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Abstract

We study the effects of regulatory oversight by the Consumer Financial Protection Bureau (CFPB) on credit supply as well as bank risk-taking, growth, and operating costs. We use a difference-in-differences approach, making use of the fact that banks below a \$10 billion size cutoff are exempt from CFPB supervision and enforcement activities. We find little evidence that CFPB oversight significantly reduces the overall volume of mortgage lending. However, we find some evidence of changes in the composition of lending—CFPB-supervised banks originated fewer loans to risky borrowers, offset by an increase in large “jumbo” mortgages. We find no clear evidence of substitution in lending between bank and nonbank subsidiaries, or effects on asset growth or bank noninterest expenses.

Key words: consumer financial protection bureau, credit, mortgage, regulation

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1 Introduction

There has been a renewed focus on consumer financial protection in recent years, both in the U.S. and internationally, motivated by concerns that individuals are prone to deceptive and predatory practices by financial firms and make costly financial “mistakes” (e.g., [Campbell 2006](#)). [Campbell et al. \(2011\)](#) presents a case for why consumer financial protection regulation may improve welfare, for example due to externalities (e.g., the social costs of mortgage foreclosures), information asymmetries, or behavioral factors such as limited financial literacy. In practice, however, regulatory efforts to bolster consumer financial protection may be burdensome, costly, or have other significant unintended consequences.

This paper tests whether enhanced regulatory oversight of consumer financial protection law has significant effects on the supply of credit or on bank risk-taking and profitability. Our analysis focuses on the Consumer Financial Protection Bureau (CFPB), a U.S. regulatory agency established in 2011 focused specifically on consumer financial protection with broad authority over both banks and nonbanks. In addition to rule-making authority, the CFPB has the power to supervise and conduct examinations of financial firms, and to pursue enforcement actions for breaches of Federal consumer financial protection law. The CFPB has actively exercised its enforcement authority, completing more than 140 enforcement actions through June 2017, involving \$11.9 billion in consumer relief payments, as well as more than \$400m in civil money penalties.¹

Critics argue that the CFPB’s activities involve high compliance costs, increase uncertainty and legal risk, and ultimately raise costs and reduce the availability of financial services to consumers. For example, a recent report by the [U.S. Chamber of Commerce \(2018\)](#) argues that the CFPB relies excessively on “regulation by enforcement”, and criticizes a number of aspects of CFPB examinations. Reflecting concerns about the costs of regulation, legislation has been proposed to raise the asset size threshold below which depository institutions are exempt from CFPB supervision and enforcement activities (e.g., the Financial Regulatory Improvement Act of 2015, and the Consumer Financial Protection Bureau Examination and Reporting Threshold Act of 2017).

¹A prominent example is the \$100m civil money penalty assessed on Wells Fargo in September 2016 relating to the practice of opening deposit and credit card accounts without customer permission.

Despite the active policy debate, there has so far been little systematic evidence to evaluate the effects of CFPB supervision, examination and enforcement activities. The goal of this paper is to help fill this gap. Our identification strategy makes use of the fact that small depository institutions with less than \$10 billion in total assets are generally exempt from CFPB supervision and enforcement. Consumer protection oversight of these small banks instead falls to the firm’s prudential supervisor (e.g., the Office of the Comptroller of the Currency in the case of national banks and national savings associations). The primary mission of these prudential supervisors is safety and soundness rather than consumer financial protection. We use a difference-in-differences approach, examining outcomes before and after July 2011, when the CFPB begins operations, and comparing “treated” commercial banks and savings banks subject to CFPB supervision, examination and enforcement activities (which we refer to collectively as CFPB “oversight”) to smaller firms below the \$10 billion size threshold for CFPB oversight. We analyze loan-level mortgage lending outcomes using data collected under the Home Mortgage Disclosure Act (HMDA); we also study the growth and composition of bank balance sheets, and bank noninterest expenses.

We detect little evidence that CFPB oversight significantly reduces the overall volume of mortgage originations, or that affected banks reject a higher fraction of mortgage applications. We consider bank lenders in a narrow asset size window close to the \$10 billion size threshold.² In our preferred specification, the change in the market share of CFPB-supervised banks is slightly negative but not statistically significant; furthermore, based on our 95% confidence bounds, the share of lending *within* this narrow class of banks declines by no more than 1.6 percentage points. We also find no statistically significant effect of CFPB oversight on the probability that a mortgage application will be denied.

We do however find some evidence that CFPB oversight is associated with a shift in the *composition* of mortgage lending. In particular, we find a moderate reduction in the market share of CFPB-supervised banks for mortgages insured by the Federal Housing Administration (FHA). These loans tend to be made to lower-income borrowers with low downpayments and credit scores.

²Specifically, in our baseline specification we consider bank lenders with between \$1 billion and \$25 billion in assets as of June 30, 2011, just prior to the date when the CFPB begins operations. We also consider alternative asset size windows, as discussed in more detail in the body of the paper.

Our point estimate is 5-6 percentage points, statistically significant at the 1 percent level. There is also some evidence of a drop in lending to borrowers with no coapplicant, a characteristic that is associated with higher mortgage default risk. Offsetting these declines, there is an increase in supervised banks' origination of large loans in the "jumbo" segment of the mortgage market, where borrowers tend to have higher incomes.

This evidence provides some support for the view that heightened legal risk and regulatory scrutiny related to consumer financial protection has led to some "de-risking" of bank activities, and in particular, affected bank lending to riskier borrowers. Although FHA loans are guaranteed against default by the Federal government, mortgage lenders still view them as carrying significant legal risk, and also the risk that the FHA may not indemnify the lender against credit losses if the loan has been found to be incorrectly underwritten. We note more broadly that there has been significant substitution from banks to nonbanks in the FHA market, a trend which has been linked to regulatory factors (e.g., see [Buchak et al. 2017](#)) and which has attracted significant attention among policy makers and in the media.³

We also examine the effects of CFPB oversight on measures of compliance costs, such as the time it takes to process mortgages and banks' noninterest expense. With respect to processing times, we do not find a robust relation with CFPB oversight and greater processing times overall, although there is a marginally significant increase for FHA loans originated by CFPB-supervised banks. We find no evidence that CFPB supervision increases noninterest expense or its components; our point estimates are actually negative, although not statistically significant. Our estimates are quite imprecise, however, based on our measured confidence bounds. We also find no evidence that banks subject to CFPB oversight grow more slowly, although again our power is relatively low. We find some weak evidence of a shift from retail loans to other assets in terms of the composition of CFPB-supervised bank balance sheets.

In interpreting our results, it is important to keep in mind that there at least two other significant regulatory implications associated with banks or bank holding companies of crossing a \$10bn asset size threshold. First, bank holding companies (BHCs) above this threshold are subject to caps on

³For example see this recent article in the Wall Street Journal: <https://www.wsj.com/articles/the-mortgage-markets-1-trillion-pocket-of-worry-1484827201>.

debit interchange fees under the “Durbin amendment”. Research by [Kay et al. \(2014\)](#) find that these caps reduce fee income for banks subject to this cap. Second, BHCs above \$10bn in size are required under the Dodd Frank Act to conduct annual company-run stress tests. Although there are no direct regulatory outcomes tied to these stress tests for banking organizations with less than \$50 billion in assets, the requirement to conduct them likely at least involves some compliance costs, and may flag issues to supervisors.⁴

To isolate the effects of CFPB oversight from these other changes, we focus primarily on consumer lending outcomes, where CFPB supervision and enforcement is likely to be the dominant concern. We also take advantage of differences in the timing of the creation of the CFPB relative to the implementation of company-run stress tests. Specifically, the final rule related to stress testing of banking institutions with assets between \$10 billion and \$50 billion was not implemented until October 2013, whereas we focus on lending outcomes between 2009 and 2013.⁵ However to the extent that we cannot fully disentangle the effects of CFPB oversight, our results will reflect the joint effect of these different regulations, and thus represent an upper bound on the effect of CFPB supervision and enforcement activities. Furthermore, although focusing on banks within a relatively narrow asset size range (generally \$1bn-\$25bn) should maximize comparability of banks above and below the \$10bn cutoff, the effects we estimate are of course “local” effects for the set of banks in our sample, and it is possible that larger banks are either more or less sensitive to CFPB oversight than the banks in our sample.⁶

As an additional caveat, we emphasize that our study focuses only on a subset of the potential effects of the supervision and enforcement activities of the CFPB. In particular, we do not present any systematic evidence on the potential benefits for consumers of heightened regulatory oversight (e.g., a reduction in predatory lending). Thus, while our study adds to the body of knowledge about

⁴[Eisenbach et al. \(2016\)](#) do not find any obvious discontinuity in Federal Reserve supervisory hours or fees at \$10bn. [Morgan and Yang \(2016\)](#) find suggestive evidence of bunching in the size distribution of banks below the \$10bn threshold, suggesting that the overall regulatory requirements associated with crossing the threshold are costly. [Bouwman et al. \(2018\)](#) finds that banks below the \$10bn threshold grow more slowly, although as mentioned above we do not detect such effects for our sample (see Section 5).

⁵See <https://www.gpo.gov/fdsys/pkg/FR-2012-10-15/pdf/2012-25194.pdf>.

⁶For example, our results could be a lower bound of the overall effect if the CFPB disproportionately targeted supervision and enforcement efforts towards the largest banks. On the other hand, larger institutions may be able to more effectively manage the compliance costs of CFPB supervision due to scale economies.

the CFPB, our results do not speak to the overall net social benefits or costs of the regulator. Finally, we note that the CFPB has also engaged in significant rule-writing activities since its creation (e.g., the TILA-RESPA integrated disclosure rule, also known as TRID, or the qualified mortgage requirements), which apply to all lenders. Our results do not speak to the effects of these rules.

1.1 Related Literature

The analysis in this paper is related to a small literature on the causal effects of financial supervision. [Agarwal et al. \(2014\)](#) find that different regulators supervise banks inconsistently, exploiting the rotation of supervision across different regulators over time. [Hirtle et al. \(2016\)](#) study the impact of greater supervisory attention on bank holding companies (BHCs) based on whether a BHC is one of the largest in its headquarter's Federal Reserve District; they find that more closely supervised banks are less risky, particularly during industry downturns, but with no discernible impact on growth or profitability. [Eisenbach et al. \(2016\)](#) present a model and empirical evidence on the determinants of bank supervisory effort. Unlike these papers, we focus on the effects of consumer financial protection supervision and enforcement authority, rather than prudential supervision. Also related, papers such as [Calem et al. \(2017\)](#) and [Morris-Levenson et al. \(2017\)](#) study the effects of being subject to enhanced supervision and the Comprehensive Capital Analysis and Review (CCAR) which applies to BHCs with more than \$50 billion in assets. (Our analysis focuses entirely on banking organizations below this threshold.) [Bouwman et al. \(2018\)](#) study effects of the \$10 billion Dodd-Frank threshold but do not examine consumer lending outcomes or examine differences in outcomes before and after the creation of the CFPB in 2011.

Our analysis is also related to research examining the effects of individual laws or regulations designed primarily to strengthen consumer financial protection, such as anti-predatory-lending laws or the CARD Act (e.g., [Ho and Pennington-Cross 2006](#); [Melzer 2011](#); [Morgan et al. 2012](#); [Di Maggio and Kermani 2017](#); [Agarwal et al. 2015](#); [Debbaut et al. 2016](#)). Unlike these studies, which focus on specific laws, our focus is on the effects of the supervision and enforcement of a large body of existing consumer financial protection law.

Since one of the likely effects of CFPB oversight is greater exposure to legal enforcement actions, our study also relates to [Hartman-Glaser et al. \(2014\)](#). These authors argue that mortgage supply is reduced by legal risk due to “put-backs” when mortgages are sold to the government-sponsored enterprises Fannie Mae and Freddie Mac. Also related, [Gissler et al. \(2016\)](#) find evidence that regulatory uncertainty affects mortgage credit supply.

The results in this paper also relate to the broader literature on household finance and the costs and benefits of consumer financial protection. [Campbell et al. \(2011\)](#) lay out the case for why consumer financial protection regulations may improve welfare. A rapidly growing literature on household finance documents the propensity for individuals to make financial mistakes, and the ability of lenders to potentially exploit those (e.g., [Campbell 2006](#), [Woodward and Hall 2012](#), [Gurun et al. 2016](#)).

Although there has been little work directly on the impact of CFPB supervision and enforcement activities, a literature on the CFPB has developed, particularly by legal scholars—e.g., [Levitin \(2013\)](#) reviews the key powers of the CFPB. [DeFusco et al. \(2017\)](#) study the effects of one particular rule implemented by the CFPB, namely the “ability-to-repay/qualified mortgage” rules that were introduced in 2014. These rules apply to all lenders, even those not otherwise subject to CFPB supervision and enforcement. [Begley and Purnanandam \(2017\)](#) use the CFPB’s complaints database to study how the frequency of mortgage-related consumer complaints varies with income, education and minority shares in the local population.

2 Institutional Background and Sample Construction

2.1 Overview of the CFPB

The Consumer Financial Protection Bureau was created as part of the Dodd-Frank Wall Street Reform and Consumer Protection Act, which was signed into law in July 2010. Prior to the founding of the CFPB, Federal responsibility for regulation related to consumer financial protection was shared among a variety of different government departments and regulatory agencies, including prudential regulators such as the Federal Reserve and Office of the Comptroller of the Currency

(OCC) as well as the Department of Housing and Urban Development, Veterans Administration and Federal Trade Commission. Consumer finance is also subject to state-level regulation and enforcement, although these regulations have in some cases been subject to federal preemption (e.g., see [Di Maggio and Kermani 2017](#) in the context of predatory lending laws). [Warren \(2007\)](#) and [Levitin \(2013\)](#) argue that this fragmentation of responsibility led to weaker overall regulatory oversight, because it meant that consumer financial protection was not the primary mission or expertise of any Federal agency, and that financial protection concerns may even have conflicted with other policy goals such as bank safety and soundness. The fragmented nature of oversight may have also created opportunities for regulatory arbitrage and charter shopping.

The CFPB was designed to replace this fragmented approach with a single agency focused squarely on consumer financial protection and with broad authority over both banks and nonbanks. The CFPB's powers fall into three broad areas (as described in 12 U.S. Code 5515):

1. Rule making. The CFPB has rulemaking authority under the Federal consumer protection laws transferred to it, such as the Truth in Lending Act, Home Ownership and Equity Protection Act, Home Mortgage Disclosure Act, and others. The CFPB also has the organic authority to define “unfair, deceptive or abusive acts or practices” (so called “UDAAPs”), which are prohibited under the Dodd-Frank Act.

2. Supervision. The CFPB has the power to send examiners to study the records of financial firms, interview employees, collect data, and so on.

3. Enforcement. The CFPB has the power to pursue enforcement actions against firms in breach of consumer protection law, requiring firms to provide relief in the form of civil money penalties, refunds, injunctive relief, or other types of remediation. The CFPB's enforcement activities have made significant use of the agency's UDAAP power as described above. The CFPB is not permitted to conduct enforcement actions alone, however; it is required to act in cooperation with other agencies.

The CFPB began operations in July 2011, a year after the passage of the Dodd-Frank Act. [Figure 1](#) plots the time-series evolution of completed CFPB enforcement actions, measured in terms of total amounts remitted by financial institutions, based on an analysis of the CFPB's

enforcement action database. The first actions were completed in the third quarter of 2012, and penalties recovered peaked between 2013-15. Total penalties are comparatively low from the fourth quarter of 2015 onwards.

2.2 Enforcement Cutoff

The rule-making authority of the CFPB applies broadly to financial institutions engaged in the provision of consumer financial services. However, under sections 1025 and 1026 of the Dodd-Frank Act, the CFPB has only limited supervisory and enforcement authority over depository institutions with less than \$10 billion in total assets. For banks below this threshold, authority to enforce consumer financial protection laws generally falls to the firm's prudential supervisor.⁷ The CFPB may however require the prudential regulator to furnish it with information from its supervisory activities, and may at its discretion include examiners on a sampling basis as part of the examinations performed by the prudential supervisor. The CFPB is also expected to notify the prudential regulator if it believes a material violation of consumer financial protection law has occurred (see 12 U.S. Code 5516).

Not all banks below \$10 billion in size are exempt from CFPB oversight, because the CFPB has authority over *affiliates* of banks with at least \$10 billion in assets. For example, if a bank holding company (BHC) owns two depository subsidiaries, one with \$15 billion in assets, the other with \$5 billion in assets, both will be subject to CFPB oversight, because the second bank is an affiliate of the first. Note also that the asset size test applies to each bank, rather than the BHC. If a BHC with assets \$16 billion is comprised of two banks each with \$8 billion in assets, neither bank will be subject to CFPB oversight, since neither individually exceeds the CFPB threshold.⁸

For the purposes of this paper, we identify which banks are subject to CFPB oversight (supervision, examinations and enforcement actions) using a list provided on the CFPB website. This list reports the set of covered firms for each calendar quarter from the second quarter of 2011 onwards.

⁷This threshold also applies to other depository institutions, in particular credit unions, although the analysis in this paper will focus only on the activities of commercial banks and savings banks.

⁸Furthermore, to reduce instability in firms' regulatory status around the \$10 billion threshold, a bank which is exempt from CFPB oversight must exceed \$10bn in assets for four consecutive quarters (rather than just a single quarter) in order to become subject to the CFPB's supervision and enforcement authority (and vice versa for a bank falling below the \$10 billion threshold).

As a cross check, we also manually calculate a list of which banks are subject to CFPB oversight each quarter since 2011Q2, based on the interpretation of sections 1025 and 1026 of the Dodd-Frank Act applied by US regulatory agencies, and using bank assets reported in bank Call Reports and Thrift Financial Reports combined with National Information Center data on bank holding company structure. Our list closely matches the list furnished on the CFPB website, although the two do not match exactly. In situations where they do not match, we rely on the CFPB list, under the assumption that it most closely matches actual agency practice.

2.3 Sample Definition and Data

Our main bank sample consists of the population of US commercial banks and savings banks with consolidated assets between \$1bn and \$25bn as of June 30, 2011, the quarter end just before the CFPB begins operations on July 7, 2011. We use this sample rather than the entire population of commercial banks in order to focus on a more homogeneous sample of firms in the neighborhood of the \$10bn asset size cutoff for CFPB oversight, and to isolate the effects of CFPB oversight from other regulations passed during this period. In some of our robustness tests we also consider alternative asset size ranges. We exclude all banks which are subsidiaries of large bank holding companies with assets exceeding \$50bn. We do this because this class of firms is subject to enhanced supervision and are likely to differ in other ways from smaller community banks not affiliated with large BHCs.

For each bank meeting these conditions, we collect information on asset size and other financial information from the Call Report (in the case of commercial banks) and Thrift Financial Report (in the case of savings banks), and also collect information on bank structure (e.g., the affiliate structure and the presence of a bank holding company) from the National Information Center. Within this sample, we identify which banks are subject to CFPB oversight based on the classification provided on the CFPB website. Although a small number of firms switch oversight status over time, in our baseline specifications, we simply use the initial designation of firms as of 2011Q2 and hold that designation constant throughout. We do this because of concerns that firms may endogenously adjust their size to avoid being above the \$10bn asset size threshold. This would be a concern

for our econometric strategy if the decision of firms to adjust their exposure to CFPB oversight in this way is correlated with omitted firm characteristics (e.g., their propensity to originate risky mortgages).

Figure 2 presents a histogram of our bank sample which covers banks with consolidated assets between \$1bn and \$25bn as of June 30, 2011. There are 48 banks in the sample subject to CFPB oversight, of which 39 are have assets between \$10bn and \$25bn, and nine are smaller than \$10bn but have an affiliate larger than \$10bn in size. There are also another 532 banks in the sample which are exempt from CFPB oversight. The much larger number of exempt firms reflects the highly skewed size distribution of U.S. banks, which includes a “long tail” of small community banks.

2.4 Empirical Strategy

Our empirical analysis is based on a fairly standard difference-in-differences approach, and is illustrated in Figure 3. In the “pre” period up until the second quarter of 2011, banks both above and below the \$10bn asset size threshold are subject to supervision by their prudential supervisor in relation to Federal consumer law. From 2011Q2 onwards, banks greater than \$10 billion in size (and their banking affiliates) are subject to CFPB oversight, with the prudential regulator instead acting in a secondary role. We then examine the change in outcomes (e.g., mortgage lending volumes) for the “treated” group of banks subject to CFPB oversight relative to the control group, around the period after the CFPB begins operations.

Why might we expect that CFPB oversight would affect the supply of financial services, bank profitability or risk? Some have argued that the CFPB, because of its mandate and focus, is a particularly active supervisor and regulator on consumer financial protection issues.⁹ As discussed above, the CFPB has the organic authority to define unfair and deceptive practices by the providers of consumer financial products, and has actively used this authority in its enforcement activities. Legal and advisory firms regularly cite the compliance and legal implications associated with CFPB

⁹Evidence consistent with the claim that the CFPB undertakes enhanced supervision and enforcement of consumer protection laws, a search of the OCC enforcement registry from 2014 to 2016 identified only \$150,000 of consumer-related civil money penalties levied on firms below \$10bn in size. This represents less than 0.1% of the penalties levied by the CFPB over the same period.

supervision and enforcement above the \$10bn threshold (e.g., [Grant Thornton L.L.P. 2015](#), [Skadden, Arps, Slate, Meagher and Flom 2016](#)). Aside from the potential legal risks associated with enforcement actions, there may also be “congestion” costs in terms of regulatory compliance, in the sense that it makes the bank subject to oversight both from their primary prudential regulator and the CFPB.

Motivated by industry concerns, there have been a number of Congressional efforts to raise the CFPB supervision and enforcement thresholds from \$10 billion to \$50 billion, for example via the Financial Regulatory Improvement Act of 2015. Other research has also found evidence of slower growth, or a bunching in the firm size distribution, below the \$10 billion asset size threshold (see [Bouwman et al. 2018](#) and [Morgan and Yang 2016](#)), which could in part be due to reluctance to be exposed to CFPB oversight. (We find no clear evidence of such effects for our sample, however, as discussed in Section 5.) Although there have been only a small number of public enforcement actions by the CFPB against small depository institutions, this does not necessarily imply that the effects of oversight are small—the *threat* of enforcement may have had effects on bank behavior and led to an increase in costs; the CFPB may have also taken nonpublic regulatory actions against these firms. The direct compliance costs of CFPB oversight could also discourage the provision of financial services to consumers.

3 Effects on Mortgage Lending Volume and Composition

In this section we study the effect of CFPB oversight on the volume of residential mortgage originations, measured using data collected under the Home Mortgage Disclosure Act (HMDA). We also study the composition of mortgage lending, and in particular the riskiness of this lending, as well as the time it takes to originate a mortgage.

Mortgage lending provides us with a good laboratory to study potential CFPB effects, because mortgages are the biggest component of consumer lending and the subject of about one-quarter of CFPB enforcement actions. Furthermore, HMDA data covers almost the entire US mortgage market, and allows us to control for detailed geographic, loan and borrower characteristics that could affect selection into different types of banks.

The HMDA data contain information on individual mortgage applications and originations. All banks with assets above a low asset size cutoff (e.g. \$40 million in 2011) that have a branch in a metropolitan statistical area and made at least one mortgage loan in a given year are required to report.¹⁰ The reported information for each mortgage application includes the lender identity, property location, loan amount, and borrower characteristics such as income, race and gender. The data also reports whether an application led to a loan origination or not (and in the latter case, whether the application was denied by the lender, withdrawn by the borrower, or closed for other reasons) and, for originations, whether the loan was sold/secured within the same calendar year or not. The restricted version of the data that is available to users within the Federal Reserve System also contains exact application and “action” (e.g. origination) dates, meaning we can track the evolution of lending in a more granular manner than with the publicly available data, which only contains year indicators. See [Avery et al. \(2007\)](#) for a detailed description of HMDA data and its strengths and weaknesses for use in research. We match the lender identifiers in the HMDA data to highholders using data from the National Information Center (NIC).

3.1 Graphical Evidence

Before turning to regressions, we graph the time-series of total mortgage originations for CFPB-supervised banks and unsupervised banks. As discussed in Section 2.3, we split the sample based on whether the bank is included in the initial list of the set of firms subject to CFPB oversight. We then hold this classification fixed.¹¹

Figure 4 includes banks with assets between \$1 billion and \$25 billion in assets as of 2011Q2, meaning that they are relatively close to the \$10 billion cutoff that determines whether they are subject to CFPB oversight. Within each group, total mortgage origination volume (including both purchase and refinancing mortgages) is normalized to 100 in 2011Q2, right before the CFPB begins operations.

¹⁰Although this study is limited to an analysis of bank lending, non-bank lenders are also required to report. See <https://www.ffiec.gov/hmda/reporter.htm> for detailed criteria.

¹¹Our results, however, are generally similar if we allow the classification to vary dynamically. This is not surprising given that we consider a relatively narrow time window around the CFPB’s creation, and given that bank asset size is generally slow moving, except in the case of significant mergers or divestments.

The figure shows no evidence that as a group, CFPB-supervised banks originated fewer loans in the period after the introduction of the CFPB than before, by comparison to the non-CFPB-supervised control group. In general, the volumes of both groups fluctuate very significantly, but move closely together. If anything, the growth in lending for the unsupervised banks is lower relative to the pre-period. We next turn to formal regression analysis that allow us to more precisely investigate these issues.

3.2 Regression Analysis

Our analysis proceeds in two stages. First, we consider origination activity at the bank level by aggregating mortgage originations by bank and testing for changes in overall origination activity for treated versus untreated banks. Then, we consider a mortgage-level analysis that allows us to control for loan-specific characteristics.

3.2.1 Bank Level

In this subsection, we estimate a difference-in-differences model using the regression:

$$Loans_{jt} = \alpha_j + \gamma_t + \beta \cdot (post2011Q2_t \times CFPBsupervised_j) + \varepsilon_{jt}, \quad (1)$$

where $Loans_{jt}$ measures the mortgage origination activity in quarter t at lender j . Origination activity is measured in log of dollars or log number of loans. Regressions include both lender and quarter fixed effects. $post2011Q2_t$ is a dummy variable equal to 1 during the period the CFPB is active (from 2011Q3 onwards) and $CFPBsupervised_j$ indicates lenders subject to CFPB oversight at the end of 2011Q2. The coefficient on the interaction term estimates the relative change in lending activity for CFPB-supervised institutions versus unsupervised lenders compared to the pre-CFPB period. Standard errors are clustered by lender.

Table 1 summarizes our findings. Panel A considers all lenders with assets between \$1bn and \$25bn as of June 30, 2011. Given that not all lenders originate loans in every quarter, the results are sensitive to the treatment of zeros in the dependent variable. Column (1) excludes bank-quarters with no origination value, effectively removing the extensive margin of entry and exit by lenders.

We find that CFPB-supervised lenders lend slightly more relative to unsupervised lenders post 2011Q2, but that the increase is not statistically significant. Column (2) operates with a balanced panel by completely removing lenders that experience any quarter of inactivity in the sample period. Similar to column (1), we find a positive but statistically insignificant change in lending activity. Column (3) includes the zeros by adding adding \$200,000 to origination activity before taking the natural log.¹² Including the zeros allows entry and exit to inform the results, which increases the magnitude and statistical significance of the coefficient. This is robust to considering specifications with the log number of originated loans rather than the dollar amount (columns 4-6).

In Panel B, we consider variations on the log dollar specifications, including weighting the results by asset size (columns 1 and 2), restricting the range of banks to \$5B-25B (columns 3 and 4), and excluding banks that are near the threshold (columns 5 and 6). For each of these variations we consider the balanced panel of banks that always lend as well as the full panel where we add \$200,000 to ensure that non-active quarters are included in the estimation. Across all these specifications we find similar results as in Panel A. The balanced panel, which is solely identified off the intensive margin, tends to find a positive impact on CFPB lenders relative to unsupervised lenders, albeit estimates are not very precise. The specification that allows entry and exit (columns 2, 4, and 6) finds a more positive impact on CFPB lenders, and the coefficient is statistically significant. The magnitudes suggest that on average, supervised banks grew lending at least 50% *more* than unsupervised banks compared to the pre-period. These large effects should be taken with an equally large grain of salt, however, given that they are based on including new entrants in the sample, which may have extremely high growth rates because they start with a low base.

At the least, bank-level regressions (like the graphical evidence above) do not detect a significant negative impact on mortgage origination activity by CFPB-supervised lenders relative to the control group. However, these bank-level results are far from conclusive, since differences in lending behavior could be obfuscated by differential local demand trends facing supervised and unsupervised banks. Alternatively, it could be that supervised banks increased originations for some types of loans (e.g. low-risk ones) at the expense of others. We next address these possibilities by

¹²\$200,000 is roughly the 1st percentile of the distribution of active lenders.

considering loan-level regressions.

3.2.2 Loan Level

In this subsection, we estimate linear probability regressions of the form:

$$CFPBsupervised_{ilt} = \alpha_l + \beta \cdot post2011Q2_t + \Gamma X_{ilt} + \varepsilon_{ilt} \quad (2)$$

where $CFPBsupervised_{ilt}$ is a dummy equal to 1 if mortgage i in location l originated at time t was originated by a CFPB-supervised lender, which in our baseline regressions means a lender was among the set of firms subject to CFPB oversight at the end of 2011Q2; $post2011Q2_t$ is a dummy variable equal to 1 during the period the CFPB is active (from 2011Q3 onwards), α_l is a vector of census tract fixed effects, and X_{ilt} is a set of loan characteristics which are included in some specifications. Our main coefficient of interest is β ; a negative estimate would suggest that CFPB supervision may have reduced lending volumes of affected banks.

In our baseline specification, we estimate this regression using weighted least squares, weighting each mortgage by its loan amount, so that β can be interpreted as the effect on the share of total mortgage origination dollars that CFPB-supervised banks originate. However, we also estimate this regression on an unweighted basis so that we can study effects on the share in the number of originated mortgages as well. Throughout, we cluster standard errors at the county level.

Results are presented in Table 2. In the first column, we exclude loan level controls and census tract fixed effects, which essentially corresponds to comparing CFPB-supervised banks' lending share in the pre-2011Q2 period to the post-2011Q2 period. The positive coefficient indicates that their overall market share within this set of banks was slightly larger in the period after the CFPB started operating. In column (2), we add census tract fixed effects, and the coefficient is reduced to zero. Adding loan and borrower level controls (in column 3) has very little effect on the estimated coefficient, which remains a quite precisely estimated zero. In our preferred specification (column 3), a 95 percent confidence interval implies that the share of CFPB lenders *within* the narrow size range of banks considered in this paper declines by no more than 1.6 percentage points.

This implies that the lending volume (in dollar terms) was not materially different for CFPB-

supervised banks in the post-2011Q2 period relative to the pre-period. However, in column (4) we estimate the same regression unweighted, and there do find a statistically significant negative coefficient. Its magnitude implies that the probability that a loan was originated by a CFPB-supervised bank was 1.3 percentage points lower in the post-2011Q2 period relative to the pre-period (about 3 percent of the average market share of banks subject to CFPB oversight).

Our overall interpretation of these results is that CFPB oversight had at most a small negative effect on overall mortgage lending, and a point estimated effect which is quite close to zero. In Figure 5 we illustrate these main results graphically. Now, instead of just a post-2011Q2 dummy, we modify equation (2) to include a vector of quarterly time dummies, and trace out their evolution. Panel (a) shows the estimated quarterly β corresponding to column (3) of Table 2, with observations weighted by loan amount. We see that during the pre-period, there is a temporary dip in the relative origination share of banks that would later be CFPB-supervised. However, in the quarters immediately surrounding the start of CFPB activities, the estimated coefficient is very close to zero. Then it decreases over the course of 2012, potentially suggesting a modest negative effect of CFPB supervision on the mortgage lending activity of affected banks. However, the estimated effect reverts toward zero over the course of 2013. Panel (b) shows the same coefficients from the unweighted specification (as in column 4 of the table) and show the more negative estimated effect in the post-2011Q2 period. The graph implies that by early 2013, the probability that a given originated mortgage came from a CFPB-supervised bank was about 3 percentage points lower than in the first quarter of 2010 (or 2011, since the estimated coefficient there is close to zero), with a confidence bound of between 2 and 4 percentage points.

In Table 3, we present a number of robustness checks of the specification in regression (2). First, we restrict the sample to mortgages used for home purchases (not refinancings) only. Column (1), which corresponds to the specification of column (3) in Table 2 where observations are weighted by loan amount, and column (5), the equivalent of the unweighted regression in column (4) of Table 2, show that the estimated coefficients become slightly more negative (and the weighted coefficient becomes marginally significant) but the qualitative conclusion is unchanged. The remaining columns use different asset size restrictions (compared to our baseline sample of banks with assets between

\$1bn and \$25bn). In columns (2) and (5) we drop banks with less than \$5bn in assets, which leads the estimated coefficient to become positive. In columns (3) and (6), we instead expand the upper end of the asset size range. This leads the estimated coefficient to become substantially more negative—it approaches -5 percentage points. This suggests that banks with assets between 25 and 50 billion cut their lending relative to smaller ones, but they may not constitute a relevant comparison group for banks with less than 10 billion of assets (and may have been affected by other regulations).

Finally, in columns (4) and (8) we drop banks within \$2.5 bn of the \$10 bn cutoff, since those may be affected by strategic considerations (for instance, those just below the cutoff may want to reduce their lending in order to avoid crossing the threshold). This has essentially no effect on the estimated coefficients relative to those from our baseline sample.

3.3 Composition of Mortgage Lending

Next, we test whether there is evidence for heterogeneous effects of CFPB supervision on lending behavior across different loan types or risk levels. To do so, we extend equation (2) to interact the $post2011Q2_t$ dummy with different dummies for certain loan types or characteristics. The coefficient on these interactions then measures the differential effect of being in the post-2011Q2 period on the likelihood that a loan is originated by a CFPB-supervised banks. We again estimate the regressions both weighted and unweighted; since the results in Table 4 do not vary much with weighting, we focus our discussion on the weighted ones.

In column (1), the interacted dummy is one for FHA mortgages, which tend to be used by relatively lower income, higher risk borrowers. FHA mortgages in recent years also were the subject of a number of lawsuits against lenders, and many bank lenders withdrew from this market segment. The estimated coefficient is strongly negative and significant, meaning that CFPB-supervised banks reduced their FHA-lending (relative to unsupervised banks) after the CFPB became active. An interesting follow-up question is whether this just reflects a loan-size effect (since FHA loans tend to be smaller than conventional mortgages); however, in unreported results we find that the magnitude of the FHA interaction coefficient remains similar if we additionally interact fine loan

amount controls with the post-2011Q2 dummy.

In column (2), we instead interact the post-2011Q2 dummy with a jumbo dummy. Jumbo mortgages are those with loan amounts above the “conforming loan limit,” meaning that the government-sponsored enterprises Fannie Mae and Freddie Mac are now allowed to securitize the loan. As a consequence, these loans are for the most part held by the banks on their balance sheet. Here, we find a significant positive coefficient, meaning that supervised banks *increased* their origination of these loans.

In columns (3) and (4), we instead interact the post-2011Q2 dummy with proxies for loans with higher default risk. The first proxy we use is whether the loan application featured only one applicant; such loans are substantially more likely to default (e.g., [Tzioumis 2017](#)). For the second proxy, we add the additional requirement that the loan has a ratio of the loan amount to the applicant’s income of more than 3, meaning even higher risk of default.¹³ For both of these proxies, we find negative interaction effects, meaning that CFPB-supervised banks reduced their lending in these risky loans by relatively more; however, even though they are statistically significant, the magnitude of these coefficients is very small.

In sum, the small overall effect (if there is any effect at all) seen earlier masks significant heterogeneity: specifically, CFPB-supervised banks reduced their FHA lending but increased their jumbo lending once the CFPB became active. An increase in share for larger loans is consistent with the results in [Table 2](#) that suggest the dollar value of lending was unaffected, but that supervised banks made fewer loans overall.

4 Additional Analysis of Mortgage Lending Outcomes

4.1 Application Denials

An alternative way of studying the effects on credit supply is to look at whether CFPB-supervised banks deny more mortgage applications. Denials are an imperfect measure of credit supply, since

¹³In the Internet Appendix, we provide direct evidence that these proxies are strongly related to default risk, based on an analysis of the HMDA data matched to McDash mortgage-level performance data. The appendix shows that loans with no co-applicant and with high loan-to-income ratios have much higher probabilities of entering 90+ day delinquency, controlling for the quarter of when a loan is originated as well as other factors.

lender actions will already determine how many applications they receive—for instance, a lender can tighten their standards and discourage borrowers from applying, which might prevent their denial rates from increasing (or, in the extreme, even lead to a decrease). At the same time, if denial rates evolve the same as volumes above, especially across loan types, that would underscore the earlier evidence.

In addition, in the regressions in this section, we can control more finely for demand factors and bank fixed effects than above. We run regressions of the form,

$$Denied_{ijlt} = \alpha_{lt} + \gamma_j + \beta \cdot post2011Q2_t \times CFPBsupervised_j + \Gamma X_{ilt} + \varepsilon_{ilt}, \quad (3)$$

where $Denied_{ijlt}$ is a dummy equal to 100 if mortgage application i submitted to lender j in location l in quarter t was rejected by the lender (instead of the mortgage being originated or the application being accepted but not taken up by the borrower), $post2011Q2_t \times CFPBsupervised_j$ is a dummy equal to 1 for CFPB-supervised banks after 2011Q2, α_{lt} is a vector of census-tract-by-quarter fixed effects, γ_j is a bank fixed effect, and X_{ilt} is a set of loan characteristics as above. Our main coefficient of interest is β ; a positive estimate would suggest that CFPB supervision increased denial rates of affected banks.

In some specifications we add additional interaction terms of the main variable of interest with loan-level dummies Z_{ilt} , such as whether the loan is an FHA loan.¹⁴ This allows us to test whether the effects vary with loan characteristics, similar to the analysis in Table 4 above.

Table 5 presents the results. Since the dependent variable is binary 0/100, the coefficients in the table should be interpreted in terms of percentage points. In the first column, we do not include loan-level controls, bank fixed effects or census tract-by-quarter fixed effects; the negative coefficient indicates that “raw” denial rates were relatively lower for CFPB-supervised banks after the CFPB became operational, although the difference is not statistically significant. In column (2), we add all the controls, and see that the coefficient moves closer to zero and remains insignificant. Thus, there is no evidence that overall, the application denial of CFPB-supervised banks changed differentially.

¹⁴In those specifications, aside from the triple interaction $post2011Q2_t \times CFPBsupervised_j \times Z_{ilt}$ we also add all the simple interaction terms $post2011Q2_t \times Z_{ilt}$, $CFPBsupervised_j \times Z_{ilt}$, and $post2011Q2_t \times Z_{ilt}$, although we only report the last one in the results table.

Column (3) adds the interaction with the FHA indicator. The first interaction coefficient shows that overall, denial rates for FHA loans slightly (and marginally significantly) increased in the post-2011Q2 period. However, the second interaction coefficient in this column indicates that this was not differentially the case for CFPB-supervised banks. Thus, this regression suggests that the decline in FHA lending by these banks that we detected earlier was not driven by increased application denials. Column (4), on the other hand, shows that these banks did reduce their denial rates for jumbo applications, in line with the volume results earlier. The final two columns show no evidence for differential changes in denial rates for high-risk applications.

4.2 Processing Times

It may be that CFPB supervision has little impact on lending but imposes other costs on the mortgage origination process. One such cost could be that supervised lenders are more diligent in their underwriting and disclosure process, but at the expense of a speedy origination. We can test this possibility by considering application processing time as a dependent variable in a difference-in-differences specification similar to equation (3). Processing time is measured as the time from the application date of the loan to the time the loan is originated; both these variables are available in the private-use HMDA dataset.¹⁵

The regression takes the form,

$$ProcessingTime_{ijlt} = \alpha_{lt} + \gamma_j + \beta \cdot post2011Q2_t \times CFPBsupervised_j + \Gamma X_{ilt} + \varepsilon_{ilt} \quad (4)$$

where $ProcessingTime_{ijlt}$ is the number of days from application to origination for loan i submitted to lender j in location l in quarter t . The remaining variables are the same as those described in the denials analysis (Section 4.1) meaning we control for location, time, and bank fixed effects as well as loan level controls. A positive β would suggest that CFPB supervision increases processing times relative to unsupervised banks. We also consider interactions with dummies that indicate more risky, and by extension more complex, loans.¹⁶

¹⁵See Fuster et al. (2018) for work that uses mortgage processing times from HMDA.

¹⁶Specifications with interactions between risk indicators also include the risk indicator alone and the risk indicator interacted with $post2011Q2_t$ and $CFPBsupervised_j$.

Table 6 shows that we find little impact of CFPB supervision on processing times. The coefficient is generally positive across specifications, but not statistically significant. We consider the sample of banks between \$1-25B (column 1), weighted by loan size (column 2), and the narrower sample of banks from \$5-25B (column 3). The remaining columns test whether there were heterogeneous effects of CFPB supervision on processing time across different loan types. For FHA loans (column 4), we find a 1.3 day greater processing time for CFPB-supervised lenders, an effect that is statistically significant at the 10% level. This is consistent with supervised lenders becoming more careful for these loans, in line also with the reduction in FHA lending volume we found earlier. For jumbo loans, loans without coapplicants, and high loan-to-income loans without coapplicants, we find coefficients of varying signs but lacking statistical significance. In sum, there is not a robust relation between higher processing times and CFPB supervision.

4.3 Substitution Between Bank and Nonbank Subsidiaries

The exemption of small depository institutions from CFPB oversight only applies to deposit-taking subsidiaries. Non-deposit lenders of any size are subject to CFPB supervision, examinations and potential enforcement activities. This creates the possibility of regulatory arbitrage by shifting retail lending between bank and nonbank subsidiaries.¹⁷

In unreported results, we test whether unsupervised subsidiaries at entities with a CFPB-supervised lender experience a greater increase in market share than unsupervised subsidiaries in institutions without CFPB lenders. Across various specifications we find an effect close to zero with confidence intervals that range from a decline in origination share of 3% to an increase of 5%. Hence we cannot discern a meaningful shift within organizations towards unsupervised lenders. One implication is that lenders do not view the benefits of shifting lending as worth the costs, either because the benefits of evading the CFPB are low or because the firms do not believe that such within-organization shifts effectively immunize them from CFPB oversight.

¹⁷For example, consider a bank holding company with two subsidiaries, a commercial bank of asset size \$5 billion, and a nonbank mortgage lender of size \$1 billion. The bank is exempt from CFPB oversight, but the nonbank subsidiary is not. Thus, the banking organization as a whole could extricate itself from CFPB oversight by winding down the nonbank lender and concentrating all, or a higher fraction, of mortgage lending in the commercial bank.

5 Bank-level Analysis

Although we find little evidence that CFPB oversight has significantly impacted overall mortgage lending volume for banks near the threshold for oversight, there may be other types of effects on banks' operations. For instance, CFPB regulation may affect other types of consumer lending (e.g., home equity loans, auto loans or credit cards), or increase banks' non-interest expenses due to regulatory compliance costs. To investigate a broader range of potential impacts, we move to a bank-level analysis using quarterly Call Report filings by banks.

As we have discussed, a caveat to this bank-level analysis is that there are other regulatory implications associated with a \$10bn asset size threshold: banks are required to undertake company-run stress tests, and become subject to the Durbin Amendment, which restricts interchange fees on debit cards. These additional regulations are unlikely to be of primary importance for mortgage origination, but might influence some of the other bank-level variables we consider below. To the extent that they do, the estimates should be viewed as an upper bound of the effect of CFPB oversight.

We construct a sample of bank-level financial data for the period 2010Q1 to 2013Q4 (matching our sample period for the loan level analysis). We obtain data from Call Reports on the financial condition of commercial banks and supplement that with data from Thrift Financial Reports so that we can fill in data for thrifts during the earlier portion of our sample.¹⁸

Based on the combination of the two financial reports, we obtain a sample of quarterly financial data for 675 unique institutions between the range of \$1bn and \$25bn in assets as of 2011Q2. As in our loan-level analysis, “post” is defined as the period from 2011Q3 onwards, after the CFPB becomes active, and “CFPB supervised” is defined as the initial set of banks subject to CFPB oversight.

¹⁸In mid-2011, the Office of Thrift Supervision (OTS) was merged with the Office of the Comptroller of the Currency (OCC). As a result many institutions in the relevant size range went from filing Thrift Financial Reports with the OTS to Call Reports with the FDIC. All thrifts were required to file Call Reports by the first quarter of 2012. The structure of the Thrift Financial Report is similar to the Call Report, and the variables we use are defined in a generally consistent way.

5.1 Asset Growth

The first outcomes we consider are asset and loan growth. If regulatory oversight by the CFPB materially increases the cost of financial intermediation, firms subject to CFPB oversight may grow more slowly after the CFPB becomes operational. To test this possibility we estimate a difference-in-difference analysis comparing asset growth for CFPB-supervised and non-supervised banks before and after 2011Q2,

$$\Delta Y_{it} = \alpha_i + \gamma_t + \beta \cdot post2011Q2_t \times CFPBsupervised_i + \varepsilon_{it}, \quad (5)$$

where ΔY_{it} is log change of loans or assets for bank i at quarter t , $post2011q2$ is a dummy variable indicating quarters after CFPB implementation and $CFPBsupervised$ is a dummy for those banks subject to CFPB oversight in the “post” period. The specification includes bank, α_i , and quarter, γ_t , fixed effects. The interaction term estimates how relative growth rates between treated and untreated firms change post 2011Q2.¹⁹ We consider equal-weighted, as well as asset weighted specifications. We also consider specifications which restrict the sample to banks with assets between \$5bn and \$25bn; this specification greatly reduces our observation count by excluding many of the smaller banks, but is arguably better identified as it compares banks of more similar size.

Results are presented in Panel A of Table 7. Both for asset and loan growth, we consistently find a negative coefficient on the difference-in-difference term, although the coefficient is relatively small and not statistically significant. The dependent variable is measured as a quarterly log change—so for example, the coefficient of -0.00346 in column (4) means that CFPB-supervised banks grow 0.346% more slowly per quarter than non-supervised banks (post-relative-to-pre).²⁰

Underlying this negative difference-in-differences coefficient, the raw mean quarterly log change in assets for the “treated” group of banks that become subject to CFPB oversight is 2.9% per quarter in the “pre” period, declining to 1.6% in the “post” period. For the non-treated group, the

¹⁹Note the uninteracted terms are unnecessary as they are accounted for by bank and time fixed effects.

²⁰In unreported analysis we have also estimated versions of these regressions using winsorized changes in log assets, to minimize the effect of extreme observations due to merger events and other large shifts in asset size. Again the difference-in-difference coefficient on asset and loan growth is not statistically significant. In general the coefficient is closer to zero.

growth rate also declined but by a smaller amount—from 1.2% to 0.8%.²¹ Therefore, one caveat regarding the results in Table 7 is that the higher growth of the CFPB-treated banks in the “pre” period suggests that there are some pre-existing differences between the two groups (e.g., reflecting the ongoing consolidation of the U.S. banking industry).²² As an additional caveat, we note that the power of the regression is relatively low (i.e., we would be unable to reject the null hypothesis of no differential trend in growth rates even for a quite economically significant point estimate).

The average effects estimated in Panel A may mask significant nonlinearities close to the \$10bn asset size threshold. For example, previous work by [Bouwman et al. \(2018\)](#) finds evidence that banks below but close to the \$10bn Dodd-Frank size threshold grow more slowly post-financial crisis—their interpretation is that this group of banks is attempting to avoid the enhanced Dodd-Frank regulation associated with crossing the \$10bn size threshold. To investigate these nonlinearities for our sample (which includes both commercial banks and thrifts, unlike [Bouwman et al. 2018](#)), we split the CFPB-supervised group of banks into two groups, based on whether total assets in 2011Q2 exceed \$15bn, and split the non-supervised group based on whether assets exceed \$7.5bn. We then include separate interactions for each group with the post-2011Q2 dummy (so that there are four groups in total, rather than two).

Results are shown in Panel B. Note that the coefficients measure the post-2011Q2 change in growth rates for each group *relative* to non-CFPB-supervised banks with less than \$7.5bn in assets (the omitted group, given that the regressions include a vector of time dummies). We do not find any evidence of discontinuities in growth rates near the threshold. Most notably, and perhaps surprisingly, we find evidence that non-supervised banks with assets between \$7.5 billion and \$10 billion actually grow *more* quickly than smaller non-supervised banks. In unreported regressions we find that this seems to be explained by a higher propensity to engage in merger events. It may be that banks just below the threshold want to cross the threshold by a significant margin, in order to spread fixed compliance costs or other noninterest expenses across a wider asset base.

These results seem different to [Bouwman et al. \(2018\)](#), who find that banks in this size range

²¹These differences-in-differences in raw mean do not exactly match any of the regression coefficients, e.g., because the panel is somewhat unbalanced due to attrition in the post period.

²²We intend to address this issue more thoroughly in a future draft; e.g., by constructing a weighted synthetic control group which matches the CFPB-treated group on growth rates in the “pre” period.

do grow significantly more slowly. This may reflect differences in methodology. Specifically, our sample includes both commercial banks and thrifts, and we compare behavior pre- and post-2011Q2, whereas [Bouwman et al. \(2018\)](#) compare banks pre- and post-crisis. The summary statistics in Table 3 of Bouwman et al. also suggest that indirectly treated banks just below the \$10 billion Dodd-Frank threshold do grow more quickly than banks above the threshold, and about the same as smaller banks significantly below the \$10 billion threshold, in the post-crisis period.

5.2 Balance Sheet Composition

While overall asset and loan growth does not seem to have been significantly negatively impacted by the introduction of CFPB oversight, banks may have shifted lending away from retail loan products which are marketed to consumers and toward business oriented products, thereby shifting the composition of loans held on balance sheet. To consider this hypothesis, we estimate a version of equation (5) in which the dependent variable is the retail loan share—defined as the value of all consumer-type loans on the bank’s balance sheet, including residential mortgages, HELOCs, credit cards, automobile loans and other consumer loans, as a percentage of total assets. Results are presented in Panel C of Table 7. In column (1), we find weak evidence that CFPB-supervised firms shifted their loan portfolios away from retail products. The coefficient implies retail share is on average 1.5% lower for supervised firms post 2011Q2 relative to the non-CFPB banks. This result is statistically significant at the 10% level. However, when we consider alternative specifications that put less emphasis on the smaller banks in the sample, the results are weaker. When we weight by assets (column 2), the coefficient suggests the retail share falls by 1.1%, but the results is not statistically significant at standard levels. Similarly, dropping the banks with less than \$5bn leads to a much smaller coefficient that is far from statistically significant (column 3). In sum, while the point estimates are negative, there is insufficient evidence to conclude with confidence that CFPB-supervised banks have significantly pivoted away from retail loans. This “stock” evidence seems roughly consistent with our “flow” evidence from mortgage originations presented earlier.

5.3 Noninterest Expenses

The final set of bank-level analyses considers bank noninterest expense ratios. CFPB oversight may have resulted in greater compliance costs. To test this possibility we again use the empirical specification in equation (5); instead of assets or loans as the dependent variable we construct several expenses ratios to determine if particular costs for CFPB-supervised firms increased. We consider total noninterest expense, and then two subcategories of noninterest expense: compensation and other noninterest expense. For each category of expense we construct two ratios: one scaled by assets and one scaled by revenues (net interest margin plus noninterest income). We winsorize ratios at the 2.5% level to reduce the influence of extreme outliers on the results.

In Table 8, we find varying coefficients, some positive and some negative, but none are statistically different from zero. There are three panels each of which reflects one of our empirical specifications; equal-weighted results are summarized in Panel A, asset weighted in Panel B, and the \$5bn-\$25bn asset range (equal-weighted) in Panel C. Columns (1)-(3) contain ratios scaled by assets. For each category of noninterest expense, the magnitude of the coefficient generally suggests that expense ratios are lower for CFPB-supervised institutions. None of the results are statistically different from zero at the 10% level. The negative magnitudes are much closer to zero in Panel C when we exclude the firms below \$5bn in assets.

Ratios may vary because of expenses (numerator) or the scaling factor (denominator). In columns (4)-(6) we consider an alternative ratio in which we scale by revenue rather than assets. These coefficients suggest a positive relationship between CFPB supervision and expenses, albeit none of the coefficients are statistically significant. The positive coefficients are consistent across all three categories: total noninterest expense, compensation expense and other noninterest expenses. The largest magnitudes and t -statistics can be found in Panel C, when the smallest firms are excluded. However, taken together these results do not suggest a strong or consistent relationship between CFPB supervision and expense ratios.

6 Conclusions

In aggregate we detect little to no impact of the newly formed CFPB on the overall volume of mortgage originations for supervised institutions. Our confidence bounds are tight enough to rule out the hypothesis that CFPB oversight led to a large decline in mortgage lending among affected banks. In our preferred specification, a 95% confidence interval implies that, *within* the \$1-\$25bn bank asset size group, the market share of CFPB-supervised banks declines by no more than 1.6 percentage points.

However, we find some evidence suggesting that CFPB oversight affected the composition and riskiness of bank lending—banks supervised by the CFPB issued fewer small mortgages or loans to riskier borrowers, offset by an increase in lending to large “jumbo” borrowers. This is consistent with the view that greater legal risk and regulatory scrutiny has contributed to a “de-risking” of the types of financial intermediation undertaken by banks in the period since the financial crisis.

In other results, we find no evidence that supervised banks are more likely to deny mortgage applications, despite widespread concerns that denials would increase in response to greater enforcement of consumer protection laws. Lastly, there is no clear evidence that CFPB oversight induced lower asset growth or higher expenses, although in these regressions our statistical power is often relatively low.

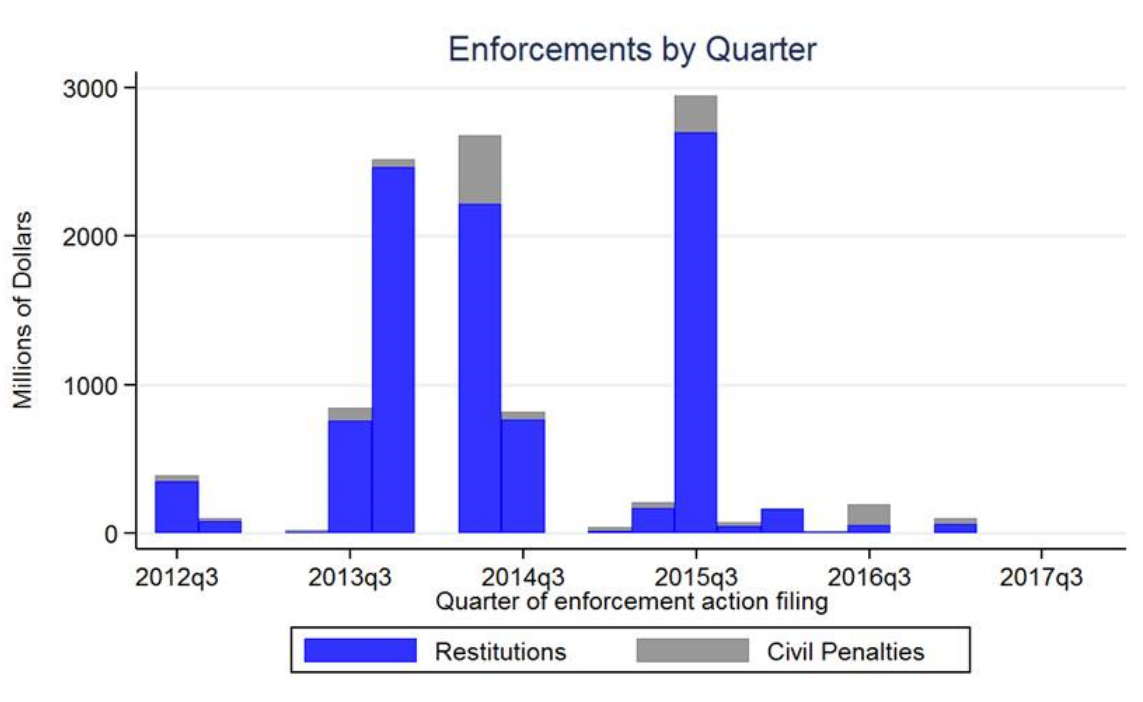
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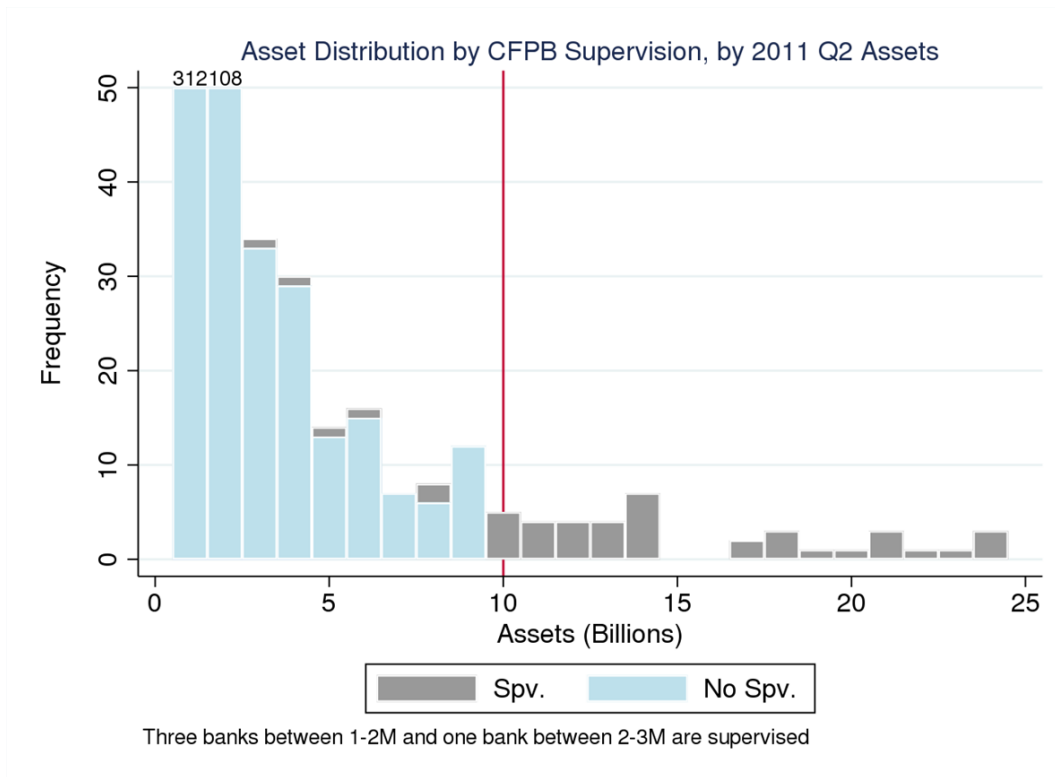
Figures and Tables

Figure 1. CFPB Enforcement Actions



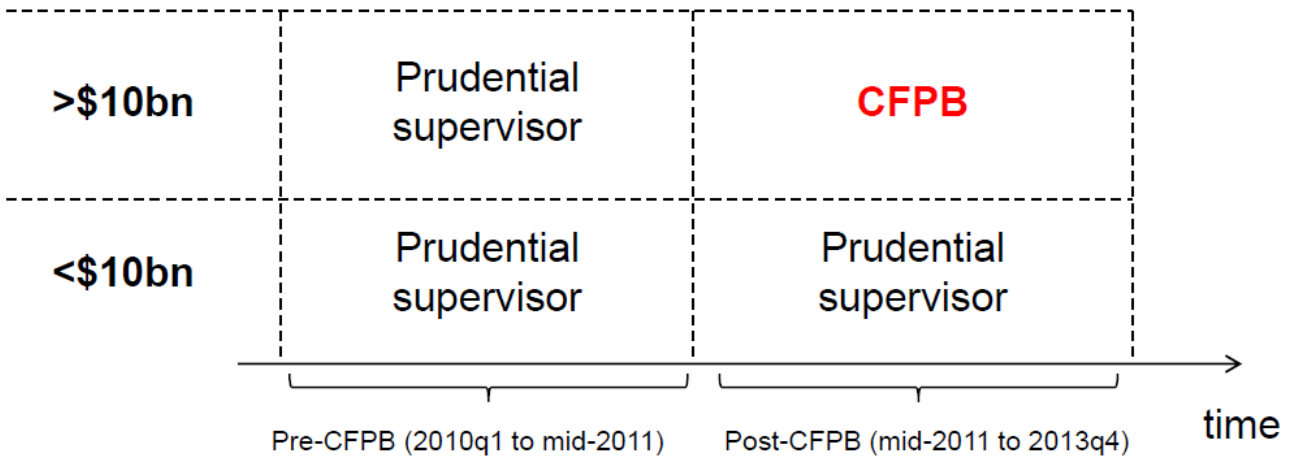
Note: Figure constructed from the CFPB enforcement action database. “Restitutions” includes payments to affected consumers. “Civil penalties” refers to penalties paid to the CFPB. Since not all payments are made public, the sum of restitution amounts in this figure is smaller than the statistic of \$11.9 billion in consumer relief payments reported on the CFPB website.

Figure 2. Histogram of bank size as of 2011Q2



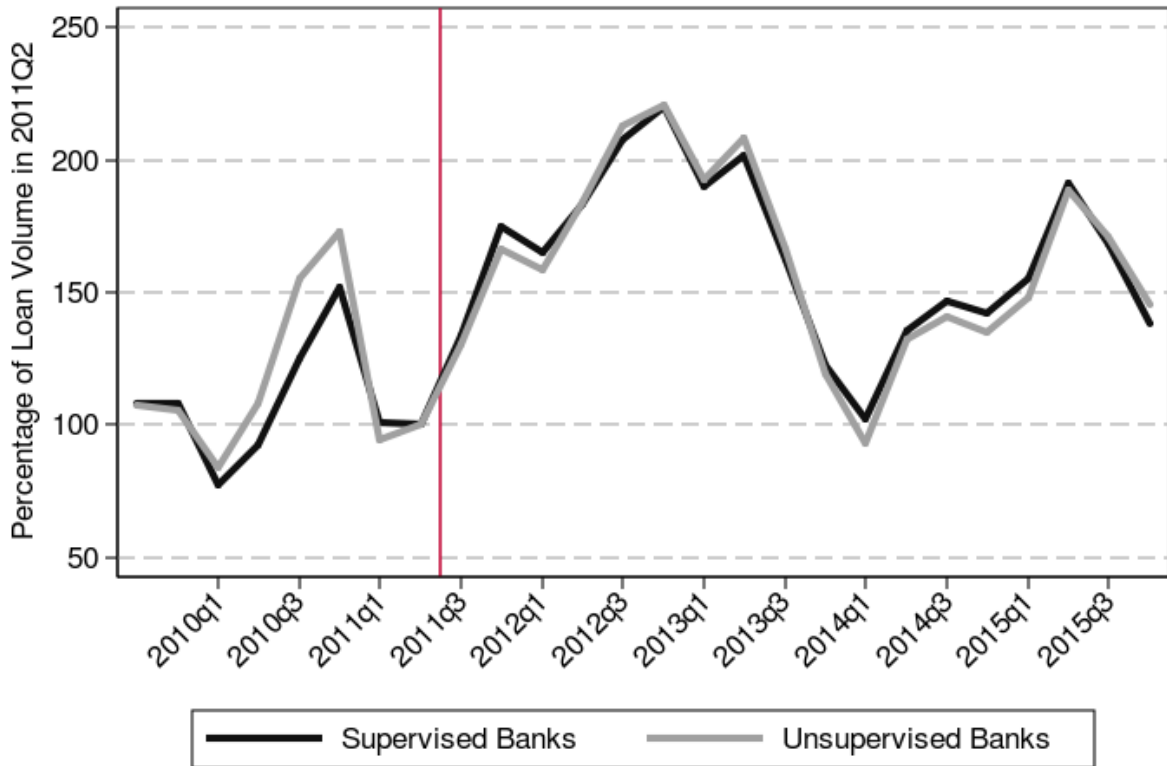
Note: “Supervised” means that the bank is subject to CFPB supervision and enforcement actions. Figure reflects savings banks and commercial banks with between \$1 billion and \$25 billion in total assets as of 2011Q2. Y-axis is truncated at a frequency of 50. There are 312 banks in the sample with \$1-2 billion in assets (of which three are subject to CFPB oversight), and 108 banks with \$2-3 billion in assets (of which one is subject to CFPB oversight).

Figure 3. Difference-in-differences approach



Note: In the “pre” period prior to 2011Q2, banks both above and below the \$10bn threshold are subject to supervision by their prudential supervisor in relation to Federal consumer law. From 2011Q2 onwards, banks greater than \$10 billion in size are subject to CFPB oversight, with the prudential regulator acting in the capacity of a secondary supervisor.

Figure 4. Total mortgage originations of CFPB-supervised and CFPB-unsupervised banks (with asset sizes close to \$10bn cutoff), relative to 2011Q2



Sample consists of banks with assets between \$1 billion and \$25 billion and whose highholders have less than \$50 billion in assets in 2011Q2.

Figure 5. Evolution of probability that a mortgage was originated by a CFPB-supervised bank (rather than a non-CFPB-supervised bank). Quarterly series show estimated quarterly coefficient (relative to 2010:Q1) and 95% confidence intervals. Regressions also control for census tract fixed effects and loan-level controls.

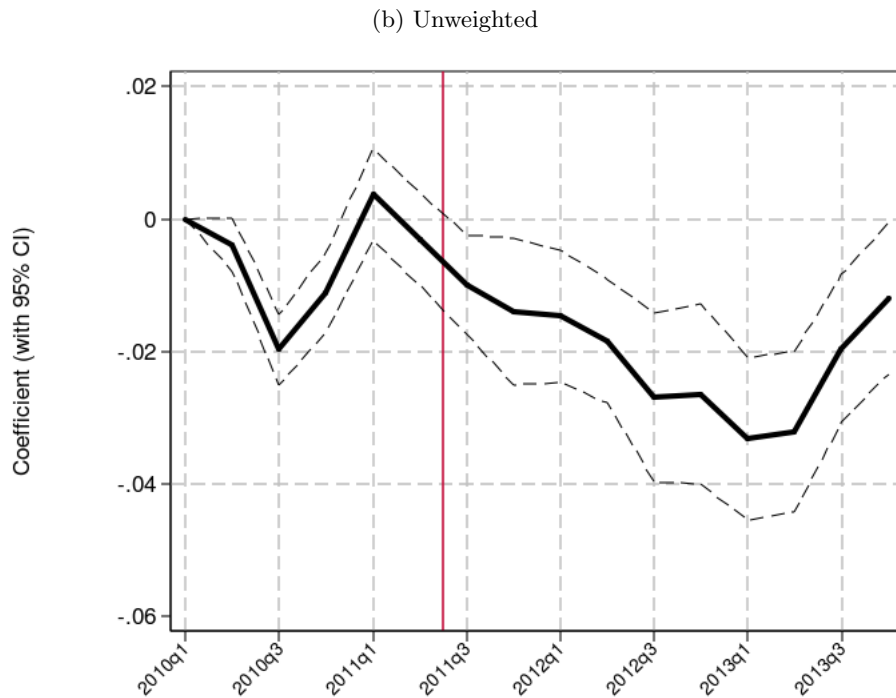
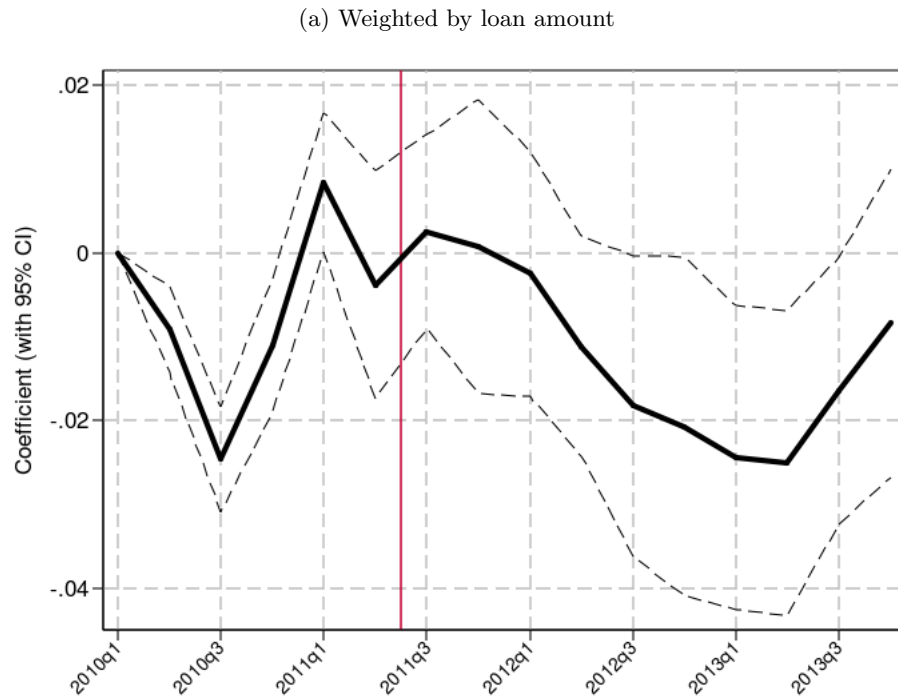


Table 1. Difference-in-difference: Bank-level mortgage origination activity

Dep. Variable	Log(Dollars)			Log(Number)		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Post×CFPB Supv.	0.10 (0.11)	0.10 (0.11)	0.42* (0.24)	0.05 (0.10)	0.05 (0.10)	0.33 (0.21)
Observations	7,967	6,960	8,672	7,967	6,960	8,672
R-squared	0.87	0.89	0.77	0.91	0.92	0.80
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Treatment of 0's	Excluded	Balanced	log(\$s+200)	Excluded	Balanced	log(#+1)
Dep. Variable	Log(Dollars)					
Panel B	(1)	(2)	(3)	(4)	(5)	(6)
Post*CFPB Supv.	0.08 (0.12)	0.56** (0.26)	0.15 (0.13)	0.67*** (0.25)	0.13 (0.18)	0.83** (0.36)
Observations	6,960	8,672	1,184	1,312	794	752
Adj. R-squared	0.91	0.80	0.91	0.83	0.91	0.90
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Treatment of 0's	Balanced	log(\$s+200k)	Balanced	log(\$s+200k)	Balanced	log(\$s+200k)
Asset weighted	Yes	Yes	Yes	Yes	Yes	Yes
Sample	\$1B-25B	\$1B-25B	\$5B-25B	\$5B-25B	\$1B-7.5B, \$12.5B-25B	\$1B-7.5B, \$12.5B-25B

Table contains difference-in-differences estimates for CFPB-supervised banks relative to unsupervised banks after 2011Q2. Panels A and B are based on banks in the \$1-25bn range. Panel B is asset weighted based on 2011Q2 assets. Panel C is based on banks in the \$5-25bn range. Asset ratios are reported in bps. Revenue (NIM+NII) are reported in %. Ratios are winsorized at the 2.5% tails. Weighted specifications are based on 2011Q2 assets. Standard errors in parentheses clustered by entity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2. Regression of probability of loan being originated by CFPB-supervised bank on post-2011Q2 dummy and controls.

	(1)	(2)	(3)	(4)
Post-2011Q2	0.0230** (0.00974)	-0.00172 (0.00731)	-0.00289 (0.00688)	-0.0131*** (0.00432)
N	3704987	3702041	3702041	3702041
Mean Y	0.38	0.38	0.38	0.33
Loan controls	N	N	Y	Y
Census Tr. FE	N	Y	Y	Y
Weighted	Y	Y	Y	N

Includes banks with assets as of 2011Q2 in the 1bn-25bn USD range. Sample period is 2010:Q1 to 2013:Q4. Only mortgages with loan amount up to \$5 million are included. Loan controls include log(applicant income), log(loan amount), and indicator variables for applicant race and gender, whether the property is owner-occupied, loan purpose, loan type (conventional, FHA, VA, FSA), jumbo status, missing applicant income, and whether there is a co-applicant. Standard errors reported in parentheses are clustered by county. ***, **, * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 3. Regression of probability of loan being originated by CFPB-supervised bank on post-2011Q2 dummy and controls – Robustness to different sample restrictions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-2011Q2	-0.0104* (0.00547)	0.00717** (0.00363)	-0.0464*** (0.00487)	0.000597 (0.00779)	-0.0196*** (0.00398)	0.00207 (0.00257)	-0.0487*** (0.00361)	-0.0118** (0.00494)
N	1290059	1658745	4127810	3320543	1290059	1658745	4127810	3320543
Mean Y	0.35	0.79	0.44	0.37	0.31	0.74	0.40	0.33
Loan controls	Y	Y	Y	Y	Y	Y	Y	Y
Census Tr. FE	Y	Y	Y	Y	Y	Y	Y	Y
Weighted	Y	Y	Y	Y	N	N	N	N
Sample	1-25bn, Purchase	5-25bn	1-50bn	1-7.5, 12.5-25bn	1-25bn, Purchase	5-25bn	1-50bn	1-7.5, 12.5-25bn

Includes banks with assets as of 2011Q2 in the 1bn-25bn USD range. Sample period is 2010:Q1 to 2013:Q4. Only mortgages with loan amount up to \$5 million are included. Loan controls include log(applicant income), log(loan amount), and indicator variables for applicant race and gender, whether the property is owner-occupied, loan purpose, loan type (conventional, FHA, VA, FSA), jumbo status, missing applicant income, and whether there is a co-applicant. Standard errors reported in parentheses are clustered by county. ***, **, * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 4. Regression of probability of loan being originated by CFPB-supervised bank on post-2011Q2 dummy interacted with loan characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-2011Q2	0.00282 (0.00718)	-0.00997 (0.00701)	0.000844 (0.00719)	-0.00164 (0.00669)	-0.00812* (0.00442)	-0.0147*** (0.00429)	-0.0109** (0.00441)	-0.0132*** (0.00412)
Post-2011Q2 × FHA	-0.0647*** (0.00745)				-0.0468*** (0.00568)			
Post-2011Q2 × Jumbo		0.0536*** (0.0110)				0.0516*** (0.0104)		
Post-2011Q2 × No Coapplicant			-0.0103*** (0.00233)				-0.00529*** (0.00170)	
Post-2011Q2 × (No Coapp. & High LTI)				-0.00784** (0.00352)				0.000558 (0.00304)
N	3702041	3702041	3702041	3702041	3702041	3702041	3702041	3702041
Mean Y	0.38	0.38	0.38	0.38	0.33	0.33	0.33	0.33
Loan controls	Y	Y	Y	Y	Y	Y	Y	Y
Census Tr. FE	Y	Y	Y	Y	Y	Y	Y	Y
Weighted	Y	Y	Y	Y	N	N	N	N

Includes banks with assets as of 2011Q2 in the 1bn-25bn USD range. Sample period is 2010:Q1 to 2013:Q4. Only mortgages with loan amount up to \$5 million are included. Loan controls include log(applicant income), log(loan amount), and indicator variables for applicant race and gender, whether the property is owner-occupied, loan purpose, loan type (conventional, FHA, VA, FSA), jumbo status, missing applicant income, and whether there is a co-applicant. Standard errors reported in parentheses are clustered by county. ***, **, * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 5. Regression of probability of loan application denial on post-2011Q2 dummy interacted with CFPB-supervised bank dummy and loan characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)
CFPB-sup. \times Post-2011Q2	-1.334 (1.074)	-0.203 (0.465)	-0.394 (0.533)	-0.121 (0.475)	-0.154 (0.428)	-0.104 (0.467)
Post-2011Q2 \times FHA			0.755* (0.415)			
CFPB-sup. \times Post-2011Q2 \times FHA			-0.0629 (0.794)			
Post-2011Q2 \times Jumbo				0.178 (0.680)		
CFPB-sup. \times Post-2011Q2 \times Jumbo				-2.605** (1.086)		
Post-2011Q2 \times No Coapplicant					0.00331 (0.150)	
CFPB-sup. \times Post-2011Q2 \times No Coapplicant					-0.128 (0.311)	
Post-2011Q2 \times (No Coapp. & High LTI)						-0.896*** (0.346)
CFPB-sup. \times Post-2011Q2 \times (No Coapp. & High LTI)						-0.558 (0.592)
N	4733159	4552664	4552664	4552664	4552664	4552664
Mean Y	16.46	16.09	16.09	16.09	16.09	16.09
Loan controls	N	Y	Y	Y	Y	Y
BHC FE	N	Y	Y	Y	Y	Y
Census Tr. \times Quarter FE	N	Y	Y	Y	Y	Y
Weighted	N	N	N	N	N	N

Includes banks with assets as of 2011Q2 in the 1bn-25bn USD range. Sample period is 2010:Q1 to 2013:Q4. Only mortgages with loan amount up to \$5 million are included. Loan controls include log(applicant income), log(loan amount), and indicator variables for applicant race and gender, whether the property is owner-occupied, loan purpose, loan type (conventional, FHA, VA, FSA), jumbo status, missing applicant income, and whether there is a co-applicant. Standard errors reported in parentheses are clustered by county. ***, **, * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 6. Difference-in-difference: Loan-level processing times and interactions with loan characteristics

Dep. Variable	Processing Times						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CFPB-sup. \times Post-2011Q2	0.84 (0.58)	0.05 (0.70)	0.12 (0.82)	0.82 (0.63)	0.95 (0.60)	0.83 (0.64)	0.89 (0.61)
CFPB-sup. \times Post-2011Q2 \times FHA				1.30* (0.74)			
CFPB-sup. \times Post-2011Q2 \times Jumbo					-1.64 (1.95)		
CFPB-sup. \times Post-2011Q2 \times No Coapplicant						0.04 (0.26)	
CFPB-sup. \times Post-2011Q2 \times (No Coapp. & High LTI)							-0.26 (0.56)
Observations	3,506,503	3,506,503	1,435,179	3,506,503	3,506,503	3,506,503	3,506,503
R-squared	0.17	0.21	0.18	0.17	0.17	0.17	0.17
Loan controls	Y	Y	Y	Y	Y	Y	Y
BHC FE	Y	Y	Y	Y	Y	Y	Y
Census Tr. \times Quarter FE	Y	Y	Y	Y	Y	Y	Y
Weighted	N	Y	N	N	N	N	N
Sample	\$1B-25B	\$1B-25B	\$5B-25B	\$1B-25B	\$1B-25B	\$1B-25B	\$1B-25B

Table contains difference-in-differences estimates for loan-level processing times issued by CFPB-supervised banks relative to unsupervised banks after 2011Q2. Processing times are reported in days for originated loans; the average processing time for the main sample (column 1) is 48.6 days. Weighted specifications are based on loan size. Standard errors in parentheses clustered by county and entity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7. Difference-in-difference: Asset and loan growth, and balance sheet composition

A. Growth	$\Delta \log(\text{assets})$			$\Delta \log(\text{total loans})$		
	(1)	(2)	(3)	(4)	(5)	(6)
Post * CFPB supv.	-0.00846 (0.0138)	-0.00648 (0.0125)	-0.0171 (0.0169)	-0.00346 (0.0135)	-0.000532 (0.0138)	-0.00366 (0.0243)
Observations	8372	8372	1409	8306	8306	1397
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Weighted by 2011q2 Assets	No	Yes	No	No	Yes	No
5B–25B in Assets	No	No	Yes	No	No	Yes
<hr/>						
B. Interactions near 10bn threshold	$\Delta \log(\text{assets})$			$\Delta \log(\text{total loans})$		
	(1)	(2)	(3)	(4)	(5)	(6)
Post * CFPB supv. * >\$15bn	0.00682 (0.00704)	0.00673 (0.00814)	-0.00127 (0.0161)	0.00846 (0.00853)	0.0131 (0.0116)	0.0249 (0.0339)
Post * CFPB supv. * <\$15bn	-0.0145 (0.0196)	-0.0133 (0.0219)	-0.0197 (0.0261)	-0.00748 (0.0189)	-0.00417 (0.0223)	0.00766 (0.0390)
Post * NonSupv. * >\$7.5bn	0.0177*** (0.00627)	0.0180** (0.00722)	0.00917 (0.0157)	0.0263*** (0.00892)	0.0316*** (0.0115)	0.0426 (0.0341)
Observations	8372	8372	1409	8306	8306	1397
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Weighted by 2011q2 Assets	No	Yes	No	No	Yes	No
5B–25B in Assets	No	No	Yes	No	No	Yes
<hr/>						
C. Asset composition	% retail loans					
Post * CFPB Supv.	-1.535* (0.928)	-1.168 (0.890)	-0.303 (1.760)			
Observations	8882	8882	1492			
Time FEs	Yes	Yes	Yes			
Bank FEs	Yes	Yes	Yes			
Weighted by 2011q2 Assets	No	Yes	No			
5B–25B in Assets	No	No	Yes			

Table contains results estimates the difference-in-differences for CFPB-supervised banks relative to unsupervised banks after 2011Q2. Columns 1, 2, 4, and 5 are based on banks in the \$1-25bn range. Columns 3 and 6 are based on banks in the \$5-25bn range. Retail and non-retail loan shares are calculated relative to total loans. Weighted specifications are based on 2011Q2 assets. Standard errors in parentheses clustered by entity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8. Difference-in-difference: Expense ratios

Panel A	NIE/Assets (1)	Comp./Assets (2)	Other/Assets (3)	NIE/Rev. (4)	Comp./ Rev. (5)	Other/Rev. (6)
Post*CFPB Supv.	-1.298 (2.077)	-0.680 (0.928)	-0.793 (1.148)	0.972 (1.051)	0.272 (0.609)	0.267 (0.738)
Observations	8952	8952	8952	8949	8949	8949
Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes
Panel B Asset Weighted	NIE/Assets (1)	Comp./Assets (2)	Other/Assets (3)	NIE/Rev. (4)	Comp./ Rev. (5)	Other/Rev. (6)
Post*CFPB Supv.	-1.764 (2.097)	-1.121 (0.996)	-0.779 (1.152)	1.298 (1.061)	0.407 (0.636)	0.202 (0.769)
Observations	8952	8952	8952	8949	8949	8949
Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes
Panel C 5B–25B Assets	NIE/Assets (1)	Comp./Assets (2)	Other/Assets (3)	NIE/Rev. (4)	Comp./ Rev. (5)	Other/Rev. (6)
Post*CFPB Supv.	0.0837 (2.488)	-0.150 (1.151)	-0.0197 (1.448)	1.690 (1.523)	0.735 (0.808)	0.335 (1.051)
Observations	1505	1505	1505	1504	1504	1504
Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes

Table contains results estimates the difference-in-differences for CFPB-supervised banks relative to unsupervised banks after 2011Q2. Panels A and B are based on banks in the \$1-25bn range. Panel B is asset weighted based on 2011Q2 assets. Panel C is based on banks in the \$5-25bn range. Asset ratios are reported in bps. Revenue (NIM+NII) are reported in %. Ratios are winsorized at the 2.5% tails. Weighted specifications are based on 2011Q2 assets. Standard errors in parentheses clustered by entity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Internet Appendix for
“Does CFPB Oversight Crimp Credit?”

Andreas Fuster, Matthew Plosser and James Vickery

A HMDA characteristics and mortgage default

This appendix presents evidence on the relationship between HMDA loan characteristics and ex-post mortgage default. The analysis is based on a fuzzy loan-level match between HMDA and the McDash mortgage servicing dataset undertaken by the RADAR group at the Federal Reserve Bank of Philadelphia. In particular we study the correlation with default of the the ratio of mortgage loan amount to household income (LTI), and an indicator variable for whether the primary mortgage applicant has a co-borrower.

Statistically these two variables are economically significantly correlated with default. First, default is higher when the LTI ratio is high, although the relationship is nonlinear—there is an upward-sloping relation for low to moderate LTI values, but no clear incremental relationship (or even at some point a negative relation) for LTI values exceeding three. Given this shape, we generally use a dummy for $LTI > 3$ as a measure of loan risk. The second figure shows that, in addition to high-LTI loans having significantly higher default across loan vintages, default is also significantly higher for loans where there is no coapplicant. This likely reflects selection effects, although there could also be some causal impact of this variable if the lack of a co-borrower reduces risk-sharing in the case of job loss, for example. For our purposes we are simply interested in which variables are correlated in default from a statistical perspective, so that these can be used as proxies for credit risk in our HMDA analysis.

Figure A.1. Default rate by loan-to-income (LTI) ratio

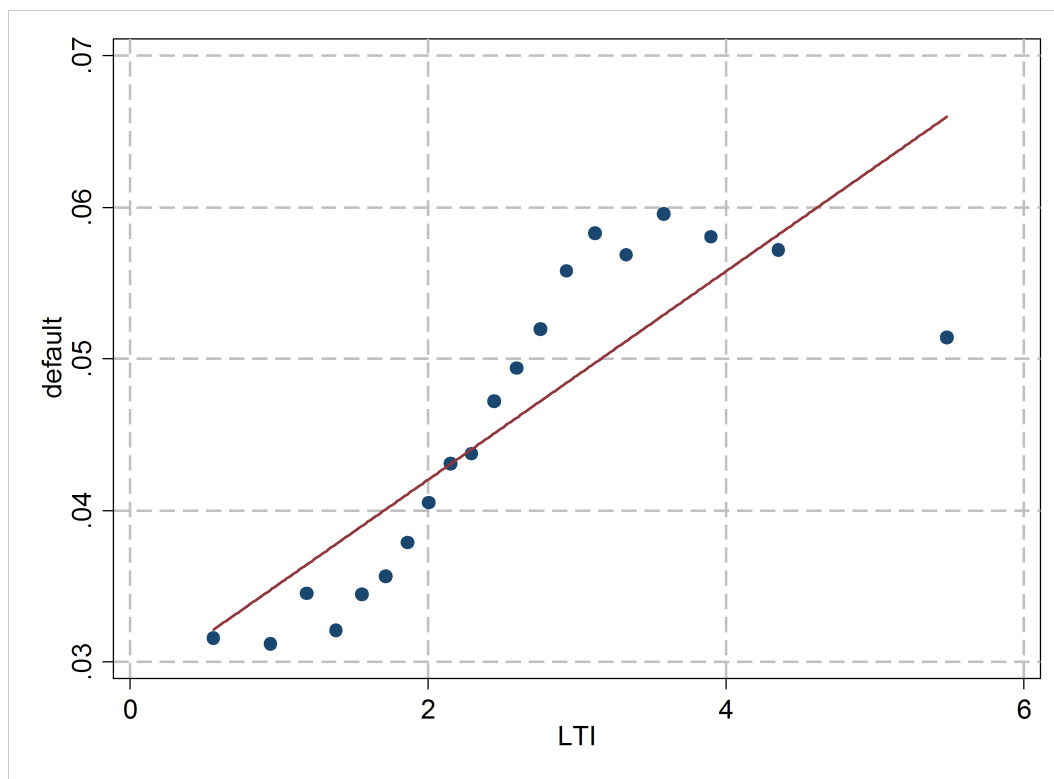


Figure A.2. Defaults over time by loan-to-income (LTI) ratio and coapplicant status

