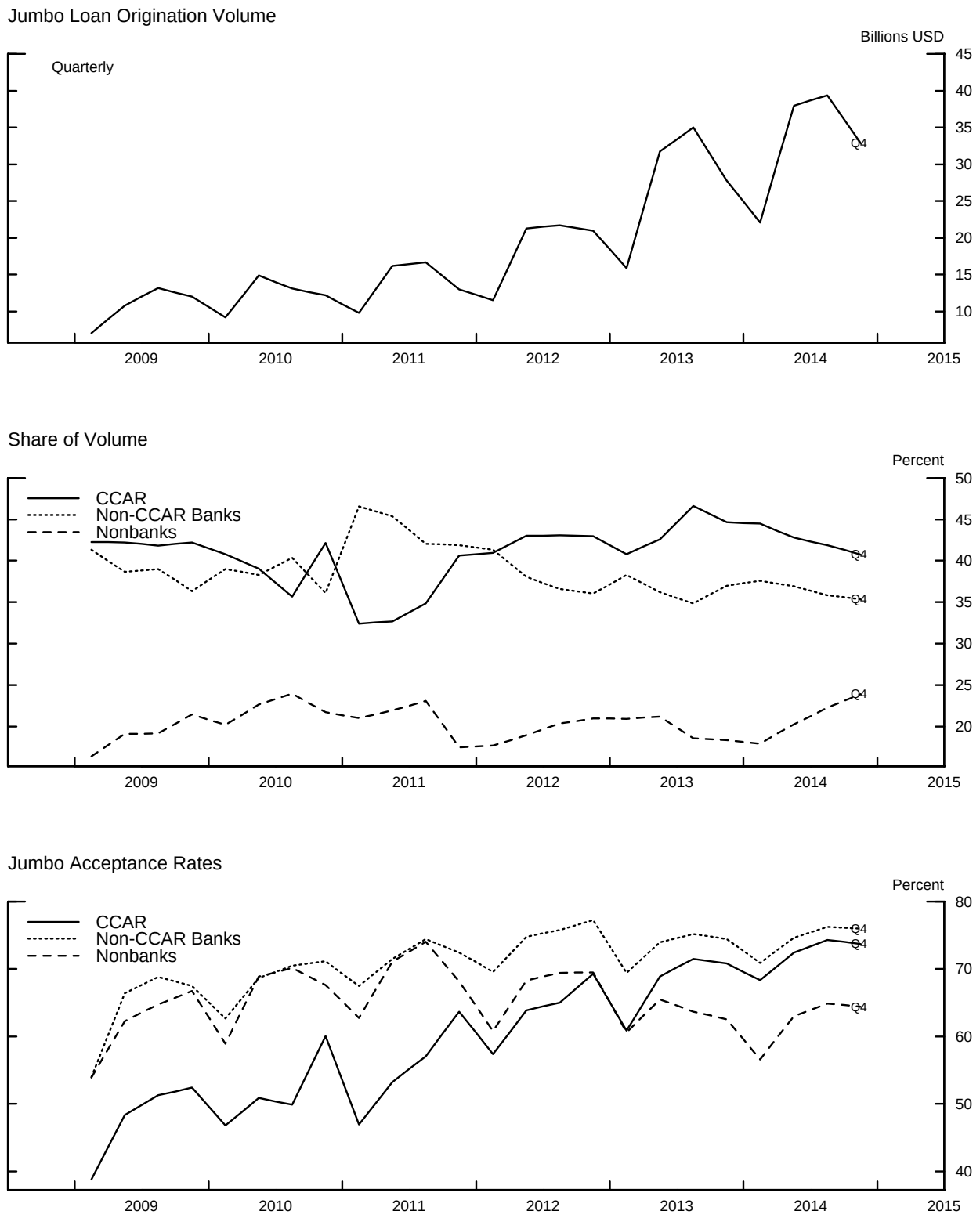


Figure 1: **Developments in the Jumbo Purchase Mortgage Market**

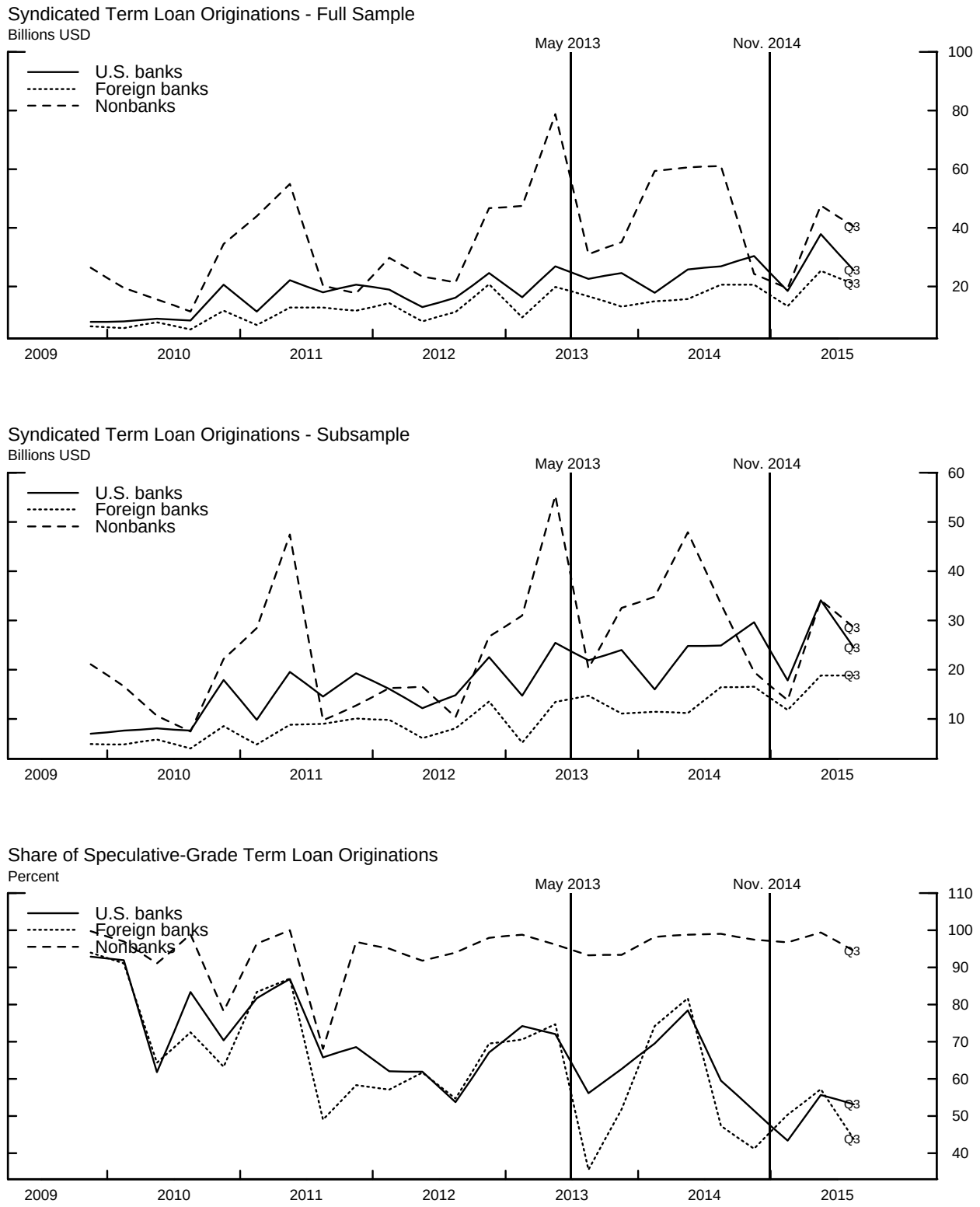


Figure 2: **Developments in the Syndicated Loan Market**

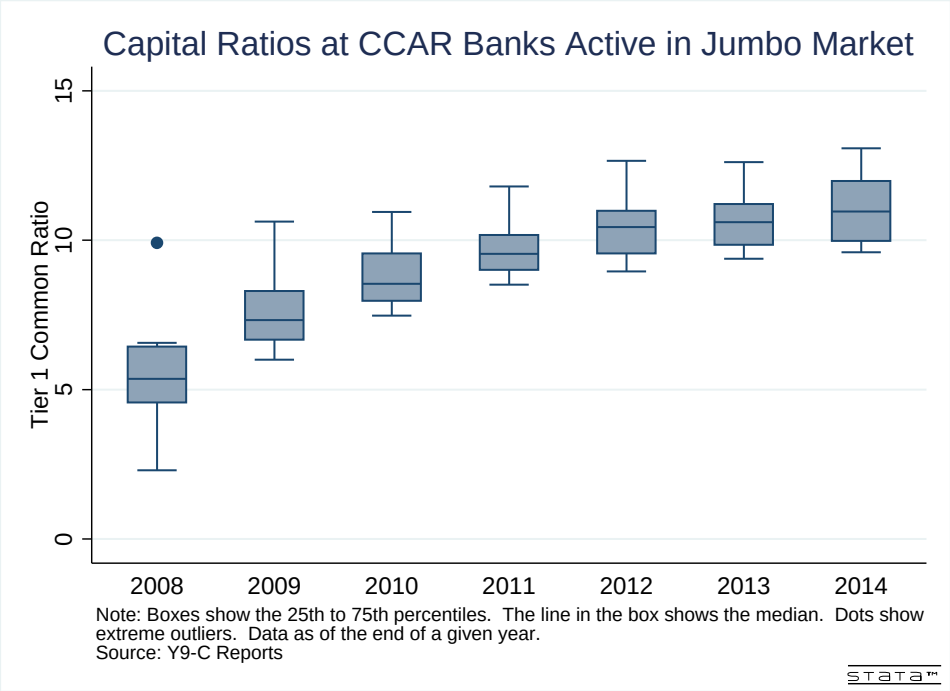


Figure 3: **Tier 1 Common Capital Ratios at CCAR Banks in the Jumbo Mortgage Market**

Table 1: Adverse scenarios for house price growth in SCAP and CCAR

| SCAP/CCAR | Adverse Scenario | Severely Adverse Scenario |
|---|---|---|
| 2009 SCAP | −28%(within 2 years) | |
| 2011 CCAR | −11%(within 3 years) | |
| 2012 CCAR | | −21%(within 3 years) |
| 2013 CCAR | −10%(within 3 years) | −21%(within 3 years) |
| 2014 CCAR | −14%(within 3 years) | −26%(within 3 years) |

Note: 2009 SCAP scenario was for two years. CCAR scenarios were for three years.

Table 2: State-level summary statistics (in percent)

| | Mean | Median | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| CCAR banks' share | 35.1 | 35.3 | 15.8 | 0.0 | 92.8 |
| Growth in house prices | 0.5 | 0.6 | 6.3 | −29.7 | 27.2 |
| Unemployment rate | 7.7 | 7.6 | 1.9 | 3.3 | 14.4 |
| Growth in per capita GSP | 1.8 | 2.4 | 3.4 | −21.2 | 11.7 |

Note: Summary statistics are for 49 states (which excludes North Dakota) and District of Columbia from 2009:Q1 to 2014:Q4. CCAR Banks' share is the share of jumbo mortgage loan originations by CCAR banks in a given state. Jumbo loans are defined as mortgages with principals above $417,000 loan limit. In Alaska and Hawaii, the limit is $625,500. Growth in house prices is compared to previous year. Unemployment rate is 12 month moving average. Growth in per capita GSP is compared to the previous year. All data is from 2009:Q1 to 2014:Q4.

Table 3: CCAR-bank-state-level summary statistics (in percent)

| | Mean | Median | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| CCAR bank share in given state | 8.1 | 6.1 | 6.7 | 0.0 | 57.3 |
| CCAR approval rate in given state | 62.8 | 65.2 | 16.0 | 3.6 | 100 |
| CCAR bank TCE ratio* | 9.1 | 9.3 | 2.0 | 2.2 | 14.6 |

Note: Summary statistics are for 10 CCAR banks operating in 33 states. CCAR Bank share is the share of jumbo mortgage loan originations by each CCAR bank in a given state from 2009:Q1 to 2014:Q4. Jumbo loans are defined as mortgages with principals above the $417,000 loan limit. In Alaska and Hawaii, the limit is $625,500. CCAR bank TCE ratio* is the summary statistics for tier 1 common ratios for 10 CCAR banks from 2008:Q4 to 2014:Q3 as we use lagged TCE ratios in our regressions.

Table 4: State-level regressions of CCAR banks' jumbo loan origination shares on stress test episodes

| | (1) 1 quarter | (2) 2 quarters | (3) 3 quarters | (4) 4 quarters |
|---|---|---|---|---|
| SCAP 2009 | 0.905 | 2.908 | 4.816*** | 2.020 |
| | (0.356) | (1.208) | (2.997) | (0.705) |
| CCAR 2011 | −4.874*** | −4.163*** | −3.372** | −4.392 |
| | (−4.029) | (−2.809) | (−2.111) | (−1.556) |
| CCAR 2012 | −0.880 | −0.609 | −0.192 | −3.319 |
| | (−0.741) | (−0.439) | (−0.145) | (−1.217) |
| CCAR 2013 | −1.230* | −0.576 | 1.115 | −2.951 |
| | (−1.819) | (−0.531) | (0.704) | (−0.713) |
| CCAR 2014 | −0.095 | 0.748 | 1.370 | −3.940 |
| | (−0.094) | (0.509) | (1.541) | (−0.753) |
| Growth in house prices | 0.278* | 0.239 | 0.162 | 0.123 |
| | (1.692) | (1.261) | (1.300) | (0.574) |
| Unemployment rate | −1.186 | −1.221 | −1.530** | −2.027** |
| | (−1.316) | (−1.369) | (−2.449) | (−2.506) |
| Growth in per capita GSP | −0.093 | 0.017 | 0.143 | −0.050 |
| | (−0.367) | (0.065) | (0.669) | (−0.190) |
| Num. of observations | 1200 | 1200 | 1200 | 1200 |
| R-squared | 0.78 | 0.79 | 0.79 | 0.78 |

Note: The dependent variable is the CCAR banks' share of jumbo mortgage originations relative to all banks and nonbanks in a given state. Jumbo loans are defined as mortgages with principals above the $417,000 loan limit. In Alaska and Hawaii, the limit is $625,500. North Dakota is excluded. District of Columbia is included. Column (1) assumes various SCAP and CCAR Stress Tests have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, and column (3) 3 quarters. The SCAR effect begins in 2009:Q2, while the CCAR effects begin in Q1 of each year (besides 2009). The sample period is from 2009:Q1 to 2014:Q4. Regressors not shown are state fixed effects and quadratic time trends. Robust standard errors are double clustered by state and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$.

Table 5: CCAR-bank-state-level regressions of jumbo loan origination shares on stress test episodes

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 1 quarter | 2 quarters | 3 quarters | 4 quarters |
| SCAP 2009 | −1.058* | −0.291 | 0.055 | 0.071 |
| | (−1.912) | (−0.324) | (0.081) | (0.115) |
| Below median × SCAP 2009 | 1.902 | 0.997 | 0.524 | −0.307 |
| | (1.488) | (0.631) | (0.344) | (−0.191) |
| CCAR 2011 | 0.375 | 0.105 | −0.074 | −0.106 |
| | (0.862) | (0.233) | (−0.173) | (−0.200) |
| Below median × CCAR 2011 | −2.580*** | −1.838* | −1.545* | −1.399 |
| | (−4.592) | (−1.672) | (−1.848) | (−1.481) |
| CCAR 2012 | 0.443 | 0.361 | 0.765 | 0.582 |
| | (0.732) | (0.399) | (1.444) | (0.546) |
| Below median × CCAR 2012 | −0.686 | −0.421 | −1.048 | −1.273* |
| | (−0.981) | (−0.554) | (−1.425) | (−1.651) |
| CCAR 2013 | −0.502 | −0.345 | −0.268 | −0.891 |
| | (−1.258) | (−0.503) | (−0.654) | (−0.773) |
| Below median × CCAR 2013 | 0.218 | 0.298 | 0.595 | 0.830 |
| | (0.470) | (0.640) | (0.943) | (1.103) |
| CCAR 2014 | −0.469 | −0.496 | −0.513* | −1.325 |
| | (−0.958) | (−1.481) | (−1.797) | (−0.874) |
| Below median × CCAR 2014 | 0.224 | 0.577 | 0.683 | 0.552 |
| | (0.370) | (1.114) | (0.976) | (0.419) |
| Lagged TCE ratio | −0.291 | −0.303 | −0.352* | −0.384** |
| | (−1.607) | (−1.574) | (−1.959) | (−2.236) |
| Lagged log(total assets) | −5.053 | −5.569 | −4.777 | −3.519 |
| | (−0.923) | (−0.940) | (−0.760) | (−0.568) |
| Growth in house prices | 0.072 | 0.061 | 0.040 | 0.030 |
| | (1.160) | (0.690) | (0.870) | (0.568) |
| Unemployment rate | −0.396 | −0.370 | −0.315 | −0.242 |
| | (−1.582) | (−0.769) | (−1.404) | (−0.818) |
| Growth in per capita GSP | −0.043 | −0.025 | −0.018 | −0.055 |
| | (−0.618) | (−0.260) | (−0.226) | (−0.731) |
| Num. of observations | 3120 | 3120 | 3120 | 3120 |
| R-sq. overall | 0.87 | 0.87 | 0.87 | 0.87 |

Note: The dependent variable is each CCAR bank's share of jumbo mortgage originations relative to all banks and nonbanks in a given state. CCAR banks are restricted to always having a non-zero share of originations in a given state. There are 10 CCAR banks operating in 33 states in this sample. Jumbo loans are defined as mortgages with principals above the $417,000 loan limit. In Alaska and Hawaii, the limit is $625,500. Below median indicates CCAR banks that had SCAP or CCAR results worse than the median of the 10 banks. Column (1) assumes various SCAP and CCAR Stress Tests have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The SCAR effect begins in 2009:Q2, while the CCAR effects begin in Q1 of each year (besides 2009). TCE ratio stands for the tangible common equity ratio. The sample period is from 2009:Q1 to 2014:Q4. Regressors not shown are CCAR-bank-state fixed effects and quadratic CCAR-bank-state specific time trends. Robust standard errors are double clustered by bank-state and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$ .

Table 6: CCAR-bank-state-level regressions of jumbo loan origination shares on stress test episodes

| | (1) 1 quarter | (2) 2 quarters | (3) 3 quarters | (4) 4 quarters |
|---|---|---|---|---|
| SCAP 2009 | 1.261 | 0.235 | 0.284 | −0.741 |
| | (0.533) | (0.084) | (0.102) | (−0.261) |
| Lagged TCE ratio × SCAP 2009 | −0.202 | 0.005 | 0.008 | 0.085 |
| | (−0.580) | (0.013) | (0.022) | (0.247) |
| CCAR 2011 | −7.199*** | −6.638*** | −6.752*** | −5.174* |
| | (−3.416) | (−2.801) | (−2.961) | (−1.785) |
| Lagged TCE ratio × CCAR 2011 | 0.683*** | 0.632*** | 0.638*** | 0.481 |
| | (3.143) | (2.778) | (2.683) | (1.459) |
| CCAR 2012 | 3.074* | 2.461* | 1.549 | 2.205 |
| | (1.858) | (1.918) | (0.939) | (0.747) |
| Lagged TCE ratio × CCAR 2012 | −0.300* | −0.231* | −0.126 | −0.202 |
| | (−1.811) | (−1.703) | (−0.766) | (−0.666) |
| CCAR 2013 | −1.123 | −2.816 | −1.797 | 1.124 |
| | (−0.658) | (−1.143) | (−0.636) | (0.230) |
| Lagged TCE ratio × CCAR 2013 | 0.077 | 0.264 | 0.192 | −0.119 |
| | (0.474) | (0.992) | (0.777) | (−0.240) |
| CCAR 2014 | 0.676 | −0.162 | −0.668 | 2.185 |
| | (0.664) | (−0.063) | (−0.344) | (0.453) |
| Lagged TCE ratio × CCAR 2014 | −0.087 | 0.011 | 0.062 | −0.267 |
| | (−1.043) | (0.042) | (0.292) | (−0.621) |
| Lagged TCE ratio | −0.282* | −0.262 | −0.289 | −0.287 |
| | (−1.788) | (−1.614) | (−1.613) | (−1.113) |
| Lagged log(total assets) | −4.855 | −5.355 | −5.487 | −5.000 |
| | (−0.937) | (−1.007) | (−1.025) | (−0.876) |
| Growth in house prices | 0.072 | 0.060 | 0.038 | 0.032 |
| | (1.165) | (0.728) | (0.611) | (0.428) |
| Unemployment rate | −0.390 | −0.368 | −0.314 | −0.227 |
| | (−1.446) | (−0.944) | (−0.865) | (−0.791) |
| Growth in per capita GSP | −0.042 | −0.022 | −0.017 | −0.054 |
| | (−0.525) | (−0.222) | (−0.153) | (−0.663) |
| Num. of observations | 3120 | 3120 | 3120 | 3120 |
| R-squared | 0.87 | 0.87 | 0.87 | 0.87 |

Note: The dependent variable is each CCAR bank's share of jumbo mortgage originations relative to all banks and nonbanks in a given state. CCAR banks are restricted to always having a non-zero share of originations in a given state. There are 10 CCAR banks operating in 33 states in this sample. Jumbo loans are defined as mortgages with principals above the $417,000 loan limit. In Alaska and Hawaii, the limit is $625,500. Column (1) assumes various SCAP and CCAR Stress Tests have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The SCAR effect begins in 2009:Q2, while the CCAR effects begin in Q1 of each year (besides 2009). TCE ratio stands for the tangible common equity ratio. The sample period is from 2009:Q1 to 2014:Q4. Regressors not shown are CCAR-bank-state fixed effects and quadratic CCAR-bank-state specific time trends. Robust standard errors are double clustered by bank-state and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$ .

Table 7: CCAR-bank-state-level regressions of approval rates of jumbo loan applications on stress test episodes

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 1 quarter | 2 quarters | 3 quarters | 4 quarters |
| SCAP 2009 | −1.393 | −3.905 | −3.453 | −5.995 |
| | (−0.235) | (−0.664) | (−0.604) | (−1.039) |
| Lagged TCE ratio × SCAP 2009 | 0.364 | 0.989 | 0.654 | 0.797 |
| | (0.380) | (1.100) | (0.755) | (0.914) |
| CCAR 2011 | −25.035* | −23.737** | −33.005*** | −35.311*** |
| | (−1.829) | (−2.165) | (−2.941) | (−3.112) |
| Lagged TCE ratio × CCAR 2011 | 2.777* | 2.323* | 3.280*** | 3.872*** |
| | (1.872) | (1.832) | (2.649) | (2.888) |
| CCAR 2012 | 12.808 | 0.230 | −6.365 | −6.027 |
| | (1.367) | (0.022) | (−0.715) | (−0.482) |
| Lagged TCE ratio × CCAR 2012 | −1.204 | −0.033 | 0.553 | 0.963 |
| | (−1.266) | (−0.029) | (0.614) | (0.744) |
| CCAR 2013 | 17.787** | 7.297 | 4.877 | 15.122 |
| | (1.980) | (0.568) | (0.450) | (0.685) |
| Lagged TCE ratio × CCAR 2013 | −1.755** | −0.788 | −0.479 | −0.997 |
| | (−2.002) | (−0.604) | (−0.477) | (−0.553) |
| CCAR 2014 | 5.872 | 6.086 | 0.235 | 15.444 |
| | (0.975) | (0.998) | (0.028) | (0.580) |
| Lagged TCE ratio × CCAR 2014 | −0.550 | −0.714 | −0.130 | −1.042 |
| | (−1.035) | (−1.293) | (−0.179) | (−0.553) |
| Lagged TCE ratio | −0.305 | −0.159 | −0.564 | −0.583 |
| | (−0.309) | (−0.149) | (−0.591) | (−0.552) |
| Lagged log(total assets) | −42.188*** | −43.036*** | −40.316*** | −35.507** |
| | (−2.773) | (−2.812) | (−2.900) | (−2.228) |
| Growth in house prices | 0.057 | −0.007 | −0.104 | −0.072 |
| | (0.381) | (−0.046) | (−0.761) | (−0.447) |
| Unemployment rate | 0.714 | 0.911 | 0.945 | 1.573 |
| | (1.003) | (1.232) | (1.291) | (1.428) |
| Growth in per capita GSP | −0.384 | −0.271 | −0.327 | −0.339 |
| | (−1.464) | (−1.116) | (−1.195) | (−1.130) |
| Num. of observations | 3120 | 3120 | 3120 | 3120 |
| R-squared | 0.58 | 0.58 | 0.58 | 0.58 |

Note: The dependent variable is each CCAR bank's approval rates of jumbo mortgage applications in a given state. CCAR banks are restricted to always having a non-zero share of originations in a given state. There are 10 CCAR banks operating in 33 states in this sample. Jumbo loans are defined as mortgages with principals above the$417,000 loan limit. In Alaska and Hawaii, the limit is $625,500. Column (1) assumes various SCAP and CCAR Stress Tests have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The SCAR effect begins in 2009:Q2, while the CCAR effects begin in Q1 of each year (besides 2009). TCE ratio stands for the tangible common equity ratio. The sample period is from 2009:Q1 to 2014:Q4. Regressors not shown are CCAR-bank-state fixed effects, quadratic CCAR-bank-state specific time trends, and state-specific quarterly dummies. Robust standard errors are clustered by time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$.

Table 8: Summary statistics for speculative-grade syndicated term-loan origination shares (in percent)

| | Observations | Mean | Median | Std.Dev. | Min | Max |
|---|---|---|---|---|---|---|
| Banks | 3920 | 71.2 | 95.5 | 36.7 | 0 | 100 |
| U.S. Banks | 2140 | 76.1 | 100.0 | 33.7 | 0 | 100 |
| Non-U.S. Banks | 1780 | 65.3 | 82.9 | 39.2 | 0 | 100 |
| Nonbanks | 52792 | 97.1 | 100.0 | 13.6 | 0 | 100 |

Note: Summary statistics are for all lender-quarter observations from 2009:Q4 to 2015:Q3 in the Shared National Credit Program.

Table 9: Speculative-grade syndicated term-loan origination shares (in percent)–most active lenders

| | Observations | Mean | Median | Std.Dev. | Min | Max |
|---|---|---|---|---|---|---|
| Banks | 960 | 65.5 | 66.3 | 24.4 | 0 | 100 |
| U.S. Banks | 543 | 67.3 | 67.2 | 22.5 | 0 | 100 |
| Non-U.S. Banks | 417 | 63.1 | 62.8 | 26.6 | 0 | 100 |
| Nonbanks | 2040 | 96.0 | 100.0 | 11.6 | 0 | 100 |

Note: Summary statistics are for lender-quarter observations restricted to having at least one syndicated loan origiantion in every period from 2009:Q4 to 2015:Q3 in the Shared National Credit Program.

Table 10: Summary statistics for macro and financial variables from 2009:Q4 to 2015:Q3 (in percent)

| | Mean | Median | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| 10 year U.S. Treasury Rate | 2.53 | 2.46 | 0.61 | 1.64 | 3.72 |
| CDX Index | 4.67 | 4.44 | 1.21 | 3.22 | 7.26 |
| High yield bond spread | 7.14 | 6.88 | 0.98 | 6.05 | 9.46 |
| Sovereign spread | 4.06 | 4.18 | 1.32 | 1.52 | 6.42 |
| S&P 500 VIX | 18.30 | 16.66 | 5.15 | 12.74 | 30.58 |
| Junk bond appetite | 38.71 | 40.03 | 6.91 | 23.43 | 50.87 |
| Inflation expectations | 3.10 | 3.12 | 0.37 | 2.54 | 4.17 |

Note: Summary statistics are for macro and financial variables from 2009:Q4 to 2015:Q3. Sovereign spread is Italian bond spread over German 10-year bonds. Junk bond appetite is the share of noninvestment-grade bond issuance as a share of total bond issuance in the U.S.

Table 11: Regressions of speculative-grade syndicated loan originations on IGLL and FAQ periods

| | (1) 1 quarter | (2) 2 quarters | (3) 3 quarters | (4) 4 quarters |
|---|---|---|---|---|
| Bank × IGLL | 16.853*** | 2.438 | −4.277 | −4.509 |
| | (4.544) | (0.473) | (−1.182) | (−0.792) |
| Nonbank × IGLL | 1.893 | 2.169 | 3.936 | 9.725* |
| | (0.666) | (0.707) | (0.779) | (1.831) |
| Bank ×FAQ | −17.345*** | −16.974*** | −15.596*** | −25.613*** |
| | (−4.860) | (−3.983) | (−3.340) | (−3.364) |
| Nonbank × FAQ | 0.907 | 1.642 | 1.524 | 0.118 |
| | (0.309) | (0.488) | (0.827) | (0.025) |
| Bank × 10-year U.S. Treasury rate | 24.214*** | 5.225 | −1.335 | −10.668 |
| | (4.556) | (0.684) | (−0.164) | (−0.764) |
| Nonbank × 10-year U.S. Treasury rate | 2.179 | 3.459 | 5.867 | 10.196 |
| | (0.366) | (0.572) | (0.741) | (0.942) |
| Bank × High yield bond spread | −14.725** | −1.437 | 6.518 | 18.720 |
| | (−2.342) | (−0.182) | (0.702) | (1.198) |
| Nonbank × High yield bond spread | −5.690** | −5.879** | −3.134 | −5.725 |
| | (−2.691) | (−2.476) | (−1.064) | (−1.453) |
| Bank × Sovereign bond spread | −5.690** | −5.879** | −3.134 | −5.725 |
| | (−2.691) | (−2.476) | (−1.064) | (−1.453) |
| Nonbank × Sovereign spread | −2.409* | −2.455 | −3.711 | −8.231** |
| | (−1.783) | (−1.304) | (−1.381) | (−2.386) |
| Bank × VIX | −0.896* | −0.056 | −0.057 | −0.424 |
| | (−1.901) | (−0.119) | (−0.110) | (−0.981) |
| Nonbank × VIX | −1.351* | −1.397* | −1.414* | −1.703** |
| | (−1.941) | (−1.914) | (−2.014) | (−2.447) |
| Bank × Junk bond appetite | −0.727** | −0.335 | −0.530 | −1.253** |
| | (−2.256) | (−1.020) | (−1.439) | (−2.766) |
| Nonbank × Junk bond appetite | −0.227 | −0.249 | −0.201 | −0.090 |
| | (−0.691) | (−0.748) | (−0.698) | (−0.243) |
| Num. of observations | 56712 | 56712 | 56712 | 56712 |
| R-squared | 0.43 | 0.43 | 0.43 | 0.44 |

Note: The dependent variable is each financial institution's dollar share of speculative-grade syndicated loan originations. Sample is restricted to institutions having to have at least one loan origination in a given quarter. IGLL is the Interagency Guidance on Leveraged Lending and FAQ is the Frequently Asked Questions documentation. Column (1) assumes IGLL and FAQ have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The IGLL effect begins in 2013:Q2, while the FAQ effects begin in 2014:Q4. Sovereign spread is Italian bond spread over German 10-year bonds. Junk bond appetite is the share of noninvestment-grade bond issuance as a share of total bond issuance in the U.S. The sample period is from 2009:Q4 to 2015:Q3. Regressors not shown are lender fixed effects, lender-type quarterly dummies, lender-type × CDX Index, and lender-type × inflation expectations. Robust standard errors are double clustered by financial firm and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$ .

Table 12: Regressions of speculative-grade syndicated loan originations for most active lenders

| | (1) 1 quarter | (2) 2 quarters | (3) 3 quarters | (4) 4 quarters |
|---|---|---|---|---|
| Bank × IGLL | 22.981*** | 3.015 | −9.116 | −6.921 |
| | (3.566) | (0.364) | (−1.516) | (−1.162) |
| Nonbank × IGLL | 2.971 | 3.587 | 7.392 | 13.557* |
| | (0.759) | (0.910) | (1.052) | (2.052) |
| Bank × FAQ | −15.476*** | −21.049*** | −19.528*** | −36.543*** |
| | (−3.305) | (−3.668) | (−2.869) | (−4.335) |
| Nonbank × FAQ | 3.236 | 3.427 | 2.968 | −0.500 |
| | (0.813) | (0.686) | (0.926) | (−0.085) |
| Bank × 10-year U.S. Treasury rate | 30.671** | 4.642 | −7.085 | −21.662 |
| | (2.581) | (0.428) | (−0.700) | (−1.467) |
| Nonbank × 10-year U.S. Treasury T rate | 2.693 | 5.701 | 9.984 | 12.938 |
| | (0.399) | (0.846) | (1.063) | (1.296) |
| Bank × High yield bond spread | −15.548 | 4.362 | 18.681* | 35.898** |
| | (−1.160) | (0.386) | (1.738) | (2.211) |
| Nonbank × High yield bond spread | −0.976 | −3.638 | −9.327 | −14.883 |
| | (−0.119) | (−0.469) | (−0.913) | (−1.308) |
| Bank × Sovereign spread | −3.897 | −4.452 | 0.638 | −4.804 |
| | (−1.103) | (−1.294) | (0.155) | (−0.916) |
| Nonbank × Sovereign spread | −2.578 | −2.700 | −5.264 | −10.735** |
| | (−1.397) | (−0.999) | (−1.445) | (−2.469) |
| Bank × VIX | −1.362* | −0.358 | −0.272 | −0.662 |
| | (−1.946) | (−0.535) | (−0.372) | (−1.093) |
| Nonbank × VIX | −1.160* | −1.244* | −1.309** | −1.567** |
| | (−1.993) | (−1.953) | (−2.123) | (−2.697) |
| Bank × Junk bond appetite | −0.505 | −0.135 | −0.405 | −1.392** |
| | (−1.097) | (−0.278) | (−0.735) | (−2.488) |
| Nonbank × Junk bond appetite | −0.231 | −0.268 | −0.168 | −0.046 |
| | (−0.497) | (−0.559) | (−0.421) | (−0.100) |
| Num. of observations | 3000 | 3000 | 3000 | 3000 |
| R-squared | 0.60 | 0.60 | 0.60 | 0.61 |

Note: The dependent variable is each financial institution's dollar share of speculative-grade syndicated loan originations. Sample is restricted to institutions having to have at least one loan origination in every quarter. IGLL is the Interagency Guidance on Leveraged Lending and FAQ is the Frequently Asked Questions documentation. Column (1) assumes IGLL and FAQ have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The IGLL effect begins in 2013:Q2, while the FAQ effects begin in 2014:Q4. Sovereign spread is Italian bond spread over German 10-year bonds. Junk bond appetite is the share of noninvestment-grade bond issuance as a share of total bond issuance in the U.S. The sample period is from 2009:Q4 to 2015:Q3. Regressors not shown are lender fixed effects, lender-type quarterly dummies, lender-type × CDX Index, and lender-type × inflation expectations. Robust standard errors are double clustered by financial firm and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$ .

Table 13: Regressions of speculative-grade syndicated loan originations on IGLL and FAQ periods

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 1 quarter | 2 quarters | 3 quarters | 4 quarters |
| US bank × IGLL | 12.591*** | 4.365 | −0.819 | −0.495 |
| | (3.487) | (0.990) | (−0.231) | (−0.112) |
| Foreign bank × IGLL | 23.408*** | 1.419 | −7.995 | −9.782 |
| | (4.058) | (0.189) | (−1.431) | (−1.179) |
| Nonbank × IGLL | 1.894 | 2.171 | 3.939 | 9.729* |
| | (0.666) | (0.707) | (0.780) | (1.830) |
| US bank × FAQ | −4.791 | −7.403* | −5.818 | −15.067** |
| | (−1.457) | (−1.840) | (−1.605) | (−2.483) |
| Foreign bank × FAQ | −30.680*** | −28.221*** | −27.192*** | −39.486*** |
| | (−5.730) | (−3.675) | (−4.022) | (−3.393) |
| Nonbank × FAQ | 0.906 | 1.644 | 1.527 | 0.135 |
| | (0.308) | (0.488) | (0.827) | (0.029) |
| US bank × 10-year U.S. Treasury rate | 26.397*** | 15.403** | 12.043 | 3.343 |
| | (4.646) | (2.121) | (1.460) | (0.278) |
| Foreign bank × 10-year U.S. Treasury rate | 23.482*** | −5.892 | −17.111 | −28.234 |
| | (3.202) | (−0.608) | (−1.696) | (−1.600) |
| Nonbank × 10-year U.S. Treasury rate | 2.196 | 3.480 | 5.899 | 10.248 |
| | (0.369) | (0.576) | (0.746) | (0.946) |
| US bank × High yield bond spread | −14.123** | −6.151 | −2.276 | 7.323 |
| | (−2.205) | (−0.791) | (−0.246) | (0.546) |
| Foreign bank × High yield bond spread | −16.934* | 3.454 | 17.049 | 33.509* |
| | (−2.033) | (0.363) | (1.523) | (1.730) |
| Nonbank × High yield bond spread | 0.076 | −1.047 | −4.208 | −10.512 |
| | (0.012) | (−0.161) | (−0.492) | (−0.877) |
| US bank × Sovereign spread | −1.054 | −1.510 | 0.292 | −2.462 |
| | (−0.555) | (−0.610) | (0.112) | (−0.702) |
| Foreign bank × Sovereign spread | −10.612*** | −10.729** | −6.516 | −8.995* |
| | (−3.280) | (−2.636) | (−1.450) | (−1.739) |
| Nonbank × Sovereign spread | −2.409* | −2.455 | −3.713 | −8.230** |
| | (−1.768) | (−1.303) | (−1.379) | (−2.377) |
| US bank × VIX | −0.696 | −0.222 | −0.200 | −0.370 |
| | (−1.380) | (−0.489) | (−0.420) | (−0.879) |
| Foreign bank × VIX | −1.075* | 0.191 | 0.189 | −0.408 |
| | (−1.843) | (0.286) | (0.276) | (−0.703) |
| Nonbank × VIX | −1.351* | −1.397* | −1.414* | −1.703** |
| | (−1.914) | (−1.901) | (−1.972) | (−2.369) |
| US bank × Junk bond appetite | −0.964** | −0.788** | −0.831** | −1.261*** |
| | (−2.755) | (−2.160) | (−2.242) | (−2.863) |
| Foreign bank × Junk bond appetite | −0.497 | 0.150 | −0.227 | −1.326** |
| | (−1.228) | (0.337) | (−0.495) | (−2.180) |
| Nonbank × Junk bond appetite | −0.227 | −0.249 | −0.200 | −0.089 |
| | (−0.683) | (−0.744) | (−0.694) | (−0.239) |
| Num. of observations | 56712 | 56712 | 56712 | 56712 |
| R-squared | 0.43 | 0.43 | 0.43 | 0.44 |

Note: The dependent variable is each financial institution's dollar share of speculative-grade syndicated loan originations. Sample is restricted to institutions having to have at least one loan origination in a given quarter. IGLL is the Interagency Guidance on Leveraged Lending and FAQ is the Frequently Asked Questions documentation. Column (1) assumes IGLL and FAQ have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The IGLL effect begins in 2013:Q2, while the FAQ effects begin in 2014:Q4. Sovereign spread is Italian bond spread over German 10-year bonds. Junk bond appetite is the share of noninvestment-grade bond issuance as a share of total bond issuance in the U.S. The sample period is from 2009:Q4 to 2015:Q3. Regressors not shown are lender fixed effects, lender-type quarterly dummies, lender-type × CDX Index, and lender-type × inflation expectations. Robust standard errors are double clustered by financial firm and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$ .

Table 14: Regressions of speculative-grade syndicated loan originations for most active lenders

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 1 quarter | 2 quarters | 3 quarters | 4 quarters |
| US bank × IGLL | 22.141*** | 5.601 | −5.035 | −3.220 |
| | (3.488) | (0.723) | (−0.808) | (−0.564) |
| Foreign bank × IGLL | 24.379*** | −0.409 | −14.470* | −11.877 |
| | (2.996) | (−0.042) | (−2.055) | (−1.637) |
| Nonbank × IGLL | 2.971 | 3.587 | 7.392 | 13.557* |
| | (0.755) | (0.897) | (1.049) | (2.036) |
| US bank × FAQ | −14.216*** | −19.336*** | −18.773** | −36.598*** |
| | (−2.905) | (−3.199) | (−2.606) | (−4.601) |
| Foreign bank × FAQ | −17.490*** | −23.541*** | −20.830*** | −36.430*** |
| | (−2.982) | (−3.333) | (−2.836) | (−3.412) |
| Nonbank × FAQ | 3.236 | 3.427 | 2.968 | −0.500 |
| | (0.811) | (0.683) | (0.882) | (−0.083) |
| US bank × 10-year U.S. Treasury rate | 32.899*** | 9.537 | −0.955 | −15.569 |
| | (2.849) | (0.934) | (−0.098) | (−1.137) |
| Foreign bank × 10-year U.S. Treasury rate | 28.666** | −1.342 | −14.731 | −29.033* |
| | (2.179) | (−0.113) | (−1.305) | (−1.769) |
| Nonbank × 10-year U.S. Treasury rate | 2.693 | 5.701 | 9.984 | 12.938 |
| | (0.398) | (0.842) | (1.061) | (1.289) |
| US bank × High yield bond spread | −17.007 | 0.768 | 13.018 | 29.755* |
| | (−1.342) | (0.069) | (1.194) | (1.950) |
| Foreign bank × High yield bond spread | −14.418 | 8.687 | 25.715** | 43.505** |
| | (−0.978) | (0.750) | (2.356) | (2.444) |
| Nonbank × High yield spread | −0.976 | −3.638 | −9.327 | −14.883 |
| | (−0.119) | (−0.468) | (−0.910) | (−1.302) |
| US bank × Sovereign spread | −4.067 | −5.183 | −1.460 | −7.450 |
| | (−1.396) | (−1.632) | (−0.336) | (−1.517) |
| Foreign bank × Sovereign spread | −3.919 | −3.702 | 3.105 | −1.413 |
| | (−0.799) | (−0.797) | (0.700) | (−0.226) |
| Nonbank × Sovereign spread | −2.578 | −2.700 | −5.264 | −10.735** |
| | (−1.387) | (−0.997) | (−1.438) | (−2.430) |
| US bank × VIX | −1.256* | −0.365 | −0.293 | −0.710 |
| | (−1.789) | (−0.562) | (−0.392) | (−1.127) |
| Foreign bank × VIX | −1.566* | −0.392 | −0.293 | −0.644 |
| | (−2.043) | (−0.480) | (−0.354) | (−0.871) |
| Nonbank × VIX | −1.160* | −1.244* | −1.309* | −1.567** |
| | (−1.907) | (−1.922) | (−2.003) | (−2.649) |
| US bank × Junk bond appetite | −0.539 | −0.221 | −0.443 | −1.387** |
| | (−1.126) | (−0.461) | (−0.779) | (−2.394) |
| Foreign bank × Junk bond appetite | −0.463 | −0.017 | −0.350 | −1.399* |
| | (−0.834) | (−0.028) | (−0.536) | (−1.997) |
| Nonbank × Junk bond appetite | −0.231 | −0.268 | −0.168 | −0.046 |
| | (−0.494) | (−0.553) | (−0.408) | (−0.098) |
| Num. of observations | 3000 | 3000 | 3000 | 3000 |
| R-squared | 0.61 | 0.61 | 0.61 | 0.62 |

Note: The dependent variable is each financial institution's dollar share of speculative-grade syndicated loan originations. Sample is restricted to institutions having to have at least one loan origination in every quarter. IGLL is the Interagency Guidance on Leveraged Lending and FAQ is the Frequently Asked Questions documentation. Column (1) assumes IGLL and FAQ have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The IGLL effect begins in 2013:Q2, while the FAQ effects begin in 2014:Q4. Sovereign spread is Italian bond spread over German 10-year bonds. Junk bond appetite is the share of noninvestment-grade bond issuance as a share of total bond issuance in the U.S. The sample period is from 2009:Q4 to 2015:Q3. Regressors not shown are lender fixed effects, lender-type quarterly dummies, lender-type × CDX Index, and lender-type × inflation expectations. Robust standard errors are double clustered by fiinancial firm and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$ .

Table 15: Regressions of speculative-grade syndicated loan originations on IGLL and FAQ periods

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 1 quarter | 2 quarters | 3 quarters | 4 quarters |
| CCAR bank × IGLL | 18.130*** | 0.261 | −7.824 | −9.146 |
| | (2.905) | (0.034) | (−1.447) | (−1.474) |
| Non CCAR bank × IGLL | 16.022*** | 2.736 | −3.443 | −3.232 |
| | (4.629) | (0.587) | (−0.986) | (−0.531) |
| Nonbank × IGLL | 1.898 | 2.174 | 3.948 | 9.741* |
| | (0.663) | (0.706) | (0.780) | (1.825) |
| CCAR bank × FAQ | −12.198** | −15.553*** | −13.309* | −32.232*** |
| | (−2.718) | (−2.971) | (−1.857) | (−4.046) |
| Non CCAR bank × FAQ | −18.335*** | −17.155*** | −16.031*** | −24.318*** |
| | (−5.160) | (−3.904) | (−3.640) | (−3.060) |
| Nonbank × FAQ | 0.905 | 1.652 | 1.532 | 0.180 |
| | (0.306) | (0.490) | (0.814) | (0.038) |
| CCAR bank × 10-year U.S. Treasury rate | 28.076** | 6.592 | −0.977 | −20.058 |
| | (2.465) | (0.606) | (−0.090) | (−1.283) |
| Non CCAR bank × 10-year U.S. Treasury rate | 21.807*** | 3.559 | −2.658 | −10.160 |
| | (4.144) | (0.471) | (−0.330) | (−0.706) |
| Nonbank × 10-year U.S. Treasury rate | 2.241 | 3.548 | 5.972 | 10.383 |
| | (0.374) | (0.584) | (0.751) | (0.955) |
| CCAR bank × High yield bond spread | −12.554 | 4.331 | 14.174 | 35.726** |
| | (−0.999) | (0.388) | (1.261) | (2.117) |
| Non CCAR bank × High yield bond spread | −14.246** | −1.804 | 5.596 | 15.994 |
| | (−2.447) | (−0.237) | (0.612) | (0.990) |
| Nonbank × High yield bond spread | 0.024 | −1.123 | −4.291 | −10.663 |
| | (0.004) | (−0.172) | (−0.500) | (−0.887) |
| CCAR bank × Sovereign spread | −3.967 | −3.638 | 0.347 | −3.351 |
| | (−1.310) | (−1.226) | (0.086) | (−0.648) |
| Non CCAR bank × Sovereign spread | −5.815*** | −6.146** | −3.774 | −6.300 |
| | (−2.811) | (−2.463) | (−1.345) | (−1.541) |
| Nonbank × Sovereign spread | −2.410* | −2.454 | −3.716 | −8.226** |
| | (−1.769) | (−1.292) | (−1.375) | (−2.362) |
| CCAR bank × VIX | −1.003 | −0.204 | −0.177 | −0.311 |
| | (−1.160) | (−0.246) | (−0.208) | (−0.443) |
| Non CCAR bank × VIX | −0.815* | 0.016 | 0.006 | −0.420 |
| | (−1.721) | (0.032) | (0.010) | (−0.846) |
| Nonbank × VIX | −1.350* | −1.397* | −1.414* | −1.703** |
| | (−1.908) | (−1.906) | (−1.985) | (−2.426) |
| CCAR bank × Junk bond appetite | −0.487 | −0.189 | −0.397 | −1.334** |
| | (−0.858) | (−0.347) | (−0.677) | (−2.146) |
| Non CCAR bank × Junk bond appetite | −0.790** | −0.387 | −0.581 | −1.258** |
| | (−2.535) | (−1.225) | (−1.634) | (−2.785) |
| Nonbank × Junk bond appetite | −0.227 | −0.248 | −0.200 | −0.087 |
| | (−0.684) | (−0.729) | (−0.675) | (−0.233) |
| Num. of observations | 56712 | 56712 | 56712 | 56712 |
| R-squared | 0.43 | 0.43 | 0.43 | 0.44 |

Note: The dependent variable is each financial institution's dollar share of speculative-grade syndicated loan originations. Sample is restricted to institutions having to have at least one loan origination in a given quarter. IGLL is the Interagency Guidance on Leveraged Lending and FAQ is the Frequently Asked Questions documentation. Column (1) assumes IGLL and FAQ have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The IGLL effect begins in 2013:Q2, while the FAQ effects begin in 2014:Q4. Sovereign spread is Italian bond spread over German 10-year bonds. Junk bond appetite is the share of noninvestment-grade bond issuance as a share of total bond issuance in the U.S. The sample period is from 2009:Q4 to 2015:Q3. Regressors not shown are lender fixed effects, lender-type quarterly dummies, lender-type × CDX Index, and lender-type × inflation expectations. Robust standard errors are double clustered by financial firm and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$ .

Table 16: Regressions of speculative-grade syndicated loan originations for most active lenders

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 1 quarter | 2 quarters | 3 quarters | 4 quarters |
| CCAR bank × IGLL | 21.566*** | 2.112 | −8.964 | −7.031 |
| | (3.315) | (0.253) | (−1.512) | (−1.108) |
| Non CCAR bank × IGLL | 25.105*** | 4.369 | −9.342 | −6.757 |
| | (3.224) | (0.515) | (−1.294) | (−0.940) |
| Nonbank × IGLL | 2.971 | 3.587 | 7.392 | 13.557* |
| | (0.747) | (0.894) | (1.045) | (2.002) |
| CCAR bank × FAQ | −12.817** | −18.026*** | −16.990** | −34.295*** |
| | (−2.621) | (−3.054) | (−2.473) | (−4.169) |
| Non CCAR bank × FAQ | −19.465*** | −25.584*** | −23.334*** | −39.915*** |
| | (−3.630) | (−4.006) | (−3.185) | (−3.919) |
| Nonbank × FAQ | 3.236 | 3.427 | 2.968 | −0.500 |
| | (0.801) | (0.683) | (0.913) | (−0.084) |
| CCAR bank × 10-year U.S. Treasury rate | 32.371** | 8.673 | −2.285 | −17.067 |
| | (2.640) | (0.758) | (−0.200) | (−1.101) |
| Non CCAR bank × 10-year U.S. Treasury rate | 28.121** | −1.404 | −14.286 | −28.554* |
| | (2.324) | (−0.126) | (−1.490) | (−1.794) |
| Nonbank × 10-year U.S. Treasury rate | 2.693 | 5.701 | 9.984 | 12.938 |
| | (0.393) | (0.835) | (1.051) | (1.280) |
| CCAR bank × High yield bond spread | −17.136 | 1.181 | 14.500 | 31.547* |
| | (−1.246) | (0.098) | (1.216) | (1.897) |
| Non CCAR bank × High yield bond spread | −13.166 | 9.132 | 24.953** | 42.426** |
| | (−0.965) | (0.819) | (2.401) | (2.292) |
| Nonbank × High yield spread | −0.976 | −3.638 | −9.327 | −14.883 |
| | (−0.118) | (−0.467) | (−0.904) | (−1.289) |
| CCAR bank × Sovereign spread | −3.902 | −4.018 | 0.704 | −4.563 |
| | (−1.099) | (−1.128) | (0.158) | (−0.808) |
| Non CCAR bank × Sovereign spread | −3.889 | −5.102 | 0.541 | −5.165 |
| | (−0.968) | (−1.300) | (0.131) | (−0.943) |
| Nonbank × Sovereign spread | −2.578 | −2.700 | −5.264 | −10.735** |
| | (−1.389) | (−0.996) | (−1.441) | (−2.422) |
| CCAR bank × VIX | −1.106 | −0.201 | −0.105 | −0.423 |
| | (−1.376) | (−0.252) | (−0.127) | (−0.617) |
| Non CCAR bank × VIX | −1.746** | −0.594 | −0.523 | −1.020 |
| | (−2.438) | (−0.818) | (−0.648) | (−1.278) |
| Nonbank × VIX | −1.160* | −1.244* | −1.309** | −1.567** |
| | (−1.929) | (−1.928) | (−2.074) | (−2.530) |
| CCAR bank × Junk bond appetite | −0.325 | 0.004 | −0.238 | −1.174* |
| | (−0.658) | (0.008) | (−0.424) | (−1.989) |
| Non CCAR bank × Junk bond appetite | −0.774 | −0.344 | −0.656 | −1.718** |
| | (−1.366) | (−0.541) | (−0.981) | (−2.444) |
| Nonbank × Junk bond appetite | −0.231 | −0.268 | −0.168 | −0.046 |
| | (−0.493) | (−0.552) | (−0.407) | (−0.099) |
| Num. of observations | 3000 | 3000 | 3000 | 3000 |
| R-squared | 0.61 | 0.60 | 0.61 | 0.62 |

Note: The dependent variable is each financial institution's dollar share of speculative-grade syndicated loan originations. Sample is restricted to institutions having to have at least one loan origination in every quarter. IGLL is the Interagency Guidance on Leveraged Lending and FAQ is the Frequently Asked Questions documentation. Column (1) assumes IGLL and FAQ have only an immediate 1 quarter effect, column (2) assumes the effects last for 2 quarters, column (3) 3 quarters, and column (4) 4 quarters. The IGLL effect begins in 2013:Q2, while the FAQ effects begin in 2014:Q4. Sovereign spread is Italian bond spread over German 10-year bonds. Junk bond appetite is the share of noninvestment-grade bond issuance as a share of total bond issuance in the U.S. The sample period is from 2009:Q4 to 2015:Q3. Regressors not shown are lender fixed effects, lender-type quarterly dummies, lender-type × CDX Index, and lender-type × inflation expectations. Robust standard errors are double clustered by fiinancial firm and time. $t$ statistics in parentheses. $^{*}$ $p < .1$, $^{**}$ $p < .05$, $^{***}$ $p < .01$ .