NBER WORKING PAPER SERIES

# THE DEATH OF A REGULATOR: STRICT SUPERVISION, BANK LENDING, AND BUSINESS ACTIVITY

João Granja
Christian Leuz

Working Paper 24168
http://www.nber.org/papers/w24168

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 2017, revised May 2024

We thank our anonymous referee, Aytekin Ertan, Henry Eyring, Anil Kashyap, Anya Kleymenova, Randy Kroszner, David Lucca (discussant), Daniel Paravisini, Hester Peirce, Raghu Rajan, Thomas Rauter, Stephen Ryan, Amit Seru (discussant), Andrei Shleifer, Tobias Troeger (discussant), and workshop participants at the AFA, Chicago Booth, Duke, ETH-NYU-SAFE Law & Banking/Finance Conference, FDIC, IESE, Imperial College, LSE, NBER Corporate Finance meetings, NYU, Rice, Vanderbilt, University of Texas at Dallas, and University of Washington for their helpful comments and suggestions. We thank Tom Kim, Igor Kuznetsov, Maximillian Muhn, Fabian Nagel, Thomas Rauter, and Steven Vanhaverbeke for their excellent research assistance. This paper also benefited from a fellow visit by Christian Leuz at the Center for Advanced Studies on the Foundations of Law and Finance funded by the German Research Foundation (DFG). João Granja gratefully acknowledges support by the Jane and Basil Vasiliou Faculty Research Fund at the University of Chicago Booth School of Business.The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

The Death of a Regulator: Strict Supervision, Bank Lending, and Business Activity
João Granja and Christian Leuz
NBER Working Paper No. 24168
December 2017, revised May 2024
JEL No. E44,E51,G21,G28,G32,G38,K22,K23,L51,M41,M48


## ABSTRACT

We exploit the extinction of the thrift supervisor (OTS) to analyze the effects of supervision on bank lending and bank management. We first show that the OTS replacement resulted in stricter supervision of former OTS banks. Next, we analyze the ensuing lending effects and show that former OTS banks on average increase small business lending by roughly 10 percent. This increase is concentrated in well-capitalized banks and especially in banks that changed management practices following the supervisory transition. These findings suggest that stricter supervision operates not only through the enforcement of loss recognition and capital adequacy, but can also act as a catalyst for operational changes that correct deficiencies in bank management and lending practices, which in turn increase lending.



João Granja
Booth School of Business
University of Chicago
5807 S. Woodlawn Avenue
Chicago, IL 60637-1610
joaogranja@chicagobooth.edu

Christian Leuz
Booth School of Business
University of Chicago
5807 S. Woodlawn Avenue
Chicago, IL 60637-1610
and NBER
cleuz@chicagobooth.edu

# 1 Introduction

A recurring story line in banking crises is the public backlash against bank supervisors for their failure to take prompt and decisive action to unearth and correct problems of weak banks. These allegations often play an important role in justifying policy interventions that overhaul the regulatory oversight of the banking system, including tighter rules and stricter supervision of financial institutions (e.g., Financial Institutions Reform, Recovery, and Enforcement Act of 1989; Dodd-Frank Act of 2010). Despite the importance of such interventions, we have limited evidence on the economic trade-offs associated with reforms that aim to limit regulatory forbearance and promote stricter bank supervision.

In this paper, we study a reform of the U.S. banking system that forced a large number of banks to transition from a lenient to a stricter supervisor. Stricter supervision with respect to loss recognition could put pressure on banks' balance sheets, and in turn, force them to cut lending (e.g., Agarwal, Lucca, Seru, and Trebbi (2014)). However, the role of supervision is not limited to enforcing loss recognition rules and ensuring capital adequacy. To guarantee that banks operate in a safe and sound manner, supervisors perform other complex tasks such as evaluating the quality of banks' information and risk management systems, as well as their loan management. We posit that a stricter supervisor not only enforces loss recognition more forcefully but also evaluates banks' operations more rigorously and is less likely to accept poor management or lending practices. Thus, strict supervision could prompt banks to make operational changes that correct lingering deficiencies. It could play the role of a "catalyst for change" that ignites improvements to bank management and lending practices, which in turn could even increase credit supply, especially for loans that require greater sophistication. Thus, it is unclear ex-ante what the economic consequences of stricter supervision for lending may be.

Effective July 2011, Title III of Dodd Frank abolished the Office of Thrift Supervision (OTS) and transferred its powers to the Office of the Comptroller of the Currency (OCC) and the Federal Deposit Insurance Corporation (FDIC). This regulatory change was prompted in part by the view that lax prudential supervision by the OTS played a significant role in the failures of Washington Mutual, IndyMac, and Countrywide.[1] The extinction of the OTS was a major change in prudential supervision in the U.S. banking system, affecting thrifts, a group of banks that accounted for roughly 10% of all depository institutions and 8.5% of all U.S. deposits. It applied to banks across a wide spectrum of capital and liquidity levels, operating in different geographies.[2]

[1] See Committee on Homeland Security and Governmental Affairs (2011) for details on the turf war between FDIC and OTS and evidence on the regulatory failure and leniency of the OTS.

[2] Thrifts, also called Savings (& Loans) banks, have charters that require them to invest 65 percent of

The extinction of the OTS is a unique opportunity to examine how bank supervision shapes credit supply. First, the resulting change in bank supervision is economically meaningful and its timing is well defined. Second, in this setting, it is possible to distinguish the effects of stricter supervision from the effects of economic shocks on local loan demand and business activity because former OTS banks operate in the same areas as other commercial banks whose supervisor did not change. Third, the transition is imposed on all thrifts, irrespective of their financial condition. Moreover, charter switches before and after the OTS extinction are rare and do not influence our analysis. Despite these advantages, the setting also comes with challenges. The biggest one is that the residential mortgage market was the epicenter of the financial crisis and, at the same time, represents the key lending area for thrifts. Thus, it is important to control for crisis-induced changes in lending and thrift business models.

We begin our analysis by documenting that the extinction of the OTS and subsequent supervisory transition of former OTS banks to the OCC and the FDIC in 2011 was followed by significant changes at former OTS banks. We find that, following the OTS extinction, former OTS banks were more likely to recognize losses on their portfolios of loans. The recognition of losses on troubled loans is an important area of scrutiny in any supervisory exam and hence our evidence illustrates that the new supervisors took a harder line than their predecessors in enforcing loan loss recognition rules. Importantly, supervisory exams are not limited to loan loss recognition; they should also identify other deficiencies in bank management. Thus, stricter supervision might scrutinize thrifts' existing management practices, prompting improvements in core areas, such as loan and credit risk management. This could lead to the adoption of alternative or more diversified lending strategies.

To explore such effects, we study formal supervisory agreements written by the OTS, the OCC and the FDIC. We find that agreements between the new supervisors and former OTS banks are more likely to include stipulations requesting changes in the risk rating and stress testing system, improvements to collateral monitoring and borrower information collection, and even requests to study or ensure the qualifications of senior management. In line with this evidence, we document an increase in board turnover and executive exits at former OTS banks following the OTS extinction. Furthermore, our findings reveal evidence of increased non-interest expenses, aligning with expenditures on new lending technologies, information systems, and consulting. Collectively, our findings suggest that the supervisory transition prompted thrifts to make far-reaching changes, which have not been previously documented.

their assets in qualified thrift investments, which mostly comprise residential mortgages. The charters of other commercial banks are usually unencumbered by such restrictions but are often subject to other state and federal regulation. Due to their special charter, thrifts have historically been supervised by a distinct regulator. The OTS was created in the aftermath of the S&L crisis to replace the Federal Home Loan Bank Board (FHLBB) as the primary regulator of the thrift industry. In the Internet Appendix A, we provide further historical background on thrifts and the rise and fall of the OTS.

Next, we analyze the economic effects of stricter bank supervision on lending. Forcing thrifts to increase loan loss provisions and recognize problem loans could induce them to de-lever to conserve capital, which likely hurts lending, and could even create a credit crunch, consistent with the capital channel shown in prior work (e.g., Caballero, Hoshi, and Kashyap, 2008). However, we show that the new supervisors prompted thrifts to revisit their governance, risk management systems, and key management practices. These investments and changes could enhance banks' operational performance and capabilities, potentially resulting in increased lending and a reallocation of lending toward areas that require better screening and monitoring. In the end, it is an empirical question which channel dominates and hence whether stricter supervision hurts or boosts lending.

We study this question using small business lending data provided under the Community Reinvestment Act (CRA). Given our novel hypothesis about the potential effects of stricter supervision on bank management, it makes sense to focus on more sophisticated lending activity such as loans to small businesses rather than fairly standardized mortgages. If stricter supervision improves bank lending, we are more likely to see this for loans that are difficult to screen and monitor (e.g, Petersen and Rajan (1994)). Moreover, small business loans are important for local economic growth (e.g., Brown and Earle (2017)) and represent a sizable share of all loans held by U.S. banks accounting, on average, for approximately 25% and 11% of the stock of loans of commercial banks and thrifts, respectively. However, we would ideally observe not only the loan supply decisions but also the borrower characteristics and the ex-post performance of the originated loans before and after the supervisory transition. Such data would allow us to evaluate whether thrifts' changes in lending technologies and management practices enabled them to safely expand their lending in a way that enhances bank profitability without taking excessive credit risks. Alas, such granular data are not publicly available.

The advantage of the CRA data set is that it contains information on the quantity of new small business loans originated by each reporting bank in each U.S. county during a year. This level of geographic granularity allows us to control for local shocks to economic conditions and credit demand, which, in turn, allows us to isolate changes in thrifts' loan supply relative to other local banks around the supervisory transition. The drawback is that the CRA data set does not provide information about borrower characteristics, loan pricing or loan performance. This implies that we need to perform additional analyses to make sure that thrifts do not increase small business lending simply by accepting riskier loans (rather than due to improved lending capabilities). We therefore examine data on loan delinquencies at the bank portfolio level from banks' call reports, which allows us to evaluate whether changes in lending are related to increases in thrifts' risk-taking by studying the ex-post performance

of the overall loan portfolio. Similarly, the focus on small business lending requires us to conduct additional analyses to ascertain the lending changes after the supervisory transition are not simply substitution, i.e., changes in the lending mix.

Our findings demonstrate that former OTS banks, on average, increase small business loan originations by roughly 10% compared to the period before the OTS extinction. We obtain this result after the inclusion of county-by-year fixed effects and bank-by-county fixed effects. Thus, the lending effect is not driven by former OTS banks being located in counties with better economic conditions (and higher loan demand) but instead implies an increase in the supply of small business loans by former OTS banks relative to the supply of other banks operating in the same county and year. We show that these effects are not explained by trends that precede the OTS extinction and that they are unlikely to be driven by systematic differences in the location of former OTS banks *within* a county. Furthermore, we rule out a number of other potential explanations for our main results, namely that our results are driven by: (i) business model differences between former OTS banks and control banks; (ii) differences in the frequency of mergers and acquisitions; (iii) other regulatory changes included in the Dodd-Frank Act. Importantly, we conduct a battery of tests to show that our results are not explained by a pullback of other large banks, notably the Top-4 banks, given the evidence in Chen, Hanson, and Stein (2017).

Having established that former OTS banks increase their small business lending following the OTS extinction, we examine the economic channels that could explain this increase in lending. By the time of the supervisory transition to the OCC/FDIC most former OTS banks had already weathered the 2008–2009 financial crisis and were, at least on average, well-capitalized. Thus, unlike other settings where such interventions coincide with systemic financial distress, the OTS setting provides significant variation in the capitalization of former OTS banks prior the supervisory change. This feature enables us to differentiate effects by bank capitalization and observe the effects of strict supervision when the capital channel is less likely to be the dominant force. Consistent with this reasoning, we find that the positive lending effect of stricter supervision is concentrated in former OTS banks with above-average capitalization ratios prior to the OTS extinction. Thrifts with below-average capital ratios exhibit a decline in their small business lending, consistent with a capital crunch.

The fact that many former OTS banks were sufficiently well capitalized to absorb the increase in loss recognition demanded by the new supervisors explains why we do not observe a credit crunch for these banks. But it does not necessarily explain why these banks increase lending following the OTS extinction. We posit one explanation is that the new supervisors prompted thrifts to substantially improve core bank management practices, which resolved lingering deficiencies and also increased their ability to extend credits, especially in the area

of small business lending, where borrowers are typically hard to evaluate. Our evidence analyzing formal supervisory agreements is consistent with this explanation. Linking the two analyses, we show that increases in small business lending after the OTS extinction are more pronounced in former OTS banks that underwent significant changes in bank management practices. In particular, we find that increases in small business lending are concentrated in former OTS banks that (i) show above-median board turnover following the supervisory transition; (ii) replace executive directors following the transition; and (iii) adopt formal risk modeling after OTS extinction. These results collectively support the explanation that stricter supervision triggered broad changes and improvements in thrifts' management practices, which, in turn, allowed them to increase their supply of small business loans.

Another (and not mutually exclusive) explanation is that the new supervisors were accustomed to a different loan portfolio mix and hence they saw the high concentration of residential loans on the balance sheets of former OTS banks with concern. The new supervisors could, therefore, have pushed former OTS banks to reduce their exposures to residential mortgages and to diversify towards commercial lending. To explore this conjecture, we first analyze the mortgage originations of former OTS banks. We find a broader trend away from residential lending for these banks starting shortly after the financial crisis and a further reduction of mortgage originations by former OTS banks following the supervisory transition. The latter reduction is consistent with a supervisor-induced shift in lending strategies away from residential lending. To drill deeper, we use the idea that some local OCC field offices had greater experience supervising commercial banks with large concentrations of residential loans. These local OCC field offices are arguably more familiar or comfortable with the business models of former OTS banks and hence less likely to steer them away from mortgages toward commercial lending. We find that the increase in small business lending after the supervisory transition is indeed less pronounced in these jurisdictions. Given these results, we gauge whether portfolio reallocation due to supervisory preferences can account for the documented increase in small business lending by former OTS banks following the OTS extinction. We find that the shifts away from mortgages, both after the financial crisis and after the OTS extinction, do not explain the increase in small business lending. We interpret this result as suggesting that the reduction in mortgage lending and the expansion of credit supply for small businesses are two separate effects coming out of the supervisory transition.

In the last part of our paper, we use call report data on bank revenues, expenses, and loan delinquencies to better understand why thrifts did not voluntarily make changes to bank management practices prior to the supervisory transition, considering these changes increased their lending capabilities. Moreover, we use these data to check that the increased small business lending is not simply new and excessive risk-taking to compensate for shrinking

margins after the supervisory transition. We find increases in the ratio of non-interest expenses to total assets and in the growth of full-time employees for thrifts relative to commercial banks following the supervisory transition. These findings suggest that the supervisory transition led thrifts to spend more, consistent with changes to bank management and investments in lending capabilities that allowed them to make more sophisticated loans. Moreover, we see an increase in the ratio of bank interest revenues to total assets, consistent with new lending business after the supervisory transition. However, when we examine banks' return on assets, we do not find an increase for thrifts relative to commercial banks. This finding suggests that the incremental operating costs associated with "tooling up" the lending capabilities offset the additional revenues obtained from lending to higher-yielding small business borrowers. It provides another explanation, aside from entrenchment and management living a "quiet life", why thrifts were not voluntarily making changes to their lending systems and management practices prior to the OTS extinction and why it took a new and stricter supervisor to induce them. Lastly, we show that the expansion of small business lending by former OTS banks after the supervisory transition does not come with greater risk-taking and is also inconsistent with evergreening of bad loans. This evidence further supports our interpretation that the expansion of credit supply is driven by improvements in thrifts' lending capabilities.

To what extent do our findings generalize? First, our work could provide important insights for other instances in which supervisory powers are transferred between bank regulators. A case in point is the recent transfer of oversight for large financial institutions in the European Union from their respective national supervisors to a new European supervisor, the Single Supervisory Mechanism (SSM). The new supranational supervisor is expected to be stricter and likely also more sophisticated relative to national bank supervisors. Our results suggests that the SSM could prompt changes in core areas of bank management resulting in new and better lending, especially in some countries where national bank oversight was relatively more lenient. Second, our analysis is particularly relevant for banking systems that feature smaller and less sophisticated banks. In fact, a recent study by Passalacqua, Angelini, Lotti, and Soggia (2021) corroborates the thrust of our findings by demonstrating that random on-site supervisory inspections of small mutual banks in Italy are associated with a reallocation of bank lending toward healthier borrowers, especially for banks that improved their governance following such inspections.

Our paper is most closely related to the findings in Agarwal et al. (2014). They exploit a pre-determined mandatory rotation of federal and state bank regulators in the on-site supervision of state-chartered banks to find that differences in regulators' institutional design and incentives affect banks' supervisory assessments and practices. The legally determined rotation policy that assigns federal and state supervisors to the same bank at exogenously set

intervals allows Agarwal et al. (2014) to show the causal impact of supervisory sophistication on banks' actions. Our setting also exploits changes in supervisory oversight between distinct bank regulators to examine how supervisory strictness shapes bank lending and economic outcomes. An important difference between our paper and Agarwal et al. (2014) is that, in our setting, the transfer of supervisory power is permanent, which in turn allows us to study longer-run consequences of supervision, such as changes to banks' management practices and their impact on lending.

More broadly, we contribute to a large literature that analyzes the impact of bank regulation and supervision on lending (e.g., Eisenbach, Lucca, and Townsend, 2017; Hirtle, Kovner, and Plosser, 2020; Kandrac and Schlusche, 2021; Altavilla, Boucinha, Peydró, and Smets, 2020) and their role in regulatory forbearance (Kroszner and Strahan, 1996; Brown and Dinç, 2005; Brown and Dinç, 2011; Costello, Granja, and Weber, 2019; Lucca, Seru, and Trebbi, 2014; Bonfim, Cerqueiro, Degryse, and Ongena, 2016). Our work is also related to studies that examine how evergreening affects the allocation of capital in an economy (e.g., Caballero et al., 2008; Bian, Haselmann, Kick, and Vig, 2017; Blattner, Farinha, and Rebelo (2019)). We examine the economic consequences of a well-defined change in the strictness of bank supervision. The novel message of our paper is that stricter supervisors can act as a catalyst inducing changes in bank management that increase bank lending, suggesting that the economic effects of supervision go beyond the capital channel.

Finally, our paper contributes to the literature examining the economic effects of the Dodd-Frank Act. An important challenge in this literature is to isolate the effects of a specific provision in the Act from those of other provisions as well as to separate them from concurrent macroeconomic changes after the crisis. We follow a recent stream of literature (e.g., Dimitrov, Palia, and Tang, 2015; Buchak, Matvos, Piskorski, and Seru, 2018a; Buchak, Matvos, Piskorski, and Seru, 2018b; Charoenwong, Kwan, and Umar, 2019; Cortés, Demyanyk, Li, Loutskina, and Strahan, 2019; Doerr, 2021) that exploits granular data as well as predetermined variation in banks' exposures to different geographic regions to overcome these challenges. In doing so, we provide novel evidence on the economic consequences of a key element of the Dodd-Frank Act, i.e., the provisions in Title III that eliminated the OTS.[3]

[3]In studying how supervision affects loan loss provisioning, our paper is also related to studies on the timeliness of loan loss provisioning and its economic effects (e.g., Beatty and Liao, 2011; Bushman and Williams, 2012; Bhat, Ryan, and Vyas, 2018). Further, the paper relates to the broader literature on enforcement of financial regulation (e.g., La Porta, Lopez-de Silanes, and Shleifer, 2006; Jackson and Roe, 2009; Christensen, Hail, and Leuz, 2016.)

# 2 OTS Extinction and the Supervisory Transition

The failures of two large OTS-supervised financial institutions, Washington Mutual and IndyMac Federal Savings Bank during the 2008–2009 financial crisis put the spotlight on the widely known supervisory leniency of the OTS.[4] These failed banks jointly represented approximately 3% of all U.S. branch deposits and are two of the largest bank failures ever. In addition, Countrywide Financial, which changed its charter in 2006 to be supervised by the OTS, was forced to merge with Bank of America to avoid failure (Appelbaum and Nakashima, 2008a). Following the public and media backlash against the OTS due to its role as supervisor of these institutions (Appelbaum and Nakashima, 2008b), President Obama asked Congress to fold the OTS into the OCC.

Title III of the Dodd-Frank Act of 2010 stipulated the closure of the OTS and the transfer of OTS powers and duties to the Federal Reserve, OCC, and FDIC. The transfer of functions occurred on July 21, 2011, one year after the passage of the Dodd-Frank Act. Under the Act, the OCC and FDIC acquired supervisory authority over federally-chartered thrifts and state-chartered thrifts, respectively. In total, 649 federal thrifts transitioned to the OCC and 59 state-chartered thrifts transitioned to the FDIC on July 21, 2011.

It is possible that, subsequent to this automatic transition, former OTS banks voluntarily switch their charters to other supervisors. We examine such behavior in Table 1, which details the operating status and charter of the 708 former OTS banks that transitioned from the OTS to the OCC or the FDIC on July 21, 2011. We find that 39 of the 649 former OTS banks that were automatically transitioned to the OCC later switched to the Federal Reserve or the FDIC by June 30, 2012. In the four years that followed the OTS extinction, an additional 49 banks decided to switch from the OCC to another supervisor. This small flow of former OTS banks from the OCC to other supervisors suggests that banks perceive the other supervisors as similar and that "supervisor shopping" is unlikely to be a substantive force in our empirical analyses.[5] Table 1 further suggests that the attrition rates in the OTS sample due to mergers, failures, or closures are similar to those in the control sample of commercial banks, alleviating concerns about survivorship bias.

A total of 674 OTS employees officially transferred to the OCC's headquarters and local field offices on July 21, 2011. The OTS employees were integrated into the new supervisor

[4]There is substantial anecdotal evidence of leniency by the OTS. For example, the Office of the Inspector General found that the OTS not only authorized but also directed the backdating of capital contributions from holding companies at IndyMac and BankUnited, thereby allowing these thrifts to stay above the "well-capitalized" threshold (Office of Inspector General, 2009).

[5]We check and find that state-chartered thrifts transitioning to the FDIC and federal thrifts transitioning to the OCC saw similar increases in their provisioning and nonperforming loan ratios following the OTS extinction.

and trained to follow the rules and processes of the OCC. According to an American Bankers Association interview with OCC's Deputy Comptroller Jennifer C. Kelly, the former OTS staff participated in programs that were designed to familiarize them with the OCC's policies, processes and systems. Moreover, earlier in 2011, the OCC and the OTS conducted a number of joint examinations of both national banks and thrifts, which were meant as preparations for the supervisory integration.

The OCC and FDIC had a number of policies, processes, and systems that were different than those of the OTS. In the Internet Appendix A, we discuss these differences in greater detail. In Section 5, we analyze the implications of the OTS extinction and the supervisory transition for former OTS banks with respect to their loss recognition, loan and credit risk management and managerial practices.

# 3 Data and Key Variables

We obtain data on the financial characteristics of all commercial banks and savings banks operating in the United States from the Quarterly Reports of Condition and Income and from the Thrift Financial Reports that banks file with the FDIC and the OTS, respectively. Financial information on savings banks prior to 2012 is obtained from the Thrift Financial Report data available for download from SNL Financial. To build consistent time-series of financial characteristics and financial ratios for thrifts, we rely on the TFR-to-Call mapping prepared by the OTS staff using the Research Information System (RIS) Data Warehouse Dictionary maintained by the FDIC.[6]

We use data on banks' small business lending activities obtained from the CRA small business loans database. This data set contains information on the total number and the total amount of small business loans originated by each reporting financial institution in each U.S. county during a calendar year. Our small business lending sample covers the period between 2005 and 2015. The data set covers all commercial and savings banks whose total assets exceed $1 billion dollars.

We also obtain data on enforcement actions issued by the OTS, OCC, and FDIC from their websites. We use BoardEx to obtain data on board turnover of publicly-listed banks. We follow Bhat et al. (2018) and conduct textual analysis of all publicly-listed banks' 10-Ks to create a proxy for whether banks employ or introduce (new) credit risk models (e.g., stress testing) to assist their management and lending practices.

We collect information on banks' mortgage originations using data provided under the Home Mortgage Disclosure Act (HMDA). The HMDA data set provides geographic and

[6]The document is available online at the following address: http://www.ots.treas.gov/_files/4830092.pdf

demographic information on all mortgage applications that a bank receives over a calendar year and we use that information to study portfolio reallocation in former OTS banks.

We employ a sample period that spans four years following the OTS extinction because the supervisory examination cycles take between 12- and 18-months, which could mean that some former OTS banks received their first on-site visit by the new supervisor only in the second half of 2012. Moreover, implementing changes in bank management practices following these on-site examinations and forging relationships with small business borrowers could take some time. For these reasons, it is possible that the impact of the supervisory transition on lending is not immediately realized. We focus on local lending within the counties covered by each bank's branch network because, as shown in Granja, Leuz, and Rajan (2022), small business lending in counties outside banks' branch networks is cyclical and often a sign of (excessive) risk taking. The CRA data set also includes aggregate information on the total number and volume of small business loans originated by all reporting institutions at the census-tract level during each calendar year, which we use in some robustness analyses.

# 4 Descriptive Statistics

The dissolution of the OTS affected 708 federal and state-chartered thrifts, for which the OTS was the primary regulator as of June 30, 2011 (Table 1). Panel A of Table 2 presents descriptive statistics for the key variables in our analyses, separately for commercial banks and former OTS banks. On average, commercial banks are substantially larger than thrifts. However, looking at the median and the quartiles, thrifts are larger than commercial banks. These differences arise because the largest and most systemically important financial institutions organize as commercial banks, creating a substantial right skew in the size distribution of commercial banks.

The lending portfolio of former OTS banks is tilted toward residential mortgage lending, which comprises approximately 41% of their total assets. This portfolio allocation suggests that former OTS banks are still influenced by their historical role in the supply of residential mortgage loans to U.S. consumers. Commercial banks have more diversified loan portfolios with C&I loans and commercial real estate (CRE) loans accounting for 9% and 23% of their total assets, respectively. These two loan categories account for only 3.3% and 17% of the total assets of thrifts. The CRA defines a small business loan as (i) a C&I loan with a principal amount of less than $1 million or (ii) a loan secured by nonfarm or nonresidential properties with a principal amount of less than $1 million. These loans account for 24% of all loans at commercial banks and 11% of loans held by thrifts. The descriptive statistics highlight important differences across the two groups of banks, which we address explicitly in

our empirical analyses. In the Internet Appendix A, we offer further descriptive statistics breaking down the allocation of the lending portfolio of commercial banks and thrifts before and after the OTS extinction. We find some convergence in business models with the share of residential lending for thrifts declining and their share of C&I and small business loans increasing after the OTS extinction. Despite these changes, much of the historical differences in the share of lending dedicated to residential loans remain.

In spite of the differences in the composition of the loan portfolios across commercial banks and thrifts, the average loan quality does not differ substantially across the two groups. The average nonperforming loan ratios of commercial and former OTS banks over the sample period are 1.2% and 1.3%, respectively, and the average ratios of provisions to total assets are also very similar. The capital ratios of former OTS banks, however, are substantially higher than the ratios of commercial banks. The relatively high capitalization rate of former OTS banks is an important feature of our setting and allows us to examine the effects of strict supervision through channels other than (low) capitalization.

In Panel B of Table 2, we report additional descriptive statistics for the subsample of CRA-reporting banks. We see that commercial banks originate on average more small business loans than former OTS banks, which is consistent with the above discussion of business model differences. The patterns in the size distribution between commercial and former OTS banks in the CRA-reporting sample are similar to those in Panel A, although they are not as pronounced when measured in terms of total deposits and number of branches. We also compare the mean annual house-price appreciation in counties where commercial banks and former OTS banks originate loans and find that the house-price appreciation is, on average, higher for commercial banks. These statistics suggest that controlling for differences in loan demand across counties is important for our analysis.

# 5 OTS Extinction and Stricter Supervision

In this section, we analyze changes in banks' loan loss accounting ratios to confirm that the transition from the OTS to the OCC and FDIC resulted indeed in stricter supervision. Next, we examine formal supervisory agreements and changes in key areas of bank management to illustrate that the supervisory transition prompted broader changes at former OTS banks.

## 5.1 Stricter Supervision and Loan Loss Accounting Ratios

A key role for banking supervisors is to ensure that delinquent loans are adequately classified and that loan losses are properly recognized and provisioned. The OCC and FDIC's interpre-

tation of existing rules in the area of loan loss recognition and provisioning was perceived to be stricter than the interpretation of the OTS. For instance, in its 2012 annual report, Bank Financial, a SEC-registered thrift holding company, states that the policies of the OCC regarding loan classification will make it more difficult to renew certain loans: "The OCC maintains a number of operating policies and practices that are different from the OTS, including in the areas of loan classification and the timing of charge-offs [...] we revised our classification of asset policies and practices to complete our transition to the OCC's loan risk rating practices. The OCC's practices will make it more difficult to renew performing classified loans [...] at December 31, 2011 approximately $3.5 million of our non-accrual loan balances reflected our decision to liquidate or not renew performing classified loans." In a similar vein, SFS Financial Inc. states that: "Lastly, in late 2011, [...] we undertook a project to reduce the number of Pass grades in our loan rating system with a goal of recalibrating our loan rating classifications to current OCC and FRS standards [...] The result of this grade elimination resulted in $67 million being reclassified to Criticized or Classified, with none going to nonaccrual status. The impact of this project contributed to an incremental $2.1 million to the provision and allowance for loan losses in 2011."

In this subsection, we show that the aforementioned anecdotes are systematic and that, following the supervisory transition, former OTS banks substantially increased both their provisions for future loan losses and the fraction of loans that they classified as delinquent. A sharp increase in various loan loss and loan delinquency ratios following the OTS extinction indicates that the OCC and FDIC enforced loan loss recognition and provisioning rules in a stricter manner and, more broadly, that the new supervisors had indeed a stricter supervisory stance. This exercise essentially confirms that our setting implies a supervisory "treatment" of former OTS banks. In Figure 1, we plot the average loan loss provision and average nonperforming loan ratios of former OTS and of commercial banks. Throughout most of the pre-crisis years, the average provisioning ratios of commercial banks exceed those of former OTS banks, with the exception of the third quarter of 2008. Following the OTS extinction, former OTS banks increase their provisions relative to those of commercial banks. This difference persists until the fourth quarter of 2012 and then disappears as the provisioning ratios of former OTS banks converge to those of other commercial banks. The nonperforming loan ratios of former OTS banks were systematically lower than those of other commercial banks throughout the crisis period but with the recalibration of the loan rating systems after the supervisory transition, non-performing loan ratios increase sharply and remain above those of commercial banks until the end of the sample period.

To formally examine whether the OTS extinction is associated with stricter supervision, we estimate the following linear regression model:

$$Y_{i,t} = \beta OTS_i \times Post_t + \theta X_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t} \tag{1}$$

where $Y_{i,t}$ is the loan loss provisioning ratio, nonperforming loans ratio, charge-off ratio of bank $i$ in quarter $t$, $OTS$ is a dummy variable that takes the value of one if the bank was previously supervised by the OTS and $Post$ is a dummy variable taking the value of one following the OTS extinction in the third quarter of 2011, inclusive. We also include a vector $X_{i,t}$ of control variables containing financial characteristics such as size, portfolio composition and bank capitalization. A concern is that there are invariant differences in the loan portfolio quality of former OTS banks (e.g., lower value of collateral). We therefore include bank fixed effects, $\gamma_i$, which control for time-invariant, unobserved characteristics of each bank. We also add quarter fixed effects, $\delta_t$, to control for changes in aggregate economic conditions, which could be correlated with the extinction of the OTS. We cluster standard errors at the level of banks' county headquarters to account for regional dependencies.

Table 3 reports the results and confirms the interpretation of Figure 1. The regression results indicate that the supervisory transition is associated with statistically significant increases in all loan loss accounting ratios. After the OTS extinction, the loan loss provision ratios, nonperforming loan ratios, and charge-off ratios of former OTS banks increase by .018, .383, and .026 percentage points, respectively. In every case, these magnitudes are economically meaningful and correspond to an increase between 20 and 30 percent relative to the unconditional average of the respective variable over the entire sample period. The inclusion of controls for size, portfolio composition, and capitalization does not attenuate the coefficients of interest. This observation suggests that it is unlikely that differences in business models between former OTS and commercial banks drive the results.

We expect that the change in supervisory strictness manifests in loan loss accounting ratios starting with the first supervisory examination cycle following the OTS extinction. Towards this end, we investigate whether the OTS extinction generates a sharp "on-impact" effect on the accounting variables. To trace out the effects around the OTS extinction over time, we estimate the following linear regression model:

$$Y_{i,t} = \sum_t \beta_t (OTS_i \times \delta_t) + \theta X_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t} \tag{2}$$

which expands the model of equation (1) with an interaction of the OTS dummy with a set of quarter dummies that take the value of one in each quarter of the sample period. Figure 2 plots the series of coefficients, $\beta_t$, and corresponding standard errors. The plots are consistent with the idea that the OTS was more permissive than the supervisors of commercial banks. The provisioning ratio and especially the nonperforming loan ratios of former OTS banks

were significantly below those of commercial banks, after controlling for bank characteristics and differences in portfolio compositions and business models. These ratios exhibit a sharp turnaround immediately following the OTS extinction. At that point, the provisioning and nonperforming loan ratios significantly increase for former OTS banks. The coefficient plots also suggest that the supervisory-induced accounting and reporting adjustments are completed around the start of 2013, when the provisioning ratios of former OTS banks converge to those of commercial banks and the difference in the levels of nonperforming loan ratios across the two bank groups plateaus. This normalization around 2013 is also an indication that the thrifts are not taking new or greater risks after the supervisory transition.

In the Internet Appendix A, we conduct a battery of robustness tests to confirm that the supervisory transition, rather than other spurious factors, drives the observed changes in the loan loss accounting ratios at former OTS banks. We show that the supervisory effects on accounting ratios exists regardless of whether former OTS banks were exposed to areas with high and low house price declines. We find that the effects of the supervisory transition are more pronounced in areas where the OTS regional offices were arguably more lenient. We find economically similar results in the subsamples of federally-charted thrifts, which were transferred to the OCC upon the OTS extinction, and state-charted thrifts, which were transferred to the FDIC, again alleviating concerns that banks' voluntary charter choices bias our results. Finally, we document that the results are robust when we employ an alternative specification that includes interactions between the *Post* dummy and banks' financial characteristics.

## 5.2 Stricter Supervision and Loan and Credit Risk Management

A novel aspect of our study is to highlight that stricter supervision could act as a catalyst and lead to far-reaching changes in bank management. The reason is that competent supervision is complex and multifaceted involving not only the enforcement of loss recognition and capital adequacy rules but also a broader evaluation of bank systems and practices, such as credit risk management. In this subsection, we examine this conjecture and ask to what extent the new supervisors went beyond forcing former OTS banks to recognize existing loan losses and to adequately provision for future losses. According to multiple accounts, the OCC and FDIC actively prompted former OTS banks to make changes to their business practices, in particular, in key areas of bank management, such loan and credit risk management. For instance, a majority of former OTS bankers surveyed by Sageworks (SageWorks, 2013) indicated that the biggest area of change that they have had to implement as a result of the supervisory transition was to strengthen their risk rating system and 38 percent responded that they

implemented stress testing.[7] Mark W. Olson, a former Federal Reserve Board governor and chairman of the PCAOB, adds support to these claims in a opinion article written for the *American Banker*. In that article he discusses that under OCC oversight, thrifts will be expected to collect periodic information on the financial health of borrowers or "other fresh information on repayment capability" and that "[e]ven the smallest thrifts are being asked to demonstrate an enterprise risk management culture."

Bank supervisors conduct regular on-site inspections of their regulated entities and request that banks correct deficiencies that the bank examiners identified in the course of these bank examinations. These corrective actions are requested informally as well as through certain supervisory actions (e.g., Goldsmith-Pinkham, Hirtle, and Lucca (2016)).[8] Alas, many of these corrective supervisory actions are not public information. When the deficiencies in bank management are more severe and banks fail to address those deficiencies, bank supervisors could request corrective measures through formal supervisory actions that have legal force. These formal supervisory actions are less frequent than the aforementioned corrective actions (e.g., Goldsmith-Pinkham et al., 2016) but they are publicly disclosed by all bank supervisors, both before and after the OTS extinction. The public nature of these supervisory actions allows us to empirically examine their content, which in turn allows us to better understand how the OCC and FDIC differ in their supervisory approach as well as to document supervisory-induced changes at former OTS banks.

We begin by examining whether the number of enforcement actions and the number of requests made in each enforcement action increase after the supervisory transition, which would indicate the OCC and FDIC requested corrective actions at former OTS banks that were not previously requested by the OTS. In Table 4, we estimate the empirical specification of equation (1) to examine the effect of the supervisory transition on the frequency and content of formal enforcement actions. Columns (1) and (2) indicate that the likelihood that a former OTS bank received an enforcement action increases by 0.2 percentage points following the supervisory transition. This increase in the frequency of enforcement actions is economically significant considering that the average quarterly rate of enforcement actions is only 0.7 percent over the entire sample period.

It is conceivable that the OCC and FDIC are quicker to "pull the trigger" on formal supervisory actions, yet their supervisory actions include fewer corrective items than those of the OTS (pre extinction). In that case, the interpretation of the increase in the number of enforcement actions would be less clear. We therefore examine the text of all enforcement

[7] https://www.sageworks.com/blog/post/2013/11/14/biggest-areas-of-change-transitioning-from-OTS-to-OCC.aspx

[8] These supervisory actions include matters requiring attention (MRA), matters requiring immediate attention (MRIA), or memorandum of understandings (MOUs) documents.

actions issued by various banking supervisors during the sample period. In columns (3) and (4) of Table 4, we find that the length of the enforcement actions issued by the OCC and FDIC against former OTS banks increases relative to the length of the enforcement actions issued to the same banks by the OTS. This evidence suggests more extensive supervisory requests. We also investigate changes in the likelihood that the supervisory agreement contains a specific request by searching the text of the enforcement actions for "stress test", "stress testing", "risk model", and "stress scenarios." We create a dummy variable that captures whether the enforcement action contains at least one of those bigrams. In columns (5) and (6) of Table 4, we find that the enforcement actions by the OCC and FDIC are more likely to request changes to thrifts' risk management relative to those issued by the OTS to the same thrifts. These results support the idea that enforcement actions of the new supervisors issued to former OTS banks were more comprehensive and, in particular, more likely to include requests to correct deficiencies in thrifts' risk modeling practices.

Next, we focus on loan and credit risk management and evaluate differences between the supervisory requests of the OCC/FDIC and the OTS in that important area of bank management. To this effect, we read all formal written agreement and cease-and-desist orders against former OTS banks that were issued by the OTS prior to its extinction and by the OCC and FDIC following the transition. We classify the content of each enforcement action in terms of whether it includes requests for improvements or corrective actions in the following specific areas of loan administration and credit risk management: Collection of borrower information, collateral monitoring, documentation of loan exceptions, limits on portfolio concentration, change in risk rating system, and change in loan review system. We then investigate whether the OCC/FDIC were more likely to request improvements in these areas than the OTS.

We provide descriptive statistics for the incidence of each type of correction action pre and post OTS extinction in the Internet Appendix A. In Table 5, we report regression results to make sure changes in the requests are not driven by composition effects. That is, we first include controls for bank characteristics and then also bank fixed effects. The findings suggest that the OCC and the FDIC request significantly more corrective actions in the following areas: Collection of Borrower Information, Collateral Monitoring, Documentation of Loan Exceptions, and change in Risk Rating System. When we include bank fixed effects, we see that the OCC and FDIC demand incremental changes with respect to loan and credit risk management from thrifts that previously received formal actions from the OTS. Thus, the results do not just reflect that the OCC and FDIC issued more formal supervisory actions in these important areas of bank management, but rather that the new supervisors requested improvements that the OTS had not requested in its enforcement actions of the same banks.

In Internet Appendix A, we provide further details on our content analysis of supervisory agreements. There, we also show that the OCC/FDIC went as far as requesting that former OTS banks review, take actions to ensure, or strengthen management qualifications of senior management personnel.

A potential concern about using public enforcement actions to evaluate whether the supervisory transition prompted former OTS banks to make broad changes in bank management is that only a relatively small number of banks receive formal enforcement actions in any given period. Thus, we need to probe if these requests for changes in bank management were limited to the subset of thrifts that received formal supervisory actions or whether the aforementioned evidence is symptomatic in that the stricter supervisory approach of the OCC and FDIC prompted changes in bank management practices across many thrifts.

To this effect, we measure changes in banks' management after the supervisory transition for all publicly-listed banks using three different proxies. First, we examine whether the supervisory transition is associated with greater rates of board turnover, defined as the ratio between the sum of entry of new directors and exit of existing directors and the average number of directors on the board of the bank during the year. Second, we analyze whether the supervisory transition is associated with a higher likelihood of executive directors exiting former OTS banks. Third, we follow Bhat et al. (2018) and create a disclosure-based proxy for the use of formal credit risk modeling by financial institutions. Changes in this proxy following the OTS extinction would be indicative that former OTS banks updated their risk modeling and credit risk management in response to the supervisory transition.

We present the results of this analysis in Table 6. Panel A of Table 6 provides descriptive statistics for the three outcome variables. On average, approximately six percent of all directors in the sample enter or exit from a bank's board during any given year. We find that the likelihood that a bank executive exits is approximately eight percent for the sample of commercial banks and approximately six percent for OTS banks. And approximately half of the banks in the sample discuss risk models in their 10-Ks.[9] In Panel B of Table 6, we present regression results using the difference-in-differences framework of equation (1) for the three outcome variables described above. These variables are available only at the bank level, at an annual frequency and for the subset of publicly-listed banks, which explains the lower number of observations for this analysis. We find that the OTS extinction is associated with significantly higher rates of board turnover (Columns (1) and (2)) and higher rates of executive director exit (Columns (3) and (4)), relative to commercial banks over the same time period. To gauge magnitudes, the exit rates of executive directors increase by four

[9]In Internet Appendix A, we plot descriptive statistics with the evolution of these variables for former OTS banks and other commercial banks. The plots show an increase in these variables for former OTS banks relative to other banks after the OTS extinction.

percentage points, which is large considering that the unconditional likelihood of exit by an executive director is around eight percent. In Columns (5) and (6), we find that former OTS banks significantly increase the use of credit risk models by roughly nine percentage points following the supervisory transition.

Overall, the collage of evidence presented in this subsection supports the conjecture that the forced transition of thrifts to stricter supervisors triggered significant and wide-ranging changes in many key areas of bank loan and risk management, including even changes in former OTS banks' management and personnel. These findings are consistent with recent evidence in Hirtle et al. (2020) showing that greater supervisory scrutiny is related to improvements in bank performance and lower bank risk.

# 6 OTS Extinction and Bank Lending

In this section, we analyze how the supervisory transition affected bank lending. We focus our analysis on small business lending, which comprises, on average, approximately 24% of all loans held by commercial banks and 11% of all loans held by thrifts. Moreover, small business loans are not only a meaningful fraction of the total lending portfolio of commercial banks and thrifts, but they also involve relatively difficult-to-evaluate borrowers, which makes small business lending a good outcome to examine in our context. We use a data set of small business loans collected under the CRA. This data set is especially well suited to examine the evolution of C&I lending around the supervisory transition because its reporting guidelines did not change around the event and, therefore, it offers consistent information on new loans through time. Moreover, it provides information on the amount of new loans that banks *originated*, rather than slow-moving stocks of loans, as well as information on where banks originated the loans.

We exploit this information on the amount of small business loans that CRA-reporting banks originate by county during a calendar year and compare the small business lending of thrifts in a county relative to the small business lending of commercial banks that operate in the same county during the same year. The empirical strategy relies on the idea that banks operating in the same counties at the same time are subject to similar shocks and trends in credit demand, which should allow us to isolate the effect of the OTS extinction on the supply of credit. We estimate this effect with the following specification:

$$Ln(TotalLoans)_{i,c,t} = \beta OTS_i \times Post_t + \theta X_{i,c,t} + \gamma_{c,t} + \delta_{i,c} + \epsilon_{i,c,t} \tag{3}$$

where $Ln(TotalLoans)_{i,c,t}$ is the natural logarithm of the total amount of small business loans originated by bank $i$ in county $c$ in calendar year $t$. $OTS$ is a dummy variable that takes

the value of one if the bank was supervised by the OTS prior to the OTS extinction and *Post* is a dummy variable that takes the value of one following the OTS extinction starting in the calendar year 2011. $X_{i,c,t}$ is a vector of bank characteristics at the county-level that includes linear and quadratic controls for the branch presence and total deposits collected by a bank in a county. The county-by-year fixed effects, $\gamma_{c,t}$, control for unobserved common shocks in a county during a calendar year. In addition, we introduce bank-by-county fixed effects, $\delta_{i,c}$, which control for unobserved time-invariant characteristics of each bank in each county, including differences in banks' business models. Standard errors are clustered at the county level. The inclusion of county-by-year and bank-by-county fixed effects ensures that we examine the evolution of a bank's lending within a given county and year comparing thrifts and commercial banks. Given the fixed effects, the results are not driven by changes in the sample composition with respect to thrifts and commercial banks across time and counties or by, on average, greater demand for small business loans in counties where former OTS banks are located.

Table 7 reports the results of this analysis. In Column (1), we estimate a specification that includes year, bank, and county fixed effects. In Column (2), we present our preferred specification, expressed by equation (3), which includes county-by-year and bank-by-county fixed effects. The coefficient on the main variable of interest, $OTS_i \times Post_t$, is statistically significant in all specifications and the coefficient estimates are economically meaningful. In our preferred specification, Column (2), the OTS extinction is associated with a roughly 9% increase in the volume of small business loans originated by former OTS banks. The decline in the magnitude of the main coefficient between Columns (1) and (2) suggests that controlling for differences in potentially unobserved demand shocks across thrifts and commercial banks with county-by-year and bank-by-county fixed effects is important.

We recognize that bank size and holdings of C&I loans can differ substantially across thrifts and commercial banks. As a result, commercial banks could respond differently to economic shocks, for instance, because they specialize in different types of loans. Thus, a potential concern is that commercial banks are not an adequate control group for former OTS banks, i.e., they do not satisfy the parallel-trends assumption. To gauge and mitigate this concern, we use coarsened exact matching (Iacus, King, and Porro, 2012) to ensure that we compare the lending of former OTS banks with the lending of commercial banks that are similar in size and have similar shares of C&I holdings. The results reported in column (3) suggest that, if anything, the magnitude of the estimated effect increases when we match on these dimensions.

Another concern is that former OTS banks and commercial banks locate in different areas *within* a county, which would not be addressed by the fixed effects in the model. We address

this concern in two ways. First, we compute a bank- and county-specific house price index that captures house price changes in the zip codes, in which a bank has branches. We re-estimate the model including this additional control for local conditions at the zip level. As this variable reflects systematic differences in the location strategies of former OTS and commercial banks within a county, it should help to absorb potential unobserved heterogeneity in *within-county* loan demand. The results, reported in Columns (4)-(6), are quantitatively very similar to those in Columns (1)-(3). Importantly, we see little attenuation in the coefficient of interest, suggesting that our results are not driven by within-county differences in local credit demand.

Second, we draw on Nguyen (2019) and examine whether our results are robust to using an alternative CRA data set that contains aggregate information on the total small business loans originated at the census-tract level, which is a finer geographical delimitation. We find that aggregate small business lending increases in census tracts with a larger share of deposits held by former OTS banks relative to other census tracts within the same county and year that have a smaller share of deposits held by former OTS banks and that this increase occurs after the supervisory transition. We report these results in Internet Appendix B.

In light of the evidence presented in Chen et al. (2017) that the largest U.S. banks pulled back from small business lending following the financial crisis, another significant concern is that our main results are driven not by larger small business lending of thrifts, but instead by reduced lending of the top commercial banks. To analyze this concern, we re-estimate equation (3) but restrict the sample. We first exclude the top-4 banks as in Chen et al. (2017) and then exclude the top-20 small business lenders, most of which were subject to formal stress tests by the Federal Reserve (e.g. Cortés et al., 2019).[10] We report the results in Panel B of Table 7 and find that the coefficients of interest not only remain statistically significant but have very similar magnitudes. This finding is remarkable considering that the top-4 and top-20 banks represent a considerable fraction of our sample. The fact that our results are essentially unchanged after removing these observations suggests that the documented increase in thrifts' small business lending is not an artifact of business lending trends for large banks in the control group.

Next, we augment the model of equation (3) to include a series of interactions between the OTS dummy and the year dummies. This analysis serves two purposes. First, it examines whether the pre-trends are parallel and the increase in small business lending occurs after the supervisory transition, and does not represent an ongoing trend towards small business lending. Second, it addresses concerns that the effects could reflect mean reversion in the performance of former OTS banks. We plot the series of coefficients and corresponding standard errors

[10] In Internet Appendix C, we further examine whether controlling for the evolution of lending by the top-4 banks changes our results and find that it does not.

from estimating this model in Figure 3. The plot shows that i) there are no significant pre-trends, which suggests that commercial banks operating in the same county and year as the thrifts are an adequate control group, and ii) the impact of the supervisory transition on small business lending starts to show soon after the OTS extinction and continues to increase for several years after the supervisory transition. These patterns support the interpretation that the increase in small business lending is a direct cause of the change in supervision, rather than mean reversion in the performance of former OTS banks.[11]

In the Internet Appendices C and F, we examine whether the relation between the OTS extinction and thrifts' small business lending survives a battery of robustness tests. Specifically, we confirm that the results are robust to (i) controlling for the total assets of banks, the interaction of this variable with the Post dummy and weighing observations by total amounts lent by banks in the county, (ii) controlling for bank participation in Troubled Asset Relief Program (TARP), (iii) adjusting for bank mergers and acquisitions to make sure the results are not driven by sample composition changes, (iv) controlling for the impact of other Dodd-Frank provisions that might have affected small business lending, such as the creation of the Consumer Financial Protection Bureau or the removal of the remaining interstate branching regulations, (v) accounting for the potential parallel impact of the supervisory transition on the stringency of the CRA examinations of thrifts, and (vi) alternative definitions of the dependent variable to address potential issues with its skewness.

Overall, we conclude that the transition to stricter supervisors led to an increase in small business lending by former OTS banks. Furthermore, we refer back to Figure 2 and note that despite this increase in lending following the OTS extinction, the non-performing loan ratios of former OTS banks are converging, albeit slowly, to those exhibited by the commercial banks. This convergence already suggests that thrifts' new and additional C&I lending is not at the expense of greater loan delinquencies in the future. We come back to this important issue in Section 8.

# 7 Potential Economic Channels

Having established that former OTS banks increase their small business lending following the extinction of the OTS, we examine the economic channels that could explain this increase in lending. In this section, we consider three different channels: bank capitalization, changes to bank management, and portfolio reallocation.

[11] In unreported tests, we find that the impact of the supervisory transition on lending flattened after 2015, which suggests that the treatment effect from the transition took a while to materialize.

## 7.1 Bank Capitalization and Credit Crunch

The lending results, together with the earlier loss recognition results, are seemingly inconsistent with a large literature showing that financial institutions cut lending in response to loan losses that negatively affect their balance sheets and regulatory capital (e.g. Peek and Rosengren, 2000; Ivashina and Scharfstein, 2010; Gambacorta and Marques-Ibanez, 2011; Chodorow-Reich, 2013; Bord, Ivashina, and Taliaferro, 2021; Granja and Moreira, 2019). Based on this literature, stricter supervision that forces banks to recognize existing loan losses and to expand their loan loss provisioning is expected to lead to less lending because banks face a capital crunch or need to conserve capital to avoid costly supervisory interventions. We call this effect the capital channel.

However, the descriptive statistics for our sample show that most thrifts that survived the financial crisis were relatively well-capitalized at the time their supervisory transition and hence were able to easily absorb the extra loan loss provisioning and recognition imposed by their new supervisors. Thus, in our setting, the capital channel is less likely to be prevalent. This is different from many other settings studied in the literature, in which supervisory interventions coincide with banks' financial distress or systemic crises. Thus, the OTS extinction allows us to study whether there are effects of stricter supervision that go beyond the capital channel. To illustrate that the latter channel is nevertheless present for some banks in our setting, we examine whether the impact of the supervisory transition on bank lending differs depending on thrifts' capitalization prior to OTS extinction.

In Columns (1) and (2) of Table 8, we stratify the sample based on banks' Tier 1 Capital ratios in the last quarter of 2010 (using the sample of former OTS banks to determine the cutoff).[12] The results are striking: thrifts with above-median regulatory capital increase small business lending while thrifts with below-median ratios significantly reduce their small business lending following the OTS extinction. In Columns (3) and (4), we repeat the empirical exercise but partition the sample based on the Tier 1 Leverage ratios defined as Tier 1 Capital divided by total assets, rather than risk-weighted assets as in the commonly used Tier 1 Capital Ratio. The results further support the idea that well-capitalized thrifts increase small business lending while less well-capitalized thrifts do not.[13] These results reconcile our findings with

[12]We determine cutoffs by using banks' capitalization ratios as of the last quarter of 2010, which results in the exclusion of banks not in the sample during that year despite being included in previous years. This exclusion reduces the number of county-bank-year observations, partly accounting for the disparity in the number of observations between columns (1) and (2) of Table 8 and column (2) of Panel A of Table 7. Additionally, partitioning the sample based on Tier 1 Capital results in the exclusion of a large number of singleton observations, contributing further to the lower combined number of observations. In unreported analyses, we replicate the empirical exercise by partitioning the sample based on banks' average capital ratios prior to 2011, yielding qualitatively and quantitatively similar results.

[13]In Internet Appendix C, we show that the effects of the OTS extinction are concentrated in areas where

the literature on the capital channel but should, nonetheless, be interpreted with caution as the cross-sectional split on banks' regulatory capital could capture other unobservable characteristics related to banks' willingness to lend.

We further explore the interplay between the capital ratios of former OTS banks and the impact of strict supervision on bank lending by examining how such impact varies across different levels of bank capitalization. We create six groups based on banks' Tier 1 capital ratios as of the fourth quarter of 2010. That is, we stratify banks based on whether their Tier 1 Capital ratio is below 10, between 10 and 12.5, between 12.5 and 15, between 15 and 17.5, between 17.5 and 25, and more than 25 percent, respectively. Next, we augment the model of equation (3) to include a series of interactions between the former OTS bank indicator and dummy variables that take the value of one for the capitalization group to which a given bank belongs.

We plot the results of this analysis in Figure 4. The findings corroborate our conjecture that less well-capitalized banks decrease lending following the transition to a stricter supervisor that puts pressure on their capital ratios. In the group of banks with Tier 1 capital ratio below ten percent, former OTS bank decrease small business lending substantially following the supervisory transition. Banks with Tier 1 capital ratios between 10 and 12.5 percent also see their small business lending decline, albeit not nearly as much. The estimated impact of the supervisory transition on small business lending is positive for all other groups.

The results for less well-capitalized banks are largely consistent with prior literature that emphasizes the role of bank capital for lending. That is, banks that are capital constrained are likely to scale back lending when they are forced to recognize losses or build up provisions. As such, our analysis confirms the central role of bank capitalization for the effects of supervisory interventions. But it also shows a novel effect of strict supervision that is not observed when banks are thinly or undercapitalized. We further explore this channel in the next subsection.

## 7.2 Changes to Bank and Loan Management

The capital channel that we examined in the previous subsection cannot explain why well-capitalized thrifts increase their small business lending following the OTS extinction. One potential explanation is that stricter supervision has effects that go beyond the capital channel and timely loan loss recognition. In Section 5.2, we show that the OCC and FDIC requested significant modifications to former OTS banks' management and lending practices when they received formal supervisory actions. We also show for the sample of publicly-traded thrifts that the supervisory transition is more broadly associated with managerial changes including

commercial banks, as local competitors, were more capital constrained and, therefore, less willing to extend credit, which in turn allowed former OTS banks to expand their lending after the supervisory transition.

its credit risk management. This evidence is consistent with the idea that the supervisory transition prompted banks, formally and informally, to resolve lingering deficiencies in bank management that were left unaddressed or allowed to linger by the OTS. We posit that such management changes improved thrifts' ability to extend credit to hard-to-evaluate small business borrowers.

To connect the evidence in Sections 5.2 and 6, we examine whether the documented changes in bank management could explain the documented increase in small business lending of former OTS banks following the supervisory transition. The idea is to build on the results of Table 6 and assess whether the lending effects are stronger in the subset of former OTS banks that saw greater board and executive director turnover and that adopted more formal risk modeling following the supervisory transition.

Again, the analysis is limited to the subsample of publicly-listed banks, for which these data are available. Despite the decline in sample size, the empirical results presented in Table 9 support the conjecture that the increases in small business lending are more pronounced in the subset of former OTS banks with greater changes in bank management and credit risk modeling. Specifically, the results in Columns (1)–(4) suggest that the increase in small business lending is more pronounced in the subsample of former OTS banks that exhibit greater board turnover and that saw at least one member of its executive team exit after the OTS extinction. Furthermore, the results in Columns (5) and (6) suggest that the increase in small business lending is larger for banks that adopted (new or more extensive) credit risk modeling after the supervisory transition.

Our results pose the obvious question of what precluded the OTS from pointing out deficiencies and asking for changes to management and systems prior to its demise. Perhaps it lacked the sophistication or resources to detect and correct these issues at former OTS banks. It is also possible that it took a softer stance than the other supervisors because it was captured by special interests.[14] Regardless of what explains the inaction of the OTS, our findings suggest that the transition to stricter supervisors triggered a broad set of changes to the internal management practices of thrifts and that these improvements, in turn, played a key role for the observed increase in small business lending.

This interpretation, however, raises the question why the thrifts themselves did not address their deficiencies in bank management prior to the OTS extinction, especially if these shortcomings constrained their lending. Our analysis does not provide a definitive answer.

[14]We do not have data on the resources of the OTS and capabilities of its examiners to shed light on whether lack of resources or sophistication explains the differences across supervisors. In the Internet Appendix, we provide evidence suggesting that the OCC imposed stronger corrective actions on thrifts headquartered in states that were formerly under the jurisdiction of the Western Division of the OTS, whose regional director, Darrel W. Dochow, received significant negative attention for having cozy ties with the thrifts in his regional division (e.g. Story and Morgenson, 2011).

One possible explanation is that thrifts' business model was relatively cheap and "sleepy" with few incentives to invest in greater sophistication. Loosely speaking, bank management was living the "quiet life" (Bertrand and Mullainathan (2003)) and reluctant to make changes until the new supervisors came in, pointing out various deficiencies, which prompted broader improvements.[15] As we show later in section 8, the supervisory-induced changes required thrifts to incur significant operating costs, which probably had uncertain benefits for a business model focused on relatively straight-forward residential mortgage lending. Another (and related) explanation is that lingering agency and governance problems prevented such changes. The turnover analyses are consistent with the notion that entrenched executives and board members are an important part of the story. Regardless of what was holding back the thrifts, the novel message of our paper is that stricter supervisors can induce changes in bank management that increase bank lending.

## 7.3 Lending Portfolio Reallocation

Former OTS banks were significantly more concentrated in residential lending than other commercial banks. The OTS extinction meant that former OTS banks moved from a supervisor that was familiar with their business model to new supervisors that were less familiar and perhaps even uncomfortable supervising thrifts with a large portfolio concentration in residential lending. Thus, a potential alternative (but not mutually exclusive) explanation for our results is that the OCC and FDIC pushed former OTS banks to change their lending strategies toward a lending portfolio mix that was closer in line with that of the commercial banks that they have been supervising. Consistent with this conjecture, the poll of former OTS bankers conducted by Sageworks that we refer to in Figure A.1 reports that approximately 25% of respondents identified "diversification of portfolio/change in lending strategy" as the biggest area of change that resulted from the supervisory transition.[16]

This conjecture implies that former OTS banks reduced their exposure to the residential mortgage market following the supervisory transition. We present evidence in Internet Appendix D that thrifts started reducing their mortgage lending after the financial crisis and further reduced it after the OTS extinction. Consistent with these findings, we also find that the mortgage interest rates increase and the interest rates on commercial equipment loans decline for former OTS banks relative to commercial banks after the supervisory transition.

[15] Bank managers could be fairly insulated from competition due to scarce managerial talent in local labor markets or due to legal restrictions to bank competition (see, for instance Bloom, Propper, Seiler, and Van Reenen (2015)).

[16] We note, however, that this answer was given less frequently than three others, including the "implementation of stress testing." Moreover, our analysis of enforcement actions before and after OTS extension shows that "Limits on Portfolio Concentration" does not exhibit significant changes (Figure A.3 and Table 5).

Given these findings, we examine next whether the small business lending results could be partly explained by supervisory pressures to make thrifts conform to lending strategies that fit the mold of what the OCC and FDIC typically oversee. Towards this end, we exploit pre-existing cross-sectional variation in the similarity between the average portfolio mix of commercial banks supervised by a local OCC field office and the average portfolio mix of former OTS banks located in the same area, all prior to OTS extinction. The idea is that bank examiners of local OCC field offices have different degrees of comfort and familiarity with the portfolios of former OTS banks depending on how (dis)similar these portfolios are to the portfolios of the other (commercial) banks that they supervise.

We assign each commercial bank and each former OTS bank to the closest OCC field office. We then compute, for each OCC field office, the difference between the pre-OTS extinction portfolio mix of commercial banks supervised by the OCC and former OTS banks that are close by and would likely be in the same jurisdiction. Specifically, we compute the difference, at the end of 2010, between the average share of C&I loans of all commercial banks supervised by a local OCC field office (commercial banks) and the average share of C&I loans of former OTS banks that we assign to the same local OCC field office. Using a similar procedure, we compute an analogous measure of distance in portfolio allocation using the share of residential loans. We then stratify our sample based on whether a bank is supervised by a local OCC field office with above- or below-median distance in the respective portfolio allocations and re-estimate the main results of Table 7 in each of these subsamples.

We report the results from this analysis in Table 10. In Columns (1) and (2), we partition the sample based on whether a bank is in the jurisdiction of an OCC field office with large or small difference in the average shares of C&I lending between commercial banks and former OTS banks. In Columns (3) and (4), we partition the sample in a similar way, but use differences in residential lending shares. The results in Columns (1) and (2) of Table 10 suggest that the positive impact of the supervisory transition on small business lending is concentrated in former OTS banks located in the jurisdictions of local OCC field offices that supervised commercial banks with much larger concentrations of C&I lending compared to the thrifts. For former OTS banks located in jurisdictions of local OCC field offices where commercial banks and thrifts have relatively similar shares of C&I lending shares on their lending portfolios, the supervisory transition does not have a positive effect.[17] Similarly, the results in Columns (3) and (4) suggest that the impact of the OTS extinction on small business

[17]The significantly negative coefficient in Column (2) is explained by a relatively greater share of thrifts with low capitalization, which are scaling back lending as shown in Table 8. If we re-estimate the analysis in Columns (1) and (2) of Table 10 for well-capitalized banks, then the coefficient on OTS×Post is positive in both partitions, but still larger in the partition with a large difference in C&I. We checked that other cross-sectional splits in our study do not exhibit such imbalances with respect to capitalization.

lending is more pronounced when the former OTS banks are located in the jurisdictions of local OCC field offices where the difference in residential lending shares between commercial banks and thrifts is larger.

As with previous cross-sectional splits, these results should be interpreted with caution as the split variable could capture other unobservable characteristics related to banks' willingness to lend. Nevertheless, the results in Table 10 are consistent with the idea that OCC field offices accustomed to a different *modus operandi* are more likely to push former OTS banks to adjust their portfolio mix, so that it is closer in line with the mix of commercial banks the OCC field office supervises. This finding is interesting because it suggests that supervisory preferences (or familiarity) could influence banks' business models and lending strategies.

In light of this evidence suggesting a supervisor-induced portfolio reallocation away from residential lending in at least some former OTS banks, we analyze whether this explanation can account for the thrifts' increase in small business lending document in Section 6. Towards this end, we include variables for the level of *residential* lending as well as changes in the supply of *mortgages* in the small business lending analyses around the OTS extinction. The idea is to see if the OTS effect on small business lending is substantially attenuated in the presence of these variables. The results in Table 11 indicate that the coefficient of interest is *not* attenuated when we include a battery of different indicators for thrifts' supply of mortgages. The lack of attenuation is consistent with the evidence in Figure A.1 suggesting that only 25% thrifts report pressures to diversify their portfolios. This relatively small fraction could explain why some thrifts exhibit a supervisor-induced reallocation from mortgage to small business lending, but the latter cannot account for the thrifts' overall increase in small business lending. Put differently, only those thrifts that, on the margin, had high exposure to residential mortgages and whose OCC field offices were less familiar with their business models ended up shifting into small business lending to diversify their portfolios.

# 8 Bank Profitability after the OTS Extinction

Our preferred interpretation of the overall evidence is that former OTS banks were prompted by new and stricter supervision to make costly changes to core bank management and lending practices, which in turn allowed them to lend safely to difficult-to-evaluate small business borrowers. To corroborate such changes and shed further light on the economic channels discussed in the previous section, we explore data on the cost structure, profitability and delinquencies from banks' call reports.

## 8.1 Non-Interest Expenses

In section 5.2, we argue and provide evidence that stricter supervision induced former OTS banks to adopt more sophisticated risk management and lending technologies, which allowed thrifts to expand credit supply to small business borrowers without necessarily sacrificing credit quality. But adopting these changes are costly as they imply new spending and investments in human capital, data, and information technology.

We therefore examine whether and to what extent banks saw their non-interest expenses and personnel counts increase around the supervisory transition relative to commercial banks. We present these results in Figure 5. We show that both the non-interest expense ratio and the number of full-time employees increase sharply and materially for thrifts after the OTS extinction. In Panel A, we find that the average ratio of non-interest expenses to total assets jumps from approximately 3.7% to more than 4.1% for thrifts, whereas the same ratio continues on a downward trend for commercial banks. These results are statistically significant after conditioning on other bank characteristics and using only within-bank variation. In Panel B, we find similar patterns using the growth in full-time employees as an outcome variable. By the end of our sample, the average former OTS bank employs 40% more people than in the year prior to the supervisory transition, whereas commercial banks employ, on average, only 20% more people over the same period.

These increases in non-interest expenses and personnel do not necessarily indicate that former OTS banks invested in new lending technologies, internal controls, or risk rating systems. It is also possible that higher non-interest expenses and more employees at former OTS banks reflect more red tape and compliance costs due to the transition. The call reports provide a breakdown of the non-interest expenses by category, which allows us to probe whether the increase in non-interest expenses are due to increased spending in categories that are likely associated with improvements in thrifts' information, risk management and lending systems. However, we are able to examine the evolution of spending in each non-interest expense category only in the period following the supervisory transition because the thrift financial reports do not report a breakdown of non-interest expenses by category.

Despite these limitations, we examine non-interest expenses by category and report the results in the Internet Appendix A. We find that, for former OTS banks, spending in the categories data processing, accounting and auditing as well as consulting and advisory strongly outgrows the spending in the same categories for commercial banks since 2012. Yet, other non-interest expense categories such as advertising and marketing, telecommunications and, in particular, legal grow at the same rate for former OTS banks and for commercial banks. Considering that improvements in lending technologies and internal controls are likely associated with the former categories rather than the latter, we interpret this evidence as

consistent with the idea that former OTS banks made significant investments in their lending capabilities following the OTS extinction.

## 8.2 Bank Revenues and Overall Profitability

Investments in information, risk management and lending systems possibly allow thrifts to better screen and monitor existing and prospective clients and hence make higher-yielding loans to small businesses without taking excessive risks. In sections 6 and 7, we show that former OTS banks expanded their supply of higher-yielding small business loans, especially when they made significant changes in their management practices. Consistent with this earlier evidence, we show in Panel A of Figure 6 that, over the sample period, the ratio of bank interest revenues to total assets is decreasing less for thrifts relative to commercial banks and that, after conditioning on bank characteristics and using only within-bank variation, thrifts see a significant increase in bank revenues after the supervisory transition. We interpret this evidence as consistent with higher-yielding loans as the outcome variable is scaled by total assets (and hence the loan volume).

Given that we find that both non-interest expenses and bank revenues increase for thrifts relative to commercial banks, it is natural to ask how the supervisory transition affected the overall profitability of former OTS banks. In Panel B of Figure 6, we show that bank profitability of former OTS banks does not significantly change relative to that of commercial banks. This result suggests that the increase in bank revenues following the supervisory transition was largely offset by the increase in non-interest expenses. This evidence provides another explanation, aside from managerial entrenchment, for why thrifts did not voluntarily make these investments prior to the OTS extinction. Without supervisory prompts to improve their systems, thrifts would have been likely content to maintain their existing business practices.

## 8.3 Loan Delinquencies and Bank Risk-Taking

If the supervisory transition primarily increased thrifts' compliance costs but did not result in better capabilities to lend safely, then we expect the margins of former OTS banks to shrink, which in turn could induce thrifts to compensate for shrinking margins by lending to riskier borrowers. Under this alternative explanation for our results, we expect loan delinquencies to increase after the supervisory transition because former OTS banks jump on lending opportunities that offer higher yields but also have greater default risks. Conversely, under our preferred interpretation, the expansion of credit supply to small business borrowers does not come at the expense of greater defaults.

This discussion suggests that studying the evolution of loan delinquencies in the commercial & industrial (C&I) lending portfolios can shed further light on the potential explanations for the increase in small business lending. If loan delinquencies increase following the OTS extinction and remain on a permanently higher plateau, then the evidence would suggest that former OTS banks take on greater risks, either because they are pushed by their new supervisors to diversify into lending areas for which they have less expertise or because they shift risks in response to shrinking margins. However, if loan delinquencies at first increase following the supervisory transition, but later converge toward the default rates of commercial banks, then the evidence would be more consistent with the idea that thrifts indeed acquired new capabilities, which in turn allowed them to lend safely to riskier small business borrowers.

To study the evolution of loan delinquencies over a longer horizon, we extend the call report series until 2019:Q4. We examine loan delinquencies in the C&I portfolios of former OTS banks and commercial banks using non-performing loan ratios and charge-off rates.[18] In Figure 7, we show that the non-performing loan ratios and charge-off rates of C&I loans increase sharply after the OTS extinction. This increase is consistent with stricter supervision as we discussed in Section 5.1. Yet, after this initial jump, both C&I loan delinquency ratios of thrifts quickly converge toward those of commercial banks. From 2015 onward, the delinquency ratios of former OTS banks and commercial banks are fairly similar and, if anything, lower for the former OTS banks. This evidence does not suggest that the former OTS banks expand their credit supply at the expense of higher credit risk, which then materializes by greater defaults at a later date. Instead, it suggests a brief period of abnormally high loan losses resulting from the transition to the new supervisors (which, e.g., force thrifts to recognize old "zombie loans"), followed by more normal loan delinquencies despite the post-transition expansion of credit supply.

# 9 Conclusion

An important question in banking is how strict supervision affects bank lending and local business activity. Bank supervisors face a trade-off between, on one hand, protecting the financial system by forcing banks to correct weaknesses in their loan and credit risk management, to recognize troubled loans, and to ensure adequate provisioning for future loan losses and, on the other hand, causing a credit crunch for the real economy by being too strict with banks, especially shortly after a financial crisis.

We explore a new dimension to this trade-off. We conjecture that stricter supervision means

[18] In this analysis, we focus on charge-offs of C&I loans rather than provisions of C&I loans because the Call Report data does not disaggregate provisions by loan type prior to 2010.

more than merely enforcing timely recognition of loan losses. Stricter supervisors also evaluate other aspects of banks' operations more rigorously. Are banks collecting periodic information from their borrowers? Do they monitor the value of collateral? Are they conducting stress tests to gauge the sensitivity of their financial condition to changes in economic conditions? A strict supervisor evaluates these and other questions pertaining to banks' management and is less likely to accept poor management or lending practices. Therefore, strict supervision could also be a "catalyst for change" that ignites improvements to bank management and lending practices.

The dissolution of the OTS afer the financial crisis meant that former OTS banks were transferred to the OCC and the FDIC. We first confirm that the supervisory transition indeed resulted in stricter supervision, documenting significant changes in loan loss recognition and loan provisioning shortly after the OTS extinction. More importantly for our analysis, we present evidence that the supervisory transition prompted thrifts improve their existing practices in core areas of bank management, including their loan and credit risk management. Next, we analyze bank lending and show that stricter supervision did not lead to a credit crunch, except for those former OTS banks that were thinly capitalized. On average, former OTS banks increase their lending to small businesses following the OTS extinction by approximately 10 percent. This increase is concentrated in well-capitalized banks as well as in banks that underwent significant changes in bank and risk management practices. In particular, we show that increases in small business lending are concentrated in former OTS banks that show above-median board turnover following the supervisory transition, replace executive directors after the transition, and adopt formal risk modeling after the OTS extinction. This collection of results is consistent with the explanation that stricter supervision prompted former OTS banks to make broad changes and improvements in bank management, which in turn increased their supply of difficult-to-evaluate small business loans.

There are two important caveats to our analysis. First, we document economic effects for the years after the supervisory transition. But we do not know how the elimination of the OTS will play out in the long run. It is, for instance, an open question whether the decline in the number of supervisors and corresponding increase in supervisory concentration benefits the financial system in the long haul. Second, the U.S. banking system features many small banks. Our analysis is, therefore, more likely to be relevant for smaller and perhaps less sophisticated banks. However, there are several banking systems around the world that feature a significant fraction of smaller banks (e.g., Germany and Italy).

# References


Agarwal, S., E. Benmelech, N. Bergman, and A. Seru (2012). Did the community reinvestment act lead to risky lending? Technical report, National Bureau of Economic Research.

Agarwal, S., D. Lucca, A. Seru, and F. Trebbi (2014). Inconsistent regulators: Evidence from banking. *The Quarterly Journal of Economics 129*(2), 889–938.

Altavilla, C., M. Boucinha, J.-L. Peydró, and F. Smets (2020). Banking supervision, monetary policy and risk-taking: Big data evidence from 15 credit registers.

Appelbaum, B. and E. Nakashima (2008a). Banking regulator played advocate over enforcer. *The Washington Post*. Published: 11 November 2008.

Appelbaum, B. and E. Nakashima (2008b). Regulator let indymac bank falsify report: Agency didn't enforce its rules, inquiry finds. *Washington Post*. Published: 23 December 2008.

Beatty, A. and S. Liao (2011). Do delays in expected loss recognition affect banks' willingness to lend? *Journal of Accounting and Economics 52*(1), 1–20.

Bertrand, M. and S. Mullainathan (2003). Enjoying the quiet life? corporate governance and managerial preferences. *Journal of Political Economy 111*(5), 1043–1075.

Bhat, G., S. G. Ryan, and D. Vyas (2018). The implications of credit risk modeling for banks' loan loss provisions and loan-origination procyclicality. *Management Science*.

Bian, B., R. Haselmann, T. Kick, and V. Vig (2017). The political economy of bank bailouts. *IMFS Working Paper Series*.

Blattner, L., L. Farinha, and F. Rebelo (2019). When losses turn into loans: the cost of undercapitalized banks. *Working Paper*.

Bloom, N., C. Propper, S. Seiler, and J. Van Reenen (2015). The impact of competition on management quality: evidence from public hospitals. *The Review of Economic Studies 82*(2), 457–489.

Bonfim, D., G. Cerqueiro, H. Degryse, and S. Ongena (2016). Evergreening and the misallocation of credit in portugal. *Manuscript, Banco de Portugal*.

Bord, V. M., V. Ivashina, and R. D. Taliaferro (2021). Large banks and small firm lending. *Journal of Financial Intermediation 48*, 100924.

Brown, C. O. and I. S. Dinç (2005). The politics of bank failures: Evidence from emerging markets. *The Quarterly Journal of Economics 120*(4), 1413–1444.

Brown, C. O. and I. S. Dinç (2011). Too many to fail? evidence of regulatory forbearance when the banking sector is weak. *The Review of Financial Studies 24*(4), 1378–1405.

Brown, J. D. and J. S. Earle (2017). Finance and growth at the firm level: Evidence from sba loans. *The Journal of Finance 72*(3), 1039–1080.

Buchak, G., G. Matvos, T. Piskorski, and A. Seru (2018a). Fintech, regulatory arbitrage, and the rise of shadow banks. *Journal of Financial Economics 130*(3), 453–483.

Buchak, G., G. Matvos, T. Piskorski, and A. Seru (2018b). The limits of shadow banks. Technical report, National Bureau of Economic Research.

Bushman, R. M. and C. D. Williams (2012). Accounting discretion, loan loss provisioning, and discipline of banks' risk-taking. *Journal of Accounting and Economics 54*(1), 1–18.

Caballero, R. J., T. Hoshi, and A. K. Kashyap (2008). Zombie lending and depressed restructuring in japan. *American Economic Review 98*(5), 1943–77.

Charoenwong, B., A. Kwan, and T. Umar (2019). Does regulatory jurisdiction affect the quality of investment-adviser regulation? *American Economic Review 109*(10), 3681–3712.

Chen, B. S., S. G. Hanson, and J. C. Stein (2017). The decline of big-bank lending to small business: Dynamic impacts on local credit and labor markets. Technical report, National Bureau of Economic Research.

Chodorow-Reich, G. (2013). The employment effects of credit market disruptions: Firm-level evidence from the 2008–9 financial crisis. *The Quarterly Journal of Economics 129*(1), 1–59.

Christensen, H. B., L. Hail, and C. Leuz (2016). Capital-market effects of securities regulation: Prior conditions, implementation, and enforcement. *The Review of Financial Studies 29*(11), 2885–2924.

Committee on Homeland Security and Governmental Affairs (2011). Wall street and the financial crisis: Anatomy of a financial collapse. *Permanent Subcommittee on Investigations*. Section IV C. (4) OTS Turf War Against FDIC, 196.

Cortés, K. R., Y. Demyanyk, L. Li, E. Loutskina, and P. E. Strahan (2019). Stress tests and small business lending. *Journal of Financial Economics*.

Costello, A. M., J. Granja, and J. Weber (2019). Do strict regulators increase the transparency of banks? *Journal of accounting research 57*(3), 603–637.

Dimitrov, V., D. Palia, and L. Tang (2015). Impact of the dodd-frank act on credit ratings. *Journal of Financial Economics 115*(3), 505–520.

Doerr, S. (2021). Stress tests, entrepreneurship, and innovation. *Review of Finance 25*(5), 1609–1637.

Eisenbach, T., D. Lucca, and R. Townsend (2017). The economics of bank supervision. Technical report, Federal Reserve Bank of New York.

Gambacorta, L. and D. Marques-Ibanez (2011). The bank lending channel: lessons from the crisis. *Economic Policy 26*(66), 135–182.

Goldsmith-Pinkham, P., B. Hirtle, and D. O. Lucca (2016). Parsing the content of bank supervision.

Granja, J., C. Leuz, and R. G. Rajan (2022). Going the extra mile: Distant lending and credit cycles. *The Journal of Finance 77*(2), 1259–1324.

Granja, J., C. Makridis, C. Yannelis, and E. Zwick (2020). Did the paycheck protection program hit the target? Technical report, National Bureau of Economic Research.

Granja, J. and S. Moreira (2019). Product innovation and credit market disruptions. *Available at SSRN 3477726*.

Hirtle, B., A. Kovner, and M. Plosser (2020). The impact of supervision on bank performance. *The Journal of Finance 75*(5), 2765–2808.

Iacus, S. M., G. King, and G. Porro (2012). Causal inference without balance checking: Coarsened exact matching. *Political analysis 20*(1), 1–24.

Ivashina, V. and D. Scharfstein (2010). Bank lending during the financial crisis of 2008. *Journal of Financial economics 97*(3), 319–338.

Jackson, H. E. and M. J. Roe (2009). Public and private enforcement of securities laws: Resource-based evidence. *Journal of Financial Economics 93*(2), 207–238.

Kandrac, J. and B. Schlusche (2021). The effect of bank supervision and examination on risk taking: Evidence from a natural experiment. *The Review of Financial Studies 34*(6), 3181–3212.

Kane, E. J. (1989). The high cost of incompletely funding the fslic shortage of explicit capital. *Journal of Economic Perspectives 3*(4), 31–47.

Kroszner, R. S. and P. E. Strahan (1996). Regulatory incentives and the thrift crisis: Dividends, mutual-to-stock conversions, and financial distress. *the Journal of Finance 51*(4), 1285–1319.

La Porta, R., F. Lopez-de Silanes, and A. Shleifer (2006). What works in securities laws? *The Journal of Finance 61*(1), 1–32.

Lucca, D., A. Seru, and F. Trebbi (2014). The revolving door and worker flows in banking regulation. *Journal of Monetary Economics 65*, 17–32.

MacDonald, C., J. Schwartz, and J. Day (2011). After the ots: Should thrifts convert to commercial banks? *Bloomberg Law Reports*.

Nguyen, H.-L. Q. (2019). Are credit markets still local? evidence from bank branch closings. *American Economic Journal: Applied Economics 11*(1), 1–32.

Office of Inspector General (2009). Safety and soundness: Ots involvement with backdated capital contributions by thrifts. *Audit Report*.

Passalacqua, A., P. Angelini, F. Lotti, and G. Soggia (2021). The real effects of bank supervision: evidence from on-site bank inspections. *Bank of Italy Temi di Discussione (Working Paper) No 1349*.

Peek, J. and E. S. Rosengren (2000). Collateral damage: Effects of the japanese bank crisis on real activity in the united states. *American Economic Review 90*(1), 30–45.

Petersen, M. A. and R. G. Rajan (1994). The benefits of lending relationships: Evidence from small business data. *The journal of finance 49*(1), 3–37.

Rajan, R. G. and L. Zingales (1998). Financial dependence and growth. *American Economic Review 88*(3), 559–586.

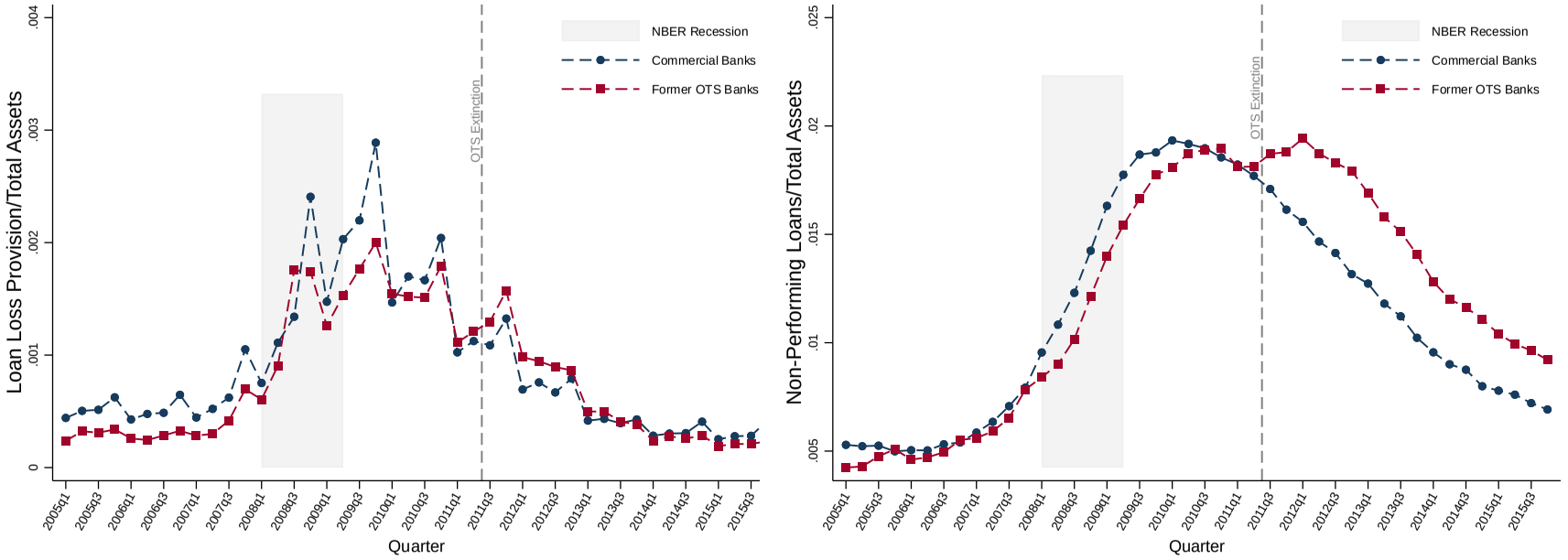
SageWorks (2013). Poll: Biggest areas of change when transitioning from ots to occ. *SageWorks*.

Story, L. and G. Morgenson (2011). Financial finger-pointing turns to regulators. *The New York Times*, A1. Published Nov 22, 2011.

Wayne, L. (1992). Thrift office's eager terminator. *The New York Times*. Published: Jan 21, 1992.

## Figure 1: Loan Loss Recognition over Time

Figure 1 plots the average loan loss provision ratio (loan loss provision divided by total assets) and average nonperforming loan ratio (nonperforming loans divided by total assets) of former OTS banks and all other commercial banks during the period 2005Q1 to 2015Q4. The shaded period is the financial crisis as defined by the NBER recession period. Data are from FFIEC Call Reports and from Thrift Financial Reports.



## Figure 2: OTS Extinction and Loan Loss Recognition over Time

Figure 2 plots the estimated impact of the OTS extinction on loan loss provisioning and nonperforming loan ratios in each quarter of the sample period. The dots represent the coefficients $\beta_t$ from estimating the empirical specification of equation (2) using the loan loss provision ratio (left) and nonperforming loan ratio (right) as dependent variables. The vertical bands represent 95% confidence intervals for the point estimates in each quarter. The shaded period is the financial crisis as defined by the NBER recession period. Data are from FFIEC Call Reports and from Thrift Financial Reports.

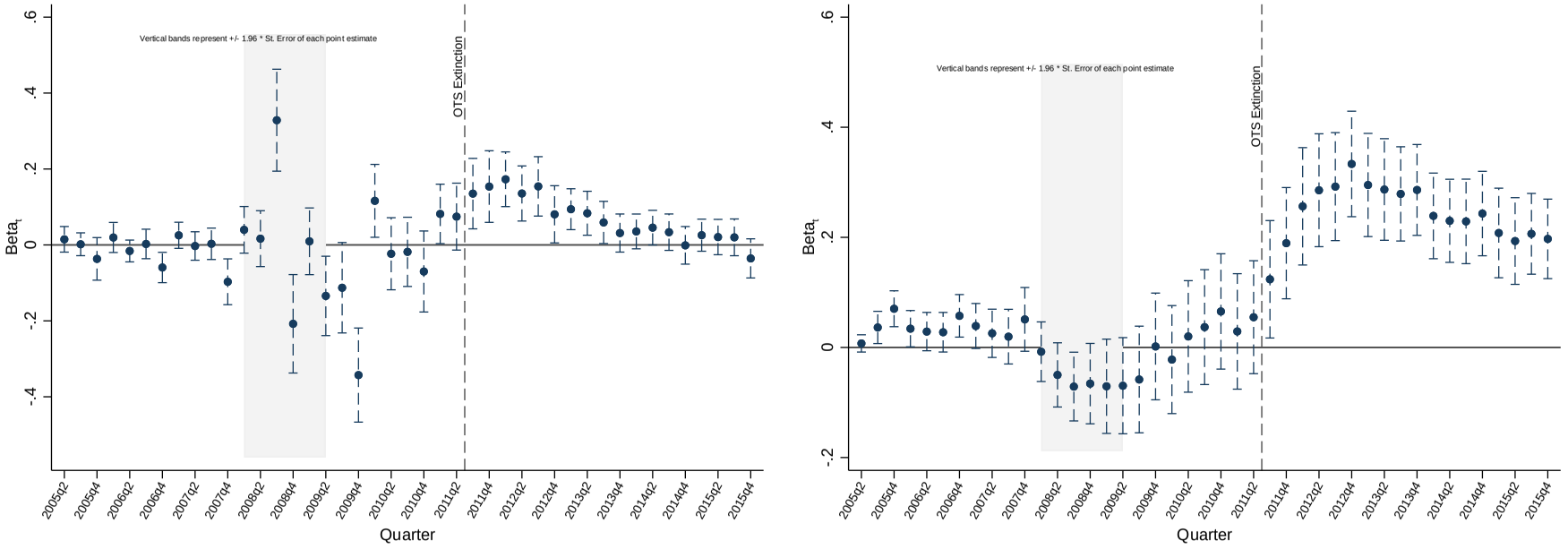


Figure 3: Small Business Lending and OTS Extinction: Impact over Time

Figure 3 plots the estimated impact of the OTS extinction on small business lending in each year of the sample period. The shallow circles represent the coefficients $\beta_t$ from expanding the model specification in Column (3) of Table 7 to include a set of interaction variables between the year indicators and a binary variable taking the value of one if the depository institution's primary supervisor in 2010 was the OTS. The vertical bands represent 90% confidence intervals for the point estimates in each year. Data come from the CRA Small Business Lending Dataset.

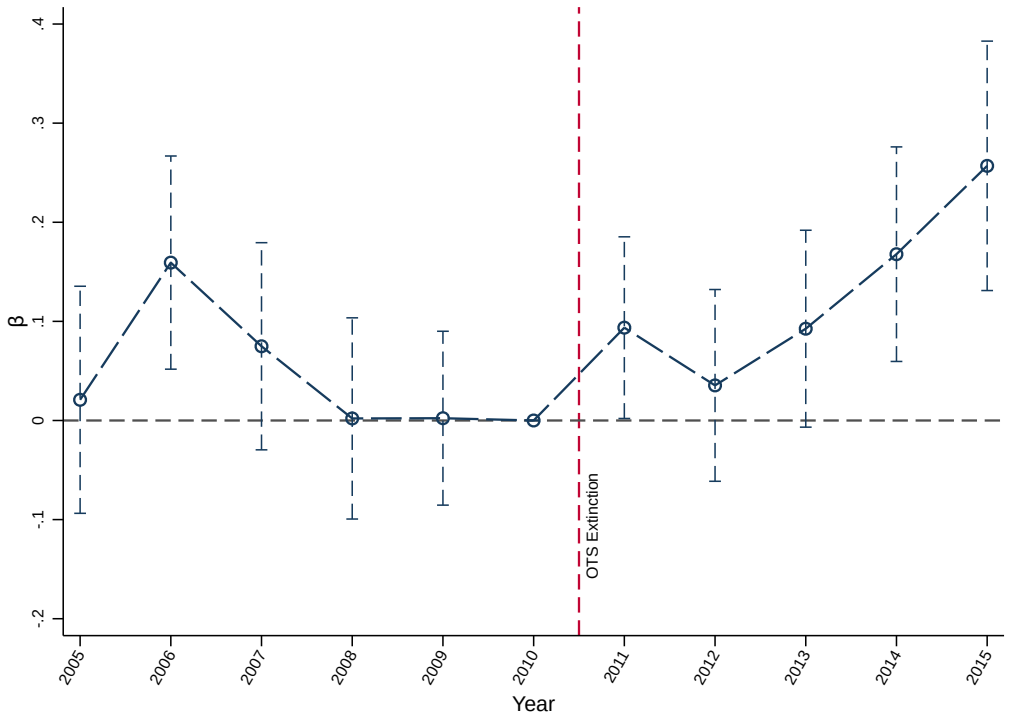


Figure 4: Small Business Lending and OTS Extinction: Impact by Capitalization

Figure 4 plots the impact of OTS supervision on small business lending across different Tier 1 capital ratio bins. The shallow circles represent the coefficients $\beta_i$ from expanding the model specification in column (2) of Table 7 to include a set of interaction variables between a dummy variable taking the value of one if the depository institution's primary supervisor in 2010 was the OTS and each of six indicator variables that take the value of one if the Tier 1 capital in the fourth quarter of 2010 is below 10, between 10 and 12.5, between 12.5 and 15, between 15 and 17.5, between 17.5 and 25, and more than 25 percent, respectively. The vertical bands represent 90% confidence intervals for the point estimates in each interaction between OTS dummy and the capitalization bins. Data come from the CRA Small Business Lending Dataset and from Call Reports and Thrift Financial Reports.

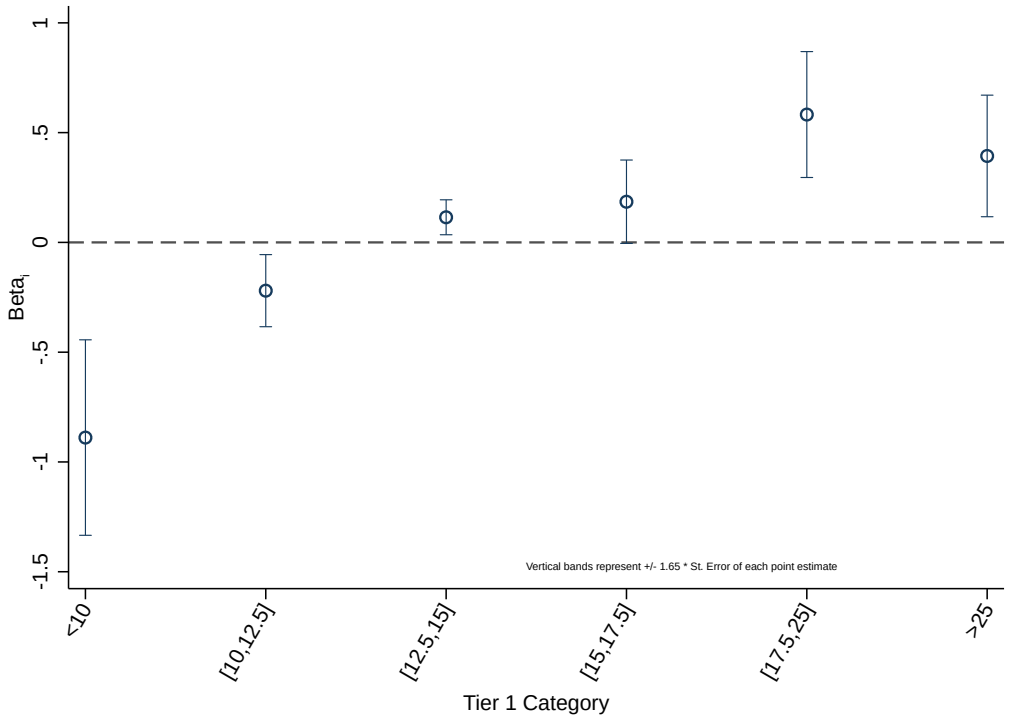


Figure 5: OTS Extinction and Banks' Non-Interest Costs

Figure 5 plots the evolution of the non-interest expenses and growth in full-time employees of former OTS banks and other commercial banks. Panel A plots the average non-interest expense ratio (total non-interest expenses divided by total assets) of former OTS banks and all other commercial banks as well as coefficients and respective confidence intervals from estimating the empirical specification of equation (2) using the non-interest expense ratio as outcome variable. In Panel B, we repeat the analysis using the growth in full-time employees (2010:Q2–2011:Q2 = 100) as outcome variable. The shaded period is the financial crisis as defined by the NBER recession period. Data are from FFIEC Call Reports and from Thrift Financial Reports.

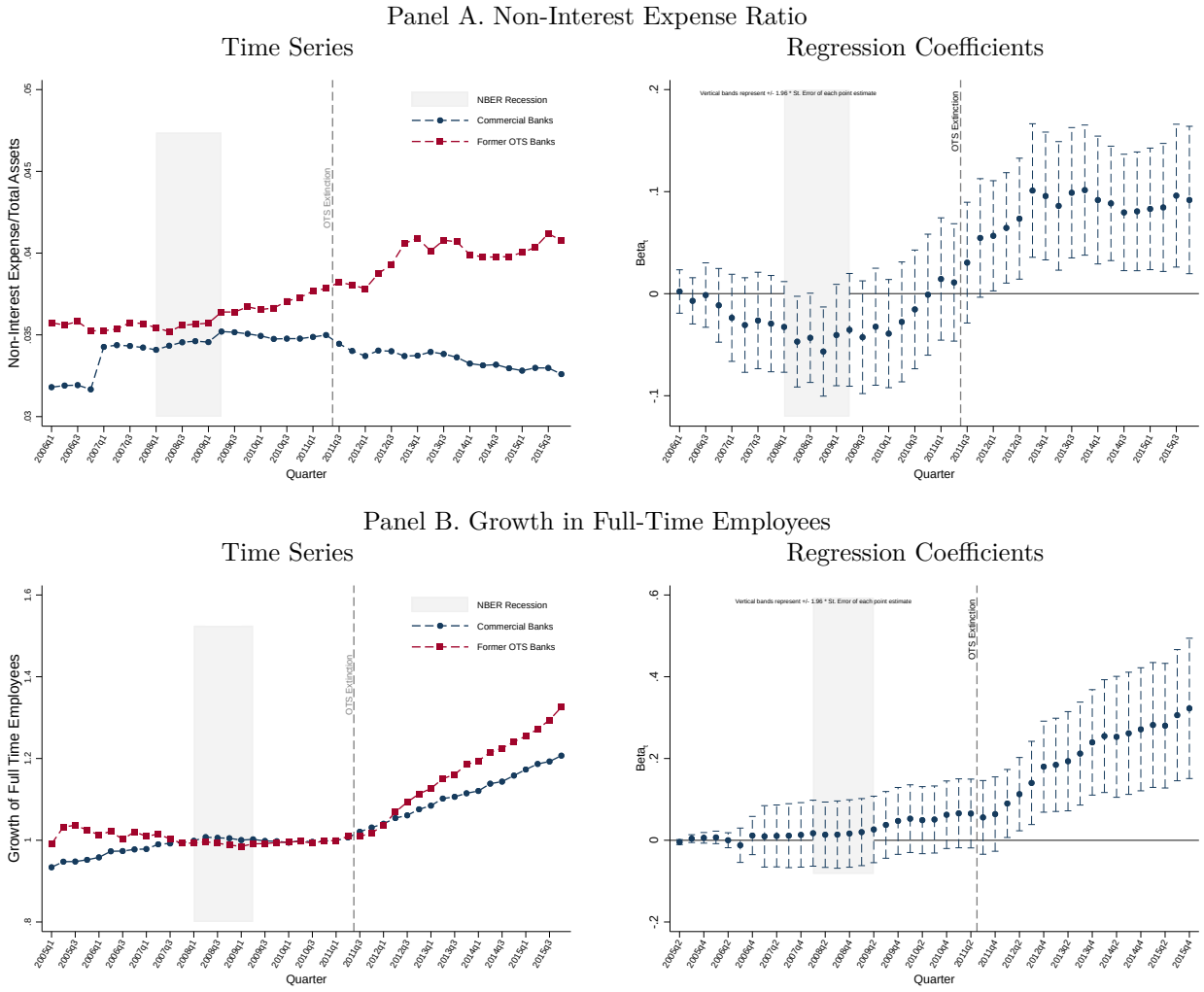


Figure 6: OTS Extinction and Banks' Revenues and Overall Profitability

Figure 6 plots the evolution of the ratio of bank revenues to total assets and of the ROA of former OTS banks and other commercial banks. Panel A plots the the ratio of bank revenues to total assets of former OTS banks and all other commercial banks as well as coefficients and respective confidence intervals from estimating the empirical specification of equation (2) using the ratio of bank revenues to total assets as the outcome variable. In Panel B, we repeat the analysis using ROA as the variable of interest. The shaded period is the financial crisis as defined by the NBER recession period. Data are from the FFIEC Call Reports and from the Thrift Financial Reports.

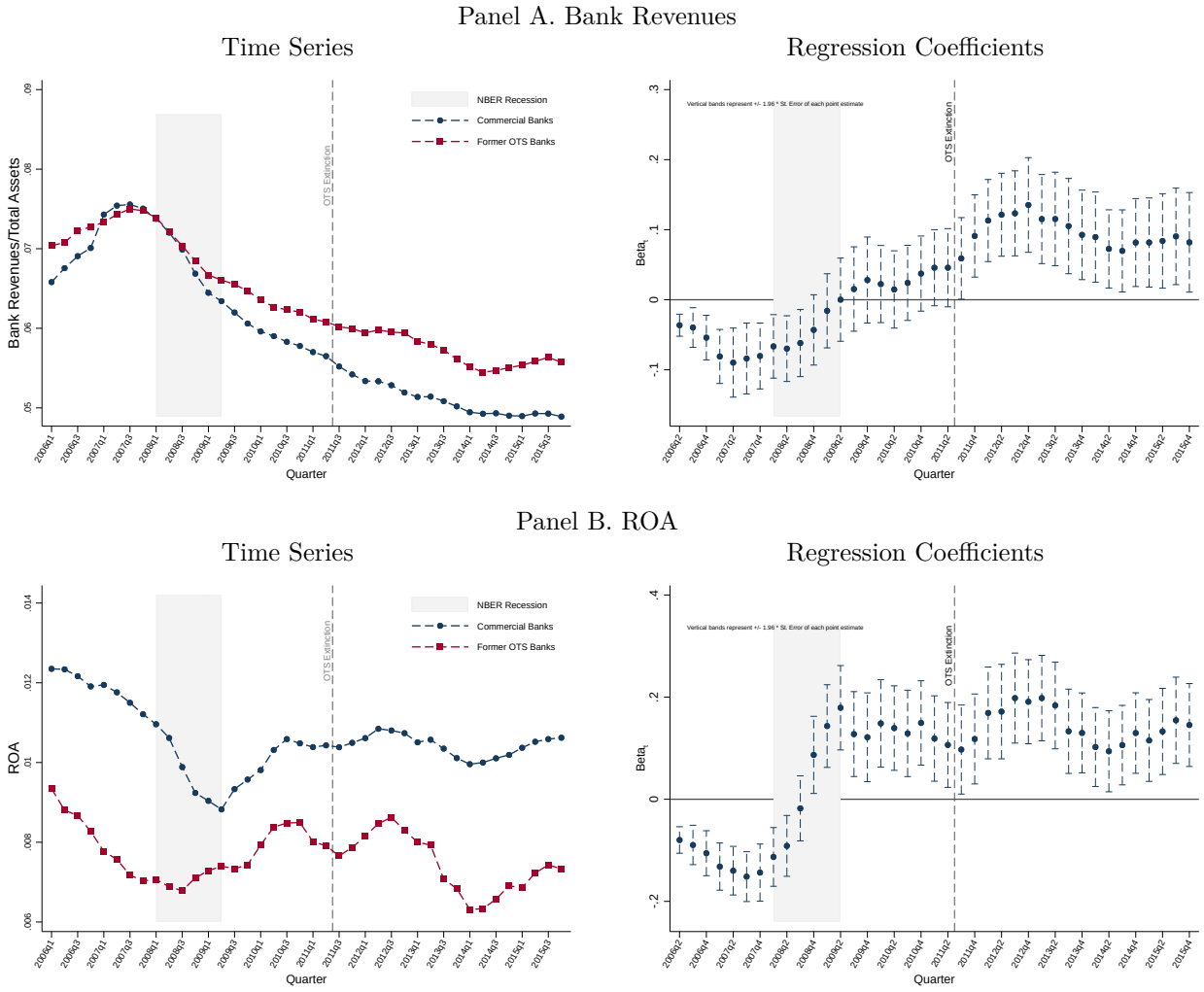
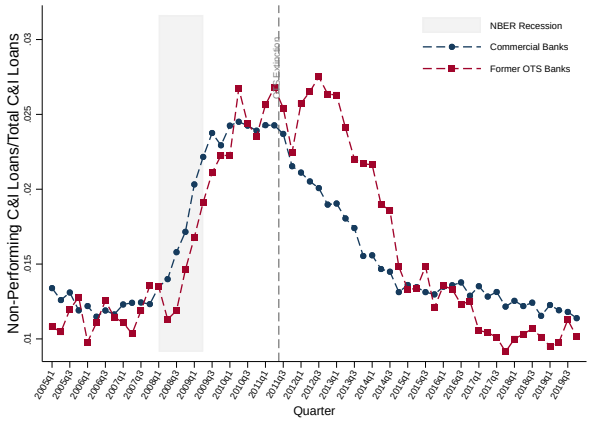


Figure 7: OTS Extinction and Delinquencies in the C&I Lending Portfolio

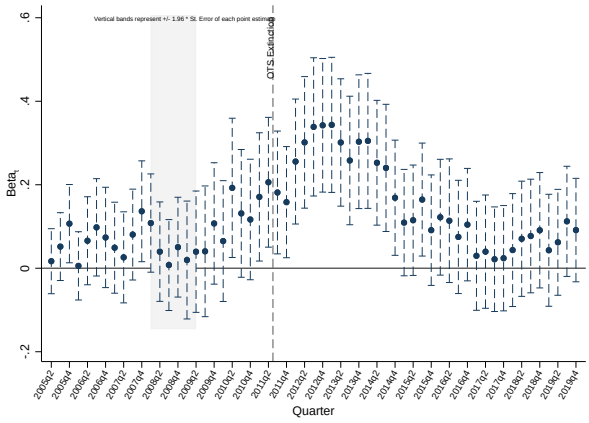
Figure 7 plots the evolution of loan delinquencies in the C&I lending portfolios of former OTS banks and other commercial banks. Panel A plots the average C&I non-performing loan ratio (non-performing C&I loans divided by total C&I assets) of former OTS banks and all other commercial banks during the period 2005:Q1 to 2019:Q4 and coefficients and respective confidence intervals from estimating the empirical specification of equation (2) using the C&I non-performing loan ratio as the outcome variable. In Panel B, we repeat the analysis using the average C&I charge-off ratio as the variable of interest. The shaded period is the financial crisis as defined by the NBER recession period. Data are from the FFIEC Call Reports and from the Thrift Financial Reports.

Panel A. Non-Performing C&I Loan Ratio

Time Series

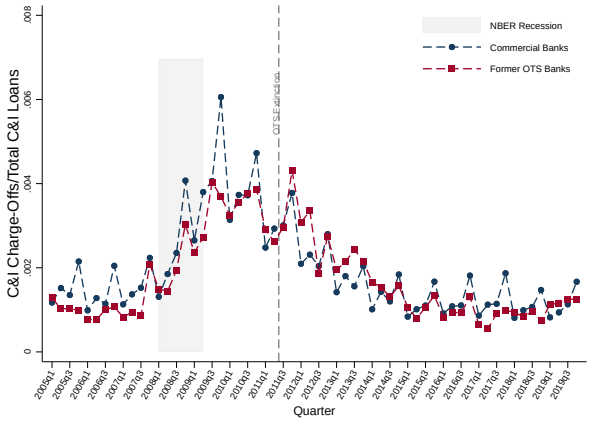



Regression Coefficients

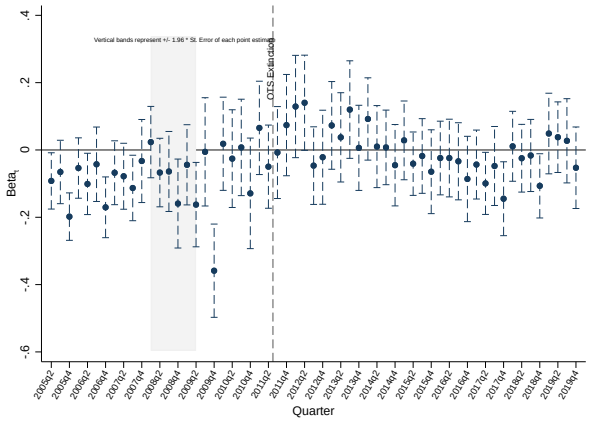



Panel B. C&I Charge-Off Ratio

Time Series




Regression Coefficients



## Table 1: Transition Matrix for Former OTS Banks and Commercial Banks

Table 1 reports on the status of former OTS banks that mandatorily transitioned supervisors following the OTS extinction. The Table shows how many former OTS banks voluntarily changed to other charters as of June 30th of the subsequent years and how many former OTS banks dropped out of the sample due to failure, merger, or closure. The numbers for each year are cumulative counts since June 30, 2011. We also report a similar migration analysis for the control group of commercial banks.

| | **Former - OTS Banks** | | | | | | | | **Commercial Banks** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mandatory Transition from OTS to OCC/FDIC on 07/21/2011 | Voluntary change to different supervisor or institution class after OTS extinction: | | | | | Drop out | | Commercial banks supervised by OCC or FDIC | Voluntary change to other supervisor | | Drop out | |
| Date | 708 OTS supervised Banks required to switch to OCC or FDIC | Cum. Δ from OCC to FDIC - Mutual Savings Bank | Cum. Δ to OCC - Commercial Bank | Cum. Δ to FDIC - Commercial Bank | Cum. Δ to FRB Commercial or Savings Banks | % of voluntary changes within each year | Cumulative number of banks that Failed, Merged, or Closed | % of drop out within each year | OCC - Federal Charter | FRB Commercial or Saving Banks | % of voluntary changes within each year | Cumulative number of banks that Failed, Merged, or Closed | % of drop out within each year |
| 6/30/2011 | 708 | 0 | 0 | 0 | 0 | | | | 5590 | 0 | | 0 | |
| 6/30/2012 | 633 | 16 | 5 | 17 | 6 | 6.02% | 32 | 4.38% | 5361 | 35 | 0.63% | 194 | 3.47% |
| 6/30/2013 | 579 | 27 | 6 | 24 | 9 | 3.25% | 63 | 4.73% | 5093 | 67 | 0.62% | 430 | 4.37% |
| 6/30/2014 | 522 | 36 | 11 | 28 | 13 | 3.41% | 98 | 5.43% | 4845 | 106 | 0.82% | 639 | 4.05% |
| 6/30/2015 | 480 | 35 | 15 | 34 | 19 | 2.45% | 125 | 4.43% | 4586 | 133 | 0.63% | 871 | 4.69% |
| **% of banks 06/30/2015 Compared to 6/30/2011** | 67.80% | 4.94% | 2.12% | 4.80% | 2.68% | | 17.66% | | 82.04% | 2.38% | | 15.58% | |

## Table 2: Descriptive Statistics for Sample Banks

Table 2 presents descriptive statistics for the main sample used in the analysis. Panel A presents financial characteristics and ratios of the entire sample of banks using call report and thrift financial report data. Panel B reports summary statistics for the sample of Community Reinvestment Act (CRA) Small Business Lending reporting banks. *Total Assets* are total assets of the depository institution (measured in $000s) (RCFD2170). *Share Residential* is the ratio of residential real estate loans (RCON1797+RCON5367+RCON5368) and total assets (RCFD2170). *Share C&I* is the ratio of commercial and industrial loans (RCFD1766) and total assets (RCFD2170). *Share CRE* is the ratio of commercial and real estate loans (RCON1415+RCON1460+RCON1480+RCFD2746) and total assets (RCFD2170). *Loan Loss Provision Ratio* is the ratio between Loan Loss Provisions (RIAD4230) and total assets (RCFD2170). *Charge-Off Ratio* is the ratio of total charge-offs (RIAD4635) and total assets (RCFD2170). *Nonperforming Loan Ratio* is the sum of total loans 90+ days past due (RCFD1407) and total nonaccrual loans (RCFD1403) divided by total assets (RCFD2170). *ALLL Ratio* is the ratio of the allowance for loan and lease losses (RIAD3123) and total assets (RCFD2170). *Small Bus. Loans as % Assets (Post-2011)* is the ratio between small business loans (RCON5565+RCON5567+RCON5569+RCON5571+RCON5573+RCON5575) and total assets. *Small Bus. Loans as % Loans* is the ratio between small business and total loans. *Total SBL Originations* is the total amount of small business loans (measured in $000s) originated by a bank over a calendar year. *Number Branches* is the total number of branches operated by a bank as of June 30th of each year. *Total Deposits* is the total deposits held in domestic branches of a bank as of June 30th of each year (measured in $000s). *HPI* is the average of the HPI of each zip code where the bank has a branch weighted by the share of county deposits that the bank holds in that zip code. The zipcode HPI is calculated using the all-transactions indexes at the zip code level provided by the Federal Housing Finance Agency.

### Panel A: Banks' Financial Characteristics and Ratios

| | Count | Mean | Std. Dev. | p25 | p50 | p75 |
|---|---|---|---|---|---|---|
| **Commercial Banks** | | | | | | |
| Total Assets | 312,687 | 1,515,650 | 28,590,374 | 68,452 | 144,039 | 329,757 |
| Share CRE | 312,687 | 0.231 | 0.168 | 0.0903 | 0.205 | 0.342 |
| Share C&I | 312,687 | 0.089 | 0.072 | 0.041 | 0.074 | 0.118 |
| Share Residential | 312,687 | 0.174 | 0.128 | 0.082 | 0.150 | 0.233 |
| Tier1 Capital Ratio | 312,687 | 22.8 | 168.7 | 11.5 | 14.1 | 18.6 |
| Loan Loss Provision Ratio | 312,686 | 0.001 | 0.003 | 0 | 0.0003 | 0.0008 |
| Charge-Off Ratio | 312,685 | 0.001 | 0.003 | 0 | 0.0002 | 0.0008 |
| Nonperforming Loan Ratio | 312,686 | 0.012 | 0.019 | 0.001 | 0.006 | 0.014 |
| ALLL Ratio | 310,229 | 0.010 | 0.007 | 0.006 | 0.009 | 0.012 |
| Small Bus. Loans as % Assets | 175,754 | 0.152 | 0.095 | 0.091 | 0.141 | 0.200 |
| Small Bus. Loans as % Loans | 175,106 | 0.241 | 0.135 | 0.158 | 0.229 | 0.311 |
| **Former OTS Banks** | | | | | | |
| Total Assets | 29,422 | 1,222,056 | 6,119,001 | 81,467 | 170,309 | 438,815 |
| Share CRE | 29,422 | 0.170 | 0.152 | 0.049 | 0.134 | 0.257 |
| Share C&I | 29,422 | 0.033 | 0.050 | 0 | 0.012 | 0.048 |
| Share Residential | 29,422 | 0.415 | 0.208 | 0.268 | 0.423 | 0.564 |
| Tier1 Capital Ratio | 29,422 | 30.12 | 67.86 | 13.91 | 18.75 | 28.57 |
| Loan Loss Provision Ratio | 29,422 | 0.001 | 0.003 | 0 | 0.0002 | 0.0007 |
| Charge-Off Ratio | 29,421 | 0.001 | 0.002 | 0 | 0.0001 | 0.0006 |
| Nonperforming Loan Ratio | 29,422 | 0.013 | 0.020 | 0.002 | 0.007 | 0.016 |
| ALLL Ratio | 27,219 | 0.007 | 0.007 | 0.003 | 0.006 | 0.009 |
| Small Bus. Loans as % Assets | 19,218 | 0.074 | 0.072 | 0.016 | 0.055 | 0.111 |
| Small Bus. Loans as % Loans | 18,811 | 0.113 | 0.204 | 0.028 | 0.089 | 0.167 |

### Panel B: Small Business Loan and Deposit Market Characteristics of CRA Reporting Banks

| | Count | Mean | Std. Dev. | p25 | p50 | p75 |
|---|---|---|---|---|---|---|
| **Commercial Banks** | | | | | | |
| Total SBL Originations | 8,505 | 214,504 | 963,641 | 21,938 | 55,692 | 125,576 |
| Number Branches | 8,505 | 350.6 | 1,626.7 | 36 | 74 | 173 |
| Total Assets | 8,505 | 4,138,426,192 | 54,375,080,904 | 1,642,812 | 5,828,784 | 28,301,078 |
| Total Deposits | 8,505 | 7,741,388 | 51,713,920 | 515,872 | 1,023,661 | 2,192,585 |
| HPI | 8,298 | 1.114 | 0.137 | 1.039 | 1.107 | 1.189 |
| **Former OTS Banks** | | | | | | |
| Total SBL Originations | 668 | 56,886 | 115,515 | 5,302 | 24,070 | 59,403 |
| Number Branches | 668 | 275.3 | 639.0 | 55 | 111 | 213 |
| Total Assets | 668 | 132,904,676 | 687,671,861 | 4,068,040 | 10,161,059 | 34,254,948 |
| Total Deposits | 668 | 3,666,661 | 7,167,811 | 928,023 | 1,343,974 | 2,987,659 |
| HPI | 646 | 1.094 | 0.143 | 1.002 | 1.090 | 1.182 |

## Table 3: OTS Extinction and Loan Loss Recognition: Impact of Stricter Supervision

Table 3 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on loan loss recognition. The dependent variables are the *Loan Loss Provision Ratio*, the *Nonperforming Loan Ratio*, and the *Charge-Off Ratio*. *OTS* is an indicator variable that takes the value of one if the depository institution's primary supervisor in the first and second quarter of 2011 was the Office of Thrift Supervision. *Post* is an indicator variable that takes the value of one for all quarters between 2011:Q3 and 2015:Q4 and zero for all quarters between 2005:Q1 and 2011:Q2. All dependent and control variables are defined as in Table 2. Standard errors are presented in parentheses, and are clustered at the level of the county, assigning banks to counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Loan Loss Provision Ratio | | Nonperforming Loan Ratio | | Charge-Off Ratio | |
| OTS × Post | 0.018*** | 0.018*** | 0.339*** | 0.383*** | 0.023*** | 0.026*** |
| | (0.004) | (0.004) | (0.045) | (0.045) | (0.003) | (0.004) |
| Ln(Assets) | | 0.003 | | -0.010 | | 0.011*** |
| | | (0.003) | | (0.034) | | (0.003) |
| Residential Share | | 0.021 | | 1.323*** | | 0.053*** |
| | | (0.017) | | (0.203) | | (0.015) |
| C&I Share | | 0.142*** | | -0.802*** | | -0.055** |
| | | (0.022) | | (0.228) | | (0.022) |
| CRE Share | | 0.108*** | | 0.129 | | -0.062*** |
| | | (0.013) | | (0.164) | | (0.015) |
| Tier1 Capital Ratio | | 0.000 | | -0.000 | | -0.000 |
| | | (0.000) | | (0.000) | | (0.000) |
| Observations | 341351 | 341351 | 341351 | 341351 | 341349 | 341349 |
| Adjusted $R^2$ | 0.293 | 0.294 | 0.508 | 0.510 | 0.303 | 0.304 |
| Quarter Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes |

## Table 4: OTS Extinction and Enforcement Actions

Table 4 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on the frequency and content of enforcement actions imposed by bank regulators on regulated entities. The dependent variables are *I(Enforcement Action=1)*, *Ln(Num. Words)*, and *I(Stress-Test=1)*, respectively. *I(Enforcement Action=1)* is an indicator variable that takes the value of one if the bank received a formal supervisory action during the quarter. *Ln(Num. Words)* is the natural logarithm of the number of English dictionary words included in the enforcement action. *I(Stress-Test=1)* is an indicator variable that takes the value of one if the enforcement action mentions stress-testing. All other variables are defined similarly to those in previous tables. Standard errors are presented in parentheses, and are clustered at the level of the county, assigning banks to counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | I(Enforcement Action=1) | | Ln(Num. Words) | | I(Stress-Test=1) | |
| OTS × Post | 0.002* | 0.002* | 0.392*** | 0.482*** | 0.132** | 0.137** |
| | (0.001) | (0.001) | (0.133) | (0.119) | (0.054) | (0.056) |
| Ln(Assets) | | 0.002*** | | 0.522*** | | -0.005 |
| | | (0.000) | | (0.048) | | (0.014) |
| Residential Share | | 0.000 | | 0.637 | | -0.142 |
| | | (0.004) | | (0.488) | | (0.164) |
| CRE Share | | -0.001 | | -0.589 | | 0.100 |
| | | (0.002) | | (0.548) | | (0.130) |
| C&I Share | | -0.001 | | -0.237 | | -0.204 |
| | | (0.003) | | (0.933) | | (0.138) |
| Tier1 Capital Ratio | | -0.000 | | -0.000*** | | -0.000 |
| | | (0.000) | | (0.000) | | (0.000) |
| Observations | 304216 | 304216 | 2701 | 2651 | 2701 | 2651 |
| Adjusted $R^2$ | 0.024 | 0.024 | 0.307 | 0.335 | 0.249 | 0.244 |
| Quarter Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes |

## Table 5: Enforcement Actions Before and After the OTS Extinction: Loan Management

Table 5 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on the content of enforcement actions imposed by bank regulators on former OTS banks. *Borrower Info* is a dummy that takes the value of one if the enforcement action contains a stipulation requesting the bank to collect periodic financial information from its borrowers. *Collateral Monitoring* is a dummy that takes the value of one if the enforcement action contains a stipulation requesting the bank to monitor the collateral that borrowers pledge in lending agreements. *Exceptions* is a dummy that takes the value of one if the enforcement action contains a stipulation requesting that the bank tracks and monitors loans made to borrowers under an exception to its lending policies. *Concentration Limits* is a dummy that that takes the value of one if the enforcement action contains a stipulation requesting the bank to implement concentration limits in its loan portfolio management. $\Delta$ *Risk Rating System* is a dummy that takes the value of one if the enforcement action contains a stipulation requesting that the bank makes changes to its internal risk rating system. *Loan Review System* is a dummy that that takes the value of one if the enforcement action contains a stipulation requesting the bank to implement an independent loan review system. All other variables are defined as those in previous tables. Standard errors are presented in parentheses, and are clustered at the level of the county, assigning banks to counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Borrower Info | | Collateral Monitoring | | Exceptions | | Concentration Limits | | $\Delta$ Risk Rating System | | Loan Review System | |
| Post | 0.332*** | 0.334*** | 0.386*** | 0.419*** | 0.372*** | 0.190* | 0.108* | 0.086 | 0.400*** | 0.277*** | 0.142** | 0.174 |
| | (0.054) | (0.118) | (0.052) | (0.105) | (0.050) | (0.105) | (0.056) | (0.143) | (0.058) | (0.096) | (0.058) | (0.122) |
| Ln(Assets) | -0.064*** | 0.097 | -0.053*** | -0.072 | -0.048*** | -0.400** | -0.041*** | -0.018 | -0.005 | 0.052 | -0.021 | -0.304 |
| | (0.013) | (0.167) | (0.012) | (0.193) | (0.012) | (0.169) | (0.013) | (0.304) | (0.011) | (0.244) | (0.015) | (0.218) |
| Residential Share | 0.182 | -1.448* | 0.129 | -0.551 | 0.297** | 0.712 | 0.074 | -0.504 | 0.014 | -0.527 | 0.112 | -0.747 |
| | (0.178) | (0.772) | (0.171) | (0.801) | (0.143) | (0.625) | (0.161) | (0.976) | (0.151) | (0.852) | (0.170) | (1.147) |
| C&I Share | 0.069 | 6.470* | 0.013 | 7.582** | 0.589* | 0.599 | 0.482 | -3.469 | -0.208 | -0.270 | -0.208 | 4.424 |
| | (0.388) | (3.433) | (0.383) | (3.673) | (0.350) | (2.784) | (0.464) | (3.473) | (0.355) | (2.994) | (0.373) | (3.462) |
| CRE Share | 0.399* | -0.980 | 0.439** | -0.117 | 0.362** | -2.066** | 0.617*** | 0.077 | 0.298* | -0.068 | 0.750*** | 0.665 |
| | (0.211) | (1.308) | (0.202) | (1.044) | (0.167) | (0.851) | (0.227) | (1.245) | (0.152) | (0.778) | (0.205) | (1.199) |
| Tier1 Capital Ratio | 0.001 | -0.001 | -0.002 | 0.002 | 0.000 | 0.004 | -0.012*** | -0.032** | -0.001 | -0.008 | -0.002 | 0.003 |
| | (0.004) | (0.027) | (0.004) | (0.017) | (0.003) | (0.015) | (0.003) | (0.015) | (0.002) | (0.016) | (0.003) | (0.018) |
| Observations | 324 | 156 | 324 | 156 | 324 | 156 | 324 | 156 | 324 | 156 | 324 | 156 |
| Adjusted $R^2$ | 0.150 | 0.238 | 0.179 | 0.281 | 0.205 | 0.368 | 0.091 | 0.094 | 0.225 | 0.232 | 0.055 | 0.191 |
| Bank Fixed-Effects | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes |

## Table 6: OTS Extinction and Changes in Bank Management

Table 6 reports analyses examining the relation between the OTS extinction and changes in bank management. Panel A provides summary statistics of key variables for former OTS banks and commercial banks. Panel B reports coefficients of OLS regressions investigating the direct effect of the OTS extinction on changes in bank and loan management. *Board Turnover* is the ratio between the number of entries and exits in the board of the bank and the average number of board members over the year, *Exec.Exit* is an indicator variable that takes the value of one if an executive director of the bank exits during the year, and *Risk Model* is an indicator variable that takes the value of one if the bank discloses risk modeling, i.e., the 10-K mentions the words "risk" and "model" within ten words of each other (e.g., Bhat et al. (2018)). The empirical specifications of Columns (2), (4), and (6) include baseline controls for *Ln(Assets)*, *Share Residential*, *Share C&I*, *Share CRE*, and *Tier1 Capital Ratio*. These variables are measured at an annual frequency as of the fourth quarter of the respective year. We control for board size non-parametrically by including board-size fixed effects in equations (1)–(4) and we also control for the natural logarithm of the number of words in the 10-K in Columns (5) and (6). All other variables are defined as in prior tables. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

**Panel A: Summary Statistics**

| | Commercial Banks | | | Former OTS Banks | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | N | Mean | Std. Dev. | N | Diff | t-stat |
| Board Turnover | 0.0644 | 0.0840 | 12,686 | 0.0602 | 0.0875 | 2,507 | 0.00420 | 2.268 |
| Exec. Exit | 0.0773 | 0.267 | 12,686 | 0.0558 | 0.230 | 2,507 | 0.0214 | 3.750 |
| Risk Model | 0.452 | 0.498 | 13,633 | 0.428 | 0.495 | 2,553 | 0.0241 | 2.246 |

**Panel B: Changes in Bank and Loan Management following OTS Extinction**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Board Turnover | | Exec. Exit | | Risk Model | |
| OTS × Post | 0.020** | 0.021** | 0.040* | 0.041* | 0.089 | 0.097* |
| | (0.008) | (0.009) | (0.023) | (0.024) | (0.057) | (0.056) |
| Observations | 3431 | 3431 | 3431 | 3431 | 3738 | 3738 |
| Adjusted $R^2$ | 0.069 | 0.073 | 0.033 | 0.036 | 0.666 | 0.669 |
| Baseline Controls | No | Yes | No | Yes | No | Yes |
| Quarter Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes |

## Table 7: OTS Extinction and Small Business Lending

Table 7 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on the supply of small business lending by former OTS banks. Panel A reports coefficients in the full sample and Panel B excludes the four largest commercial banks or the 20 largest small business lenders in the sample. The dependent variable *Ln(Total Loans)* is the total amount of small business loans (i.e., loans whose principal amount is below $1 million) originated by a depository institution in a county over a calendar year. *OTS* is an indicator variable that takes the value of one if the depository institution primary supervisor in the first and second quarter of 2011 was the Office of Thrift Supervision. *Post* is an indicator variable that takes the value of one for all years between 2011 and 2015 and zero for all years between 2005 and 2010. *Ln(HPI)* is the natural logarithm of a house price index (HPI) calculated for each bank and each county. The HPI is calculated using the all-transactions indexes at the zip code level provided by the Federal Housing Finance Agency. The HPI of a bank in a county is the average of the zip-level HPI, weighted by the deposits held by the bank in each zip code of the county. Baseline controls include linear and quadratic terms for a bank's presence in a county measured as the number of branches and the total amount of deposits of each bank in a county. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| Panel A: Full Sample | | | | | | |
|---|---|---|---|---|---|---|
| | Ln(Total Loans) | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| OTS × Post | 0.206*** | 0.088** | 0.152*** | 0.204*** | 0.094** | 0.158*** |
| | (0.041) | (0.039) | (0.041) | (0.041) | (0.039) | (0.042) |
| Ln(HPI) | | | | 0.266*** | 0.206 | 0.450** |
| | | | | (0.041) | (0.159) | (0.203) |
| Observations | 139277 | 130989 | 116550 | 129310 | 123123 | 109740 |
| Adjusted $R^2$ | 0.755 | 0.864 | 0.881 | 0.754 | 0.865 | 0.883 |
| Baseline Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | No | Yes | No | No |
| County Fixed Effects | Yes | No | No | Yes | No | No |
| Bank Fixed Effects | Yes | No | No | Yes | No | No |
| County-Year Fixed Effects | No | Yes | Yes | No | Yes | Yes |
| Bank-County Fixed Effects | No | Yes | Yes | No | Yes | Yes |
| Coarsened Exact Matching | No | No | Yes | No | No | Yes |
| Panel B: Excluding the Largest Banks | | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| OTS × Post | 0.226*** | 0.134*** | 0.152*** | 0.199*** | 0.119*** | 0.147*** |
| | (0.040) | (0.040) | (0.041) | (0.040) | (0.042) | (0.043) |
| Observations | 115891 | 106988 | 95445 | 84719 | 73760 | 61495 |
| Adjusted $R^2$ | 0.755 | 0.859 | 0.875 | 0.761 | 0.853 | 0.865 |
| Baseline Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | No | Yes | No | No |
| County Fixed Effects | Yes | No | No | Yes | No | No |
| Bank Fixed Effects | Yes | No | No | Yes | No | No |
| County-Year Fixed Effects | No | Yes | Yes | No | Yes | Yes |
| Bank-County Fixed Effects | No | Yes | Yes | No | Yes | Yes |
| Coarsened Exact Matching | No | No | Yes | No | No | Yes |
| Excluded Observations? | Top4 | Top4 | Top4 | Top20 SBL | Top20 SBL | Top20 SBL |

## Table 8: OTS Extinction and Small Business Lending: Role of Capitalization

Table 8 reports the coefficients of OLS regressions. Columns (1) and (2) repeat the analysis of Column (2) of Table 7 after partitioning the sample based on the median of the Tier 1 Capital Ratio (Tier 1 Capital divided by risk-weighted assets) of former OTS banks in the year prior to the OTS extinction. Columns (3) and (4) repeat the analysis of Column (2) of Table 7 after partitioning the sample based on the median of the Tier 1 leverage ratio (Tier 1 Capital divided total non-risk weighted assets) of former OTS banks prior to the OTS extinction. All variables and specifications are defined as those in Table 7. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Ln(Total Loans) | | | |
| | High Tier1 | Low Tier1 | High T1 Lev. Ratio | Low T1 Lev. Ratio |
| OTS × Post | 0.265*** | -0.227*** | 0.382*** | -0.062 |
| | (0.061) | (0.070) | (0.077) | (0.063) |
| Observations | 19197 | 88309 | 13984 | 93989 |
| Adjusted $R^2$ | 0.838 | 0.868 | 0.865 | 0.859 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| County-Year Fixed Effects | Yes | Yes | Yes | Yes |
| Bank-County Fixed Effects | Yes | Yes | Yes | Yes |

Table 9: OTS Extinction and Small Business Lending: Role of Changes in Bank Management

Table 9 reports coefficients of OLS regressions investigating the role of bank management in mediating the association between the OTS extinction and small business lending. Columns (1) and (2) repeat the analysis of Column (2) of Table 7 after partitioning the sample based on the median post-OTS extinction board turnover. Columns (3) and (4) repeat the analysis of Column (2) of Table 7 after partitioning the sample based on whether an executive director of the bank left following the OTS extinction. Columns (5) and (6) repeat the analysis of Column (2) of Table 7 after partitioning the sample based on whether the bank adopted credit risk modeling after the regulatory transition. We code a bank as *adopting* risk modeling if it discloses risk modeling in at least one year after the OTS extinction but *not* in any of the years prior to the regulatory transition. All variables and specifications are defined as those in Table 7. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Ln(Total Loans) | | | | | |
| | Low Brd Turn. | Hi Brd Turn. | No Exec.Exit | Exec.Exit | No Model | Model Adopt |
| OTS × Post | 0.145 | 0.386*** | 0.073 | 0.806*** | 0.359*** | 1.045*** |
| | (0.121) | (0.138) | (0.087) | (0.261) | (0.106) | (0.357) |
| Observations | 13043 | 12584 | 27217 | 1691 | 11922 | 563 |
| Adjusted $R^2$ | 0.864 | 0.850 | 0.865 | 0.800 | 0.838 | 0.851 |
| Baseline Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| County-Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank-County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes |

## Table 10: OTS Extinction and Small Business Lending: Portfolio Reallocation

Table 10 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on small business lending after partitioning the sample based on the difference in the portfolio allocations of commercial banks and former OTS banks within the jurisdiction of each OCC field office. Columns (1) and (2) repeat the empirical specification of Column (2) of the main table in the paper after partitioning the sample based on whether a bank belongs to the jurisdiction of an OCC field office with below- or above-median differences in the C&I lending shares of commercial banks (national banks) and former OTS banks. Columns (3) and (4) repeat the empirical specification of Column (2) of the main table after partitioning the sample based on whether a bank belongs to the jurisdiction of an OCC field office with below- or above-median differences in the real estate lending shares of commercial banks (national banks) and former OTS banks. All variables and specifications are defined as those in Table 7 Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Ln(Total Loans) | | | |
| | Large Δ C&I | Small Δ C&I | Large Δ Resi. | Small Δ Resi. |
| OTS × Post | 0.194*** | -0.214** | 0.197*** | -0.014 |
| | (0.047) | (0.085) | (0.060) | (0.055) |
| Observations | 56035 | 54049 | 54711 | 55640 |
| Adjusted $R^2$ | 0.859 | 0.864 | 0.859 | 0.863 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| County-Year Fixed Effects | Yes | Yes | Yes | Yes |
| Bank-County Fixed Effects | Yes | Yes | Yes | Yes |

## Table 11: OTS Extinction and Small Business Lending: Controlling for Mortgage Lending

Table 11 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on small business lending after controlling for changes in the volume of mortgage originations and the likelihood of rejection for mortgage applications. *% Residential + CRE* is the percentage of the portfolio of loans that is allocated to residential and CRE loans. *Ln(Mortgage Originations* is natural logarithm of the volume of mortgage loans originated by a bank in each county during the year obtained from the HMDA data set. *Av. Bank Mort. Rej. Rate* is the average fraction of mortgage applications that a bank rejects during a year computed from the HMDA data set. *Av. Bank-County Mort. Rej. Rate* is the average fraction of mortgage applications that a bank rejects in a county during a year computed from the HMDA data set. All other variables are defined as those in Table 7 Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Ln(Total Loans) | | | | |
| OTS × Post | 0.088** | 0.087** | 0.089** | 0.091** | 0.091** |
| | (0.039) | (0.038) | (0.038) | (0.038) | (0.038) |
| % (Residential + CRE) | | -0.256** | -0.552*** | -0.536*** | -0.536*** |
| | | (0.099) | (0.101) | (0.100) | (0.100) |
| Ln(Mortgage Originations) | | | 0.101*** | 0.099*** | 0.099*** |
| | | | (0.005) | (0.005) | (0.005) |
| Av. Bank Mort. Rej. Rate | | | | -0.126*** | -0.119*** |
| | | | | (0.039) | (0.042) |
| Av. Bank-County Mort. Rej. Rate | | | | | -0.010 |
| | | | | | (0.029) |
| Observations | 130989 | 129389 | 125314 | 125314 | 125314 |
| Adjusted $R^2$ | 0.864 | 0.865 | 0.866 | 0.866 | 0.866 |
| Baseline Controls | Yes | Yes | Yes | Yes | Yes |
| County-Year Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Bank-County Fixed Effects | Yes | Yes | Yes | Yes | Yes |

# Internet Appendix for "The Death of a Regulator: Strict Supervision, Bank Lending, and Business Activity"

## Table of Contents:

# A Historical Background on the OTS and Additional Results on the Effects of Supervisory Changes on Bank Management

Savings and Savings & Loans banks, also called thrifts, specialize in supplying residential mortgages to U.S. consumers. These banks are required by their charter to invest 65 percent of their asset portfolio in qualified thrift investments, which include residential real-estate loans, home-equity loans, mortgage-backed securities, credit card, and small business loans. In return for these restrictions, these banks enjoyed favorable regulatory treatment that included privileged access to financing through the Federal Home Loan Banks, preemption of state law, and unlimited interstate branching. Table A.1 shows that thrifts' specialization in residential lending persists to these days. Both before and after the OTS extinction, thrift banks still had a higher concentration of residential loans in their loan portfolios than other commercial.

The Savings & Loans (S&L) crisis in the 1980s and early 1990s hit the thrift industry hard and was blamed, in part, on lenient supervision (e.g., Kane, 1989). The OTS was created in the aftermath of the S&L crisis to replace the Federal Home Loan Bank Board (FHLBB) as the primary regulator of the thrift industry. Initially, the OTS was perceived as strict, cracking down on insolvent thrifts that had been left unscathed by the FHLBB (Wayne, 1992).

Over the next decades, however, sweeping industry and regulatory changes undermined the competitive advantages of the thrift charter. Federal thrifts were the first financial institutions entitled to open new branches across state borders and benefited from the preemption of state law pursuant to the Depression-era Home Owners' Loan Act (HOLA). The passage of the Riegle-Neal Act of 1994 eroded this regulatory advantage, giving the Office of the Comptroller of the Currency (OCC) the power to adopt preemption rules for national banks. In 1995, several unsuccessful bills proposed to abolish the OTS and to consolidate the regulation for thrifts and commercial banks, arguing that the thrift charter had become obsolete (MacDonald, Schwartz, and Day, 2011). The Treasury Department's 2008 blueprint for a modernized financial regulatory structure also recognized that the thrift charter no longer had a special role in providing residential mortgage loans to U.S. consumers. The business models of commercial banks and thrifts had converged substantially and the commercial banks' share of the U.S. residential mortgage market surpassed that of the thrifts. As a result, the blue print concluded that the thrift charter had lost its *raison d'etre* and recommended phasing it out.

Consistent with these developments, the number of thrifts regulated by the OTS declined from 1,628 in 1994 to 815 in 2007. Between 1998 and 2010, 120 thrifts converted to commercial banks whereas only 43 commercial banks converted to a thrift charter (MacDonald et al.,

2011). These trends resulted in a decline in the share of depository institutions regulated by the OTS from 12.5% in 1994 to less than 9.5% in the wake of the 2008 financial crisis. At the same time as its share of the regulatory market declined, the OTS became increasingly associated with initiatives that promoted the reduction of regulations and "red tape." This pro-industry stance is epitomized in its five-year strategic plan released in 2007, which stated that the "OTS listens to, learns from, and collaborates with the institutions it regulates and the public it serves on how best to address their needs."

Industry documents and SEC filings of many thrift holding companies suggest that the OCC and FDIC supervision was perceived as relatively more demanding than OTS supervision, affecting key areas of bank and loan management. In the remainder of this section, we provide further results that complement the analysis of section 5 and further corroborate the idea that the OCC and FDIC had a more active approach to supervision and requested significant changes in the management of former OTS banks. In Figure A.1 we show the results of a survey of former OTS bankers conducted by Sageworks, which confirms that banks experienced significant changes in the areas of loan loss recognition, risk management, and loan management as a result of the regulatory transition. In Figure A.2, we show excerpts of enforcement actions issued by the OCC and FDIC against former OTS banks showing some of the areas of management where the OCC and FDIC asked for improvements. These examples show the text of formal written agreements requesting that the boards of these banks ensure that they have competent management personnel in their executive management positions (Panel A), that the bank implements better loan portfolio management including establishing procedures to ensure satisfactory collateral documentation (Panel B), and that board ensures better classification of loan risk and stress testing of higher risk loan concentration categories (Panel C).

The examples of Figure A.2 provide an illustration of what type of actions the OCC and FDIC requested from former OTS banks through formal enforcement actions to correct management deficiencies. To provide more detailed and systematic evidence about the actions that the OCC and FDIC requested to correct management deficiencies at former OTS banks, we read approximately 500 formal written agreements and cease-and-desist orders received by former OTS banks both prior and following the transition. Our approach was to read the sections of these documents that focused on loan policy management and credit risk management and to create a taxonomy of the most common types of corrective actions that supervisors requested from former OTS banks. Specifically, we classified the enforcement actions based on whether they included each of the following corrective actions:

1. [**Collection of Borrower Information:**] Does the formal supervisory action request that the bank revise its lending policy to ensure that it collects more information about

the financial health of the borrower prior to the origination of the loan or to ensure that it periodically collects and updates the loan file of the borrower over the life of the loan?

2. [**Collateral Monitoring:**] Does the formal supervisory action request that the bank revise its lending policies to ensure that the value of collateral in collateral-dependent loans is periodically evaluated and maintained throughout the life of the loan?

3. [**Documentation of Loan Exceptions:**] Does the formal supervisory action request that the bank develops a system to track the performance of loans whose parameters fall outside the bank loan policy guidelines or that the motivations for the origination of such loans by loan officers are well-documented?

4. [**Limits on Portfolio Concentration:**] Does the formal supervisory action request that the bank develops or modifies its loan portfolio concentration policy?

5. [**Change in Risk Rating System:**] Does the formal supervisory action request that the bank enacts changes in its risk rating system to ensure accurate and timely classification of problem loans?

6. [**Loan Review System:**] Does the formal supervisory action request that the bank implements an independent periodic review of their loan classification system?

We start by reporting descriptive statistics of the likelihood of each type of corrective action during the pre- and post-OTS extinction periods. The bar chart of Figure A.3 represents the fraction of enforcement actions against former OTS banks that stipulates a corrective action of the areas of loan management deficiency that we itemized above. The chart indicates that following the OTS extinction, the OCC and FDIC were significantly more active in requesting corrective actions in the areas of "Collection of Borrower Information", "Collateral Monitoring", "Documentation of Loan Exceptions", and "Change in Risk Rating System". There is also an increase in the areas of "Limits on Portfolio Concentration" and "Loan Review System" but these increases are less pronounced than those of other areas. We present similar results using regression analyses in Table 5 of the paper.

We also implement a similar procedure to further examine corrective actions that the regulators requested from former OTS banks in terms of improving the qualifications of their management team. We classified these corrective actions into three types:

1. [**Management Study:**] Does the formal supervisory action request that the bank complete an independent study to assess the qualifications of its management?

2. [**Qualified Management:**] Does the formal supervisory action request that the bank ensure that it has qualified personnel in its management positions either by hiring new managers or by ensuring that current managers undergo a formal training program?

3. [**Appointment of New Director:**] Does the formal supervisory action directly request that the bank appoints a new director?

We provide descriptive statistics pertaining to this analysis in Figure A.4. This figure suggests that following the OTS extinction, the OCC and OTS are more likely to request former OTS banks to conduct management studies and to ensure a competent management team but they fall short of directly requesting the appointment of new directors to a greater extent than the OTS did. In Table A.2 , we also find that following that the likelihood of a request for a management study or a requests for improvements in management qualifications significantly increase following the OTS transition.

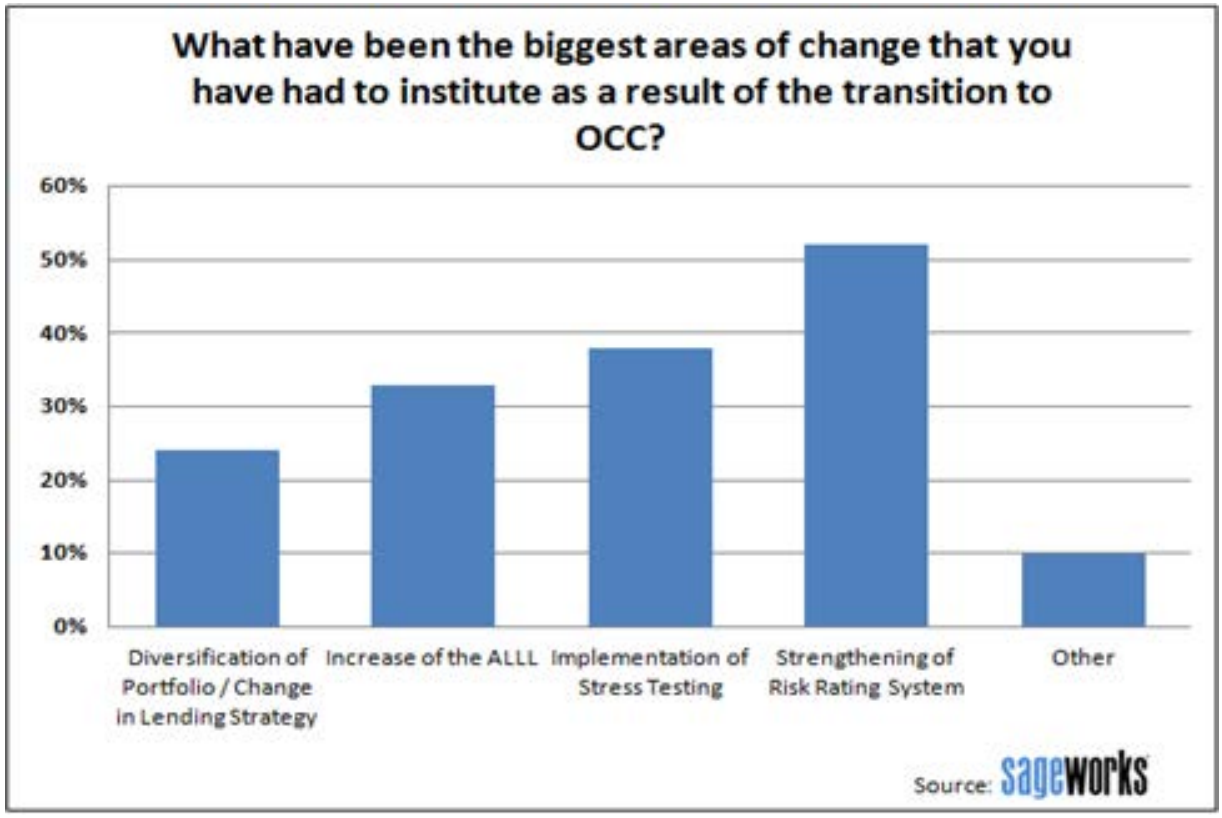
In the main document we also measure changes in banks' management after the supervisory transition for all publicly-listed banks using three proxies that are widely available at an annual frequency for these banks. There, we examine how the OTS extinction is associated with changes in bank management using regression analysis. Here, we complement the analysis in that section with Figure A.5, which plots the evolution of board turnover and risk modeling for thrifts and commercial banks separately. Prior to the OTS extinction, thrifts' board turnover rates and the use of credit risk models are consistently below those of commercial banks. But following the OTS extinction, these patterns flip and thrifts see greater rates of board turnover and increased use of credit risk modeling.

To further probe whether thrifts made material investments in lending technologies and in information management and internal control systems following the supervisory transition, we examined the evolution of certain types of non-interest expenses. The Call Reports (but not the Thrift Financial Reports) provide a breakdown of non-interest expense by categories. Here, we analyze whether expenses that are related to investments in information management and internal control systems such as data processing, accounting and auditing, consulting and advisory evolve differently from other categories such as advertising and marketing, legal, and telecommunications expenses. In Figure A.6, we examined the evolution of the different non-interest. While we cannot observe the pre-transition period for thrifts, the post transition period indicates that the data processing, auditing and accounting, and consulting and advisory expenses of thrifts are growing at a faster pace that those of other commercial banks in the years following the transition. We find no such pattern for the other kinds of expenses. We believe that this is further evidence corroborating our conjecture that the OCC induced significant investments in lending technologies at thrifts.

We also conducted a battery of tests to further assess whether the effects that we documented in section 5 are likely to be driven by the supervisory transition. In Table A.3, we partition the sample based on the magnitude of the local house price decline between 2007 and 2010 and we find that the effects of supervisory transition on loan loss accounting ratios and likelihood of enforcement actions are statistically significant both in the subsamples with high and low house price declines. In Table A.4, we show that the corrective actions imposed by the OCC were more pronounced in banks headquartered in areas that were formerly under the jurisdiction of the Western Division of the OTS, whose regional director, Darrel W. Dochow, received significant negative attention for being a lax supervisor with cozy ties with its regulated entities (e.g., Story and Morgenson, 2011). This evidence suggests that the actions of the OCC are driven by stricter enforcement standards. In Table A.5 we investigate if the effects of the supervisory transition on loan loss accounting ratios and likelihood of enforcement actions are similar regardless of whether the former OTS banks was a federal chartered thrift that transitioned to the OCC or a state-chartered thrift that transitioned to the FDIC. The results provide some mixed evidence with loan loss provisions increasing relatively more at state-chartered thrifts and nonperforming loans and the likelihood of enforcement actions increasing relatively more at federal-chartered thrifts. Finally, in Table A.6 we find that our results are largely robust to interactions between the *Post* dummy and the financial characteristics vector, $X$.

Figure A.1: Sageworks Survey

Figure A.1 is a bar chart obtained from a survey of bankers that asked "What have been the biggest areas of change that you have had to institute as a result of the transition to OCC?". The survey was made in the context of a webinar by Sageworks covering the topic of "OTS to OCC: What ALLL Challenges Still Exist".



## Figure A.2: Example passages from OCC Enforcement Action on Former OTS

In this appendix, we show passages from OCC Enforcement Actions and formal written agreements between the OCC and former OTS banks. Panel A shows the third section of the formal written agreement between the OCC and Delanco Federal Savings Bank of November 21st, 2012 requiring Delanco's Board to ensure competent management by means of hiring new managers or providing additional training to existing managers that continue in their position. Panel B shows shows the sixth section of the formal written agreement between the OCC and Amory Federal Savings & Loans Association of July 19th, 2012 requiring Amory's management to implement new loan portfolio management practices. Panel C shows shows the sixth section of the formal written agreement between the OCC and Community Bank, Staunton, Virginia of August 9th, 2012 requiring Community Bank's management to implement new credit risk management practices.

**Panel A:** Formal Written Agreement between OCC and Delanco, FSB.

ARTICLE III

BOARD TO ENSURE COMPETENT MANAGEMENT

(1) The Board shall ensure that the Bank has competent management in place on a full-time basis in its Chief Executive Officer, Chief Financial Officer, and Vice President of Commercial Lending positions to carry out the Board's policies, ensure compliance with this Agreement, applicable laws, rules and regulations, and manage the day-to-day operations of the Bank in a safe and sound manner.

(4) If the Board determines that an officer will continue in his/her position but that the officer's depth of skills needs improvement, the Board will within sixty (60) days develop and implement a written program, with specific time frames, to improve the officer's supervision and management of the Bank. At a minimum, the written program shall include:

(a) an education program designed to ensure that the officer has skills and abilities necessary to supervise effectively;

**Panel B:** Formal Written Agreement between OCC and Amory Federal Savings & Loans Association.

ARTICLE VI

LOAN PORTFOLIO MANAGEMENT

(1) The Board shall, within sixty (60) days, develop, implement, and thereafter ensure Bank adherence to a written program to improve the Bank's loan portfolio management. The program shall include, but not be limited to:

(a) procedures to ensure satisfactory and perfected collateral documentation;

(b) procedures to ensure that extensions of credit are granted, by renewal or otherwise, to any borrower only after obtaining and analyzing current and satisfactory credit information;

**Panel C:** Formal Written Agreement between OCC and Community Bank, Staunton,Virginia.

Article VI

CREDIT RISK MANAGEMENT

(1) Within sixty (60) days, the Board shall develop, implement, and thereafter ensure Bank adherence to a written program to improve the Bank's credit risk management consistent with the guidance set forth in the OCC Handbook "Rating Credit Risk". The program shall include, but not be limited to:

(a) procedures to ensure accurate and timely risk grades, including loss recognition and identification of nonaccrual loans;

(b) procedures for early problem loan identification;

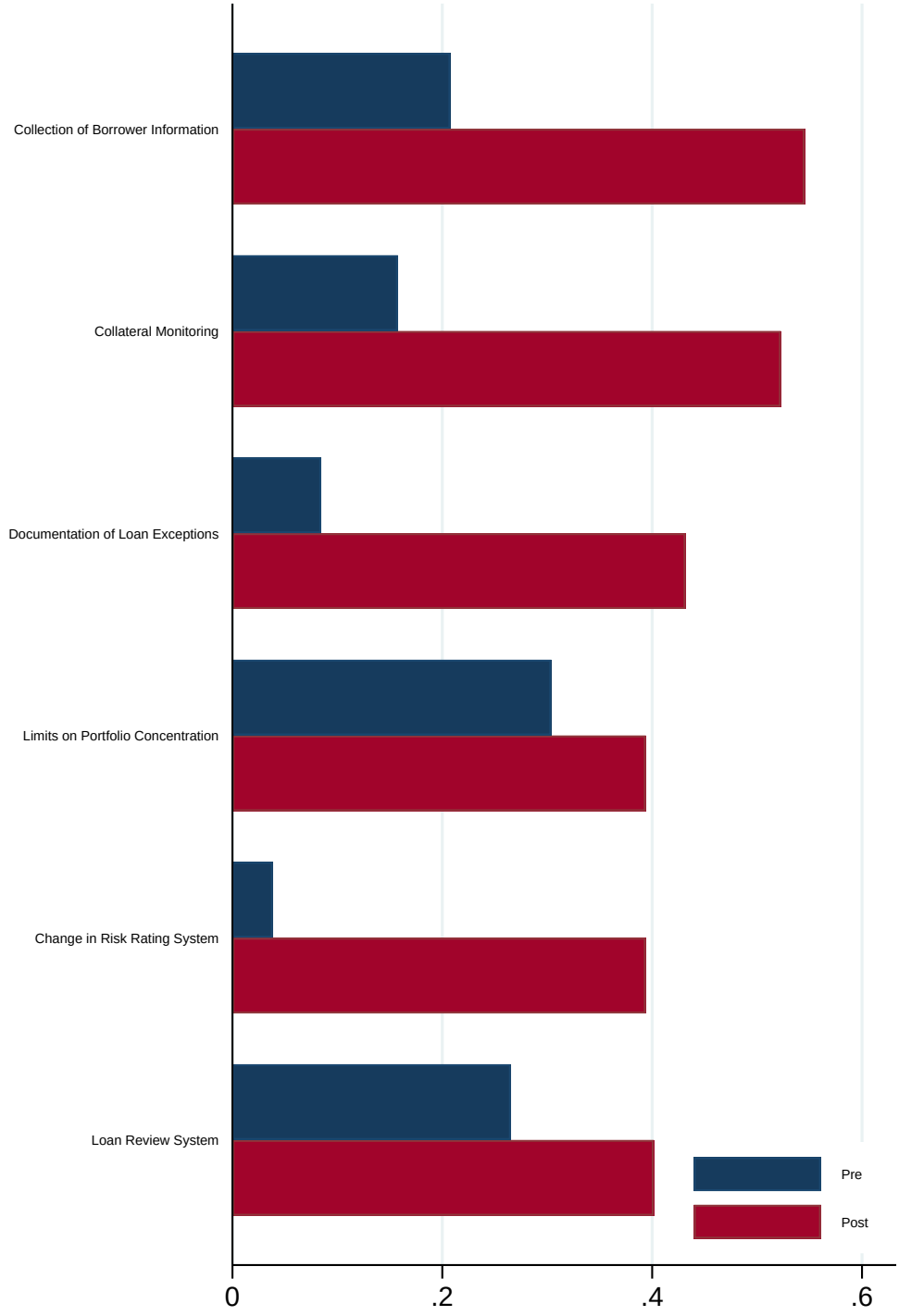
(c) procedures for establishing loan officer and credit administration accountability for failure to assign accurate and timely risk grades on loans, including recognition of nonaccrual status under their respective supervision;

(d) implementation of an effective credit risk training program for all lending staff, internal loan review staff, financial analysts, and members of the Directors Loan Committee;

(e) stress testing of higher risk loan concentration categories (non-owner occupied, commercial real estate (CRE), land, and construction loans),

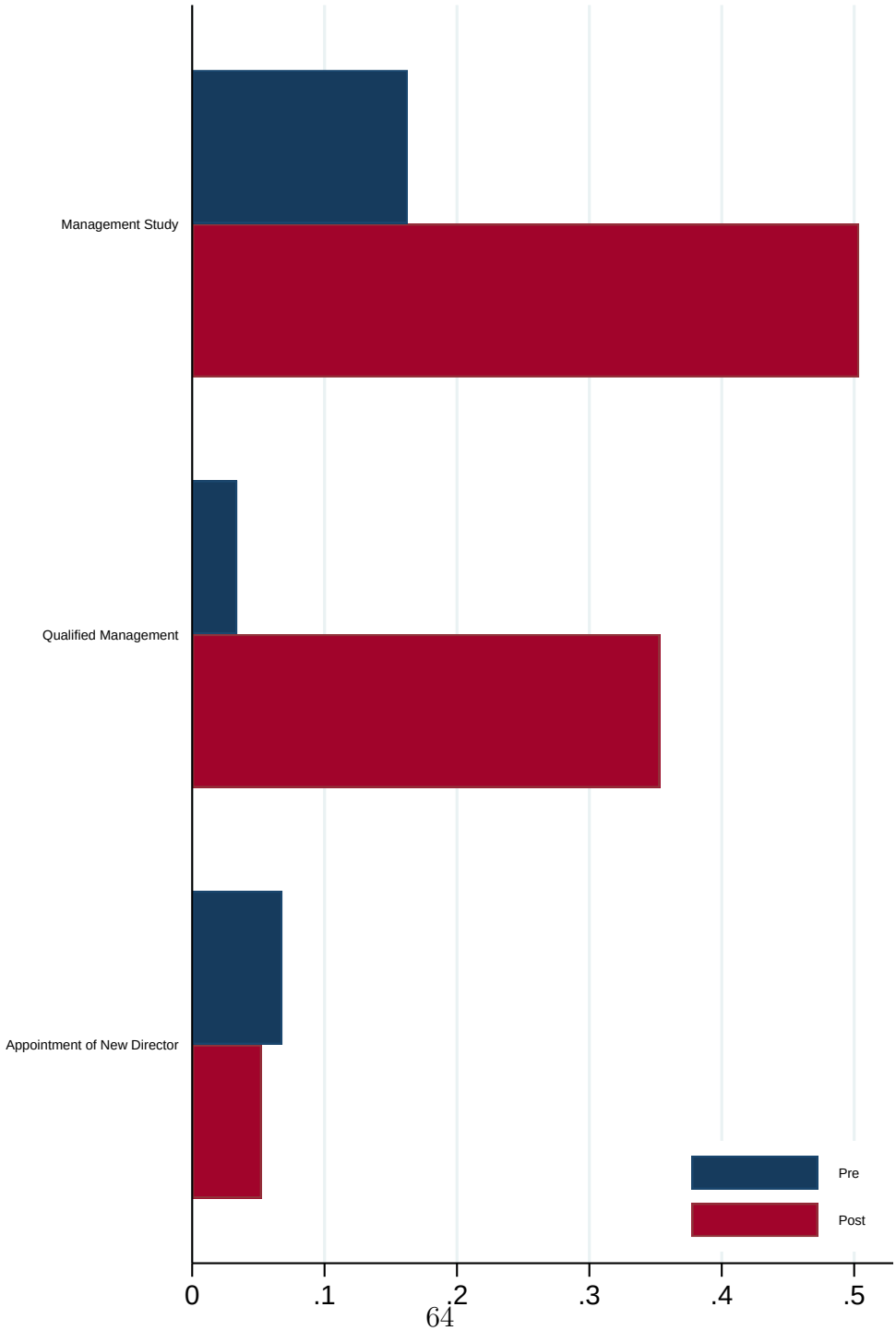
## Figure A.3: Enforcement Actions Before and After the OTS Extinction: Loan Management Requests

Figure A.3 represents the fraction of enforcement actions that requested former OTS banks to correct deficiencies in the areas of collection of borrower information, collateral monitoring, documentation of loan exceptions, limits on portfolio concentration, change in risk rating systems, and loan review system. The blue bars represent the fraction of enforcement actions issued against former OTS banks that included each of these requests during the pre-OTS extinction period. The red bars represent the fraction of enforcement actions issued against former OTS banks that included each of these requests during the post-OTS extinction period. Data are obtained from publicly-available enforcement actions of former OTS banks and collected by the authors.



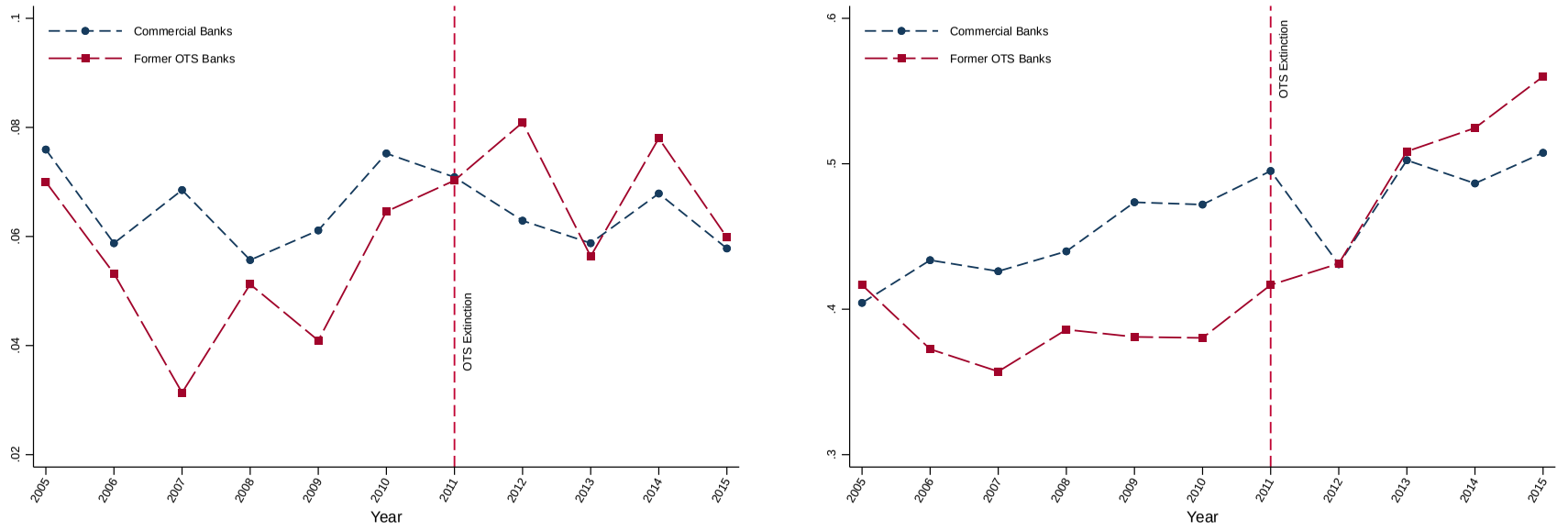
## Figure A.4: Enforcement Actions Before and After the OTS Extinction: Management Qualifications

Figure A.4 represents the fraction of enforcement actions that requested former OTS banks to correct deficiencies in the qualification of their senior management personnel. The categories of enforcement actions represented in the bar chart are: requests for the performance of a management study of the qualifications of senior management personnel, requests for ensuring qualified management in key positions either by appointing a new manager or by training existing executive officers and directors, and direct requests for the appointment of a new director or management, The blue bars represent the fraction of enforcement actions issued against former OTS banks that included each of these requests during the pre-OTS extinction period. The red bars represent the fraction of enforcement actions issued against former OTS banks that included each of these requests during the post-OTS extinction period. Data are obtained from publicly-available enforcement actions of former OTS banks and collected by the authors.



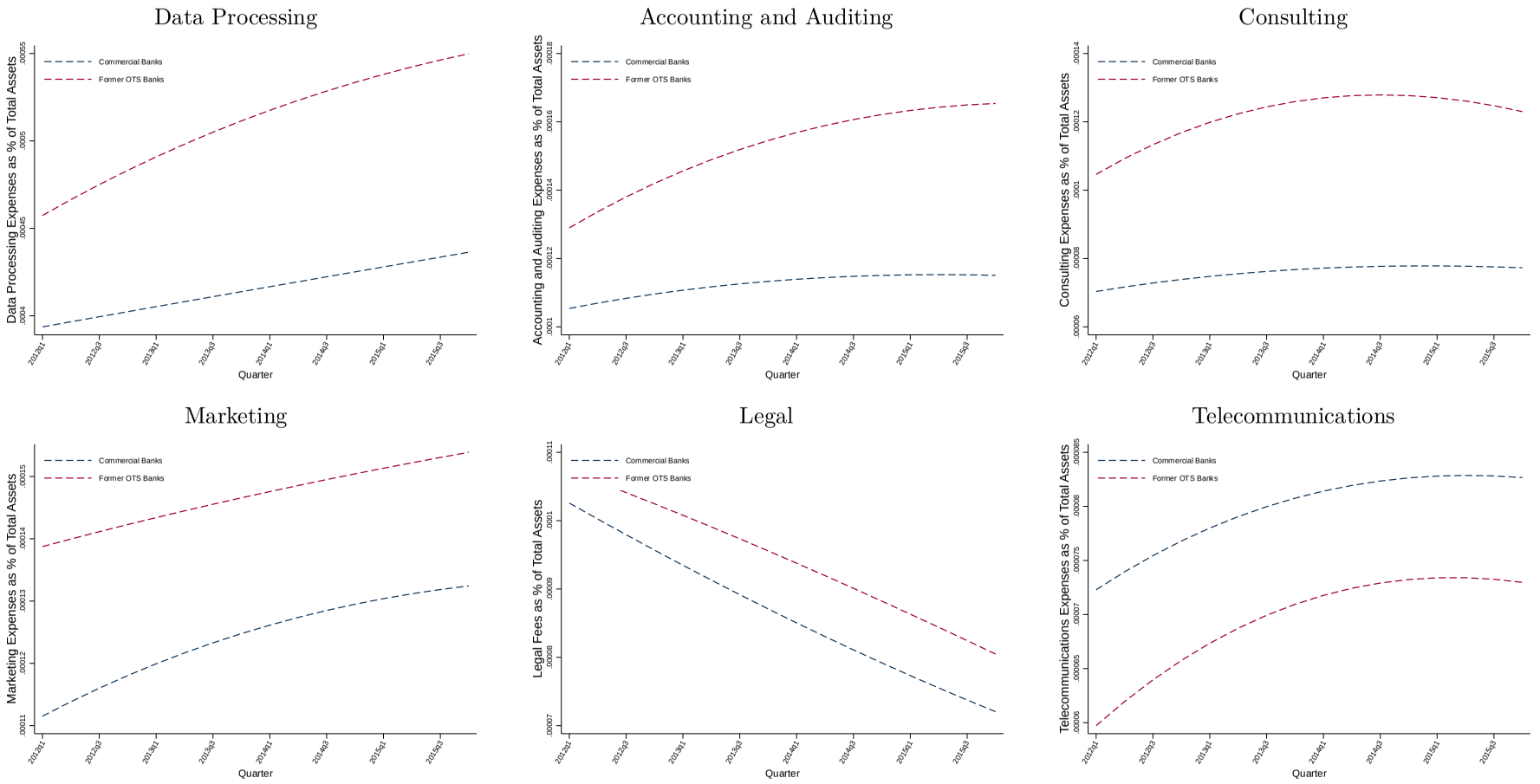
## Figure A.5: Impact of the Supervisory Transition on Board Turnover and Credit Risk Modeling over Time

Figure A.5 plots the average board turnover (sum of entries and exits of board directors divided by average number of board directors) and share of banks using formal risk models and disclosing this practice in their 10-Ks (defined as mentions of the words "risk" and "model" within ten words of each other in the annual 10-K of the bank), separately for former OTS banks and commercial banks during the period 2005–2015. Data are from the FFIEC Call Reports and from the Thrift Financial Reports, regulatory filings, BoardEx, and 10-Ks of publicly traded banks.



## Figure A.6: OTS Extinction and Banks' Non-Interest Expenses by Category

Figure A.6 plots a polynomial fitted line of the evolution of different types of non-interest expenses of former OTS banks and other commercial banks. We examine the evolution of data processing expenses (RIADC017), accounting and auditing expenses (RIADF556), consulting and advisory expenses (RIADF557), advertising and marketing expenses (RIAD0497), legal fees and expenses (RIAD4141), and telecommunications expenses (RIADF559). Data are obtained from call reports for the period 2012:Q1 through 2015:Q4.



## Table A.1: Descriptive Statistics for Sample Banks (before and after the OTS extinction

Table A.1 presents descriptive statistics for the main sample used in the analysis prior to and after the OTS extinction. All variables are defined similarly to Table 2 of the paper

### Panel A: Banks' Financial Characteristics and Ratios prior to the OTS Extinction

| | Count | Mean | Std. Dev. | p25 | p50 | p75 |
|---|---|---|---|---|---|---|
| **Commercial Banks (Pre-OTS Extinction)** | | | | | | |
| Total Assets | 200,386 | 1,520,247 | 28,084,325 | 61,839 | 131,416 | 303,886 |
| Share CRE | 200,386 | 0.240 | 0.175 | 0.092 | 0.212 | 0.357 |
| Share C&I | 200,386 | 0.0928 | 0.0742 | 0.0434 | 0.0775 | 0.123 |
| Share Residential | 200,386 | 0.176 | 0.131 | 0.0825 | 0.152 | 0.236 |
| Tier1 Capital Ratio | 200,386 | 22.1 | 117.1 | 10.9 | 13.4 | 18.2 |
| Loan Loss Provision Ratio | 200,385 | 0.001 | 0.004 | 0 | 0.0004 | 0.001 |
| Nonperforming Loan Ratio | 200,385 | 0.012 | 0.020 | 0.001 | 0.005 | 0.014 |
| Charge-Off Ratio | 200,384 | 0.001 | 0.004 | 0.00007 | 0.0001 | 0.0008 |
| ALLL Ratio | 197,928 | 0.010 | 0.007 | 0.006 | 0.009 | 0.011 |
| Small Business Loans as % of Assets | 75,355 | 0.160 | 0.109 | 0.092 | 0.150 | 0.216 |
| Small Business Loans as % of Loans | 74,880 | 0.244 | 0.153 | 0.155 | 0.235 | 0.324 |
| **Former OTS Banks (Pre-OTS Extinction)** | | | | | | |
| Total Assets | 18,038 | 1,106,950 | 5,523,292 | 76,155 | 162,864 | 407,471 |
| Share CRE | 18,038 | 0.175 | 0.156 | 0.0506 | 0.140 | 0.261 |
| Share C&I | 18,038 | 0.034 | 0.052 | 0 | 0.012 | 0.049 |
| Share Residential | 18,038 | 0.427 | 0.212 | 0.279 | 0.435 | 0.581 |
| Tier1 Capital Ratio | 18,038 | 29.40 | 68.66 | 13.09 | 17.81 | 28.22 |
| Loan Loss Provision Ratio | 18,038 | 0.00106 | 0.00335 | 0 | 0.000184 | 0.000786 |
| Nonperforming Loan Ratio | 18,038 | 0.0113 | 0.0198 | 0.00129 | 0.00504 | 0.0134 |
| Charge-Off Ratio | 18,038 | 0.000807 | 0.00256 | 0 | 0.0000504 | 0.000522 |
| ALLL Ratio | 15,968 | 0.00639 | 0.00617 | 0.00281 | 0.00511 | 0.00799 |
| Small Business Loans as % of Assets | 9,082 | 0.069 | 0.075 | 0.005 | 0.046 | 0.109 |
| Small Business Loans as % of Loans | 8,773 | 0.106 | 0.280 | 0.013 | 0.074 | 0.163 |

### Panel B: Banks' Financial Characteristics and Ratios after the OTS Extinction

| | Count | Mean | Std. Dev. | p25 | p50 | p75 |
|---|---|---|---|---|---|---|
| **Commercial Banks (Post-OTS Extinction)** | | | | | | |
| Total Assets | 112,301 | 1,507,448 | 29,471,897 | 82,009 | 167,794 | 374,056 |
| Share CRE | 112,301 | 0.216 | 0.153 | 0.087 | 0.196 | 0.319 |
| Share C&I | 112,301 | 0.082 | 0.0675 | 0.038 | 0.067 | 0.108 |
| Share Residential | 112,301 | 0.170 | 0.123 | 0.082 | 0.148 | 0.229 |
| Tier1 Capital Ratio | 112,301 | 24.12 | 234.1 | 12.61 | 15.13 | 19.30 |
| Loan Loss Provision Ratio | 112,301 | 0.0005 | 0.002 | 0 | 0.0002 | 0.0006 |
| Nonperforming Loan Ratio | 112,301 | 0.012 | 0.018 | 0.002 | 0.006 | 0.014 |
| Charge-Off Ratio | 112,301 | 0.0008 | 0.0021 | 0.000006 | 0.00016 | 0.00068 |
| ALLL Ratio | 112,301 | 0.0101 | 0.0064 | 0.00647 | 0.00899 | 0.0122 |
| Small Business Loans as % of Assets | 100,399 | 0.146 | 0.082 | 0.090 | 0.135 | 0.189 |
| Small Business Loans as % of Loans | 100,226 | 0.238 | 0.118 | 0.159 | 0.225 | 0.302 |
| **Former OTS Banks (Post-OTS Extinction)** | | | | | | |
| Total Assets | 11,384 | 1,404,442 | 6,955,627 | 90,018 | 178,168 | 484,721 |
| Share CRE | 11,384 | 0.162 | 0.144 | 0.045 | 0.127 | 0.251 |
| Share C&I | 11,384 | 0.031 | 0.046 | 0 | 0.012 | 0.045 |
| Share Residential | 11,384 | 0.395 | 0.200 | 0.245 | 0.402 | 0.538 |
| Tier1 Capital Ratio | 11,384 | 31.28 | 66.55 | 15.19 | 20.02 | 29.01 |
| Loan Loss Provision Ratio | 11,384 | 0.0006 | 0.0020 | 0 | 0.00014 | 0.00058 |
| Nonperforming Loan Ratio | 11,384 | 0.015 | 0.021 | 0.0036 | 0.009 | 0.0189 |
| Charge-Off Ratio | 11,383 | 0.0008 | 0.0023 | 0 | 0.00017 | 0.0007 |
| ALLL Ratio | 11,251 | 0.009 | 0.007 | 0.004 | 0.0076 | 0.0111 |
| Small Business Loans as % of Assets | 10,136 | 0.078 | 0.068 | 0.023 | 0.063 | 0.113 |
| Small Business Loans as % of Loans | 10,038 | 0.119 | 0.099 | 0.041 | 0.101 | 0.169 |

## Table A.2: Enforcement Actions Before and After the OTS Extinction: Management Qualifications

Table A.2 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on the content of enforcement actions imposed by bank regulators on regulated entities. *Management Study* is an indicator variable that takes the value of one if the enforcement action contains a stipulation requesting the bank to perform an evaluation of the qualifications of senior management. *Competent Management* is an indicator variable that takes the value of one if the enforcement actions contains a stipulation requesting the bank to ensure competent management at its senior positions. *New Directors* is an indicator variable that takes the value of one if the enforcement action contains a stipulation requesting that the bank appoints new directors. *OTS* is an indicator variable that takes the value of one if the depository institution's primary supervisor in the first and second quarter of 2011 was the Office of Thrift Supervision. *Post* is an indicator variable that takes the value of one for all quarters between 2011:Q3 and 2015:Q4 and zero for all quarters between 2005:Q1 and 2011:Q2. *Ln(Assets)* is the natural logarithm of total assets (RCFD2170). *Share Residential* is the ratio of residential real estate loans (RCON1797+RCON5367+RCON5368) and total assets (RCFD2170). *Share C&I* is the ratio of commercial and industrial loans (RCFD1766) and total assets (RCFD2170). *Share CRE* is the ratio of commercial and real estate loans (RCON1415+RCON1460+RCON1480+RCFD2746) and total assets (RCFD2170). *Tier1 Capital Ratio* is the bank's Tier 1 capital ratio (RCFD7206). Standard errors are presented in parentheses, and are clustered at the level of the county, assigning banks to counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Management Study | | Competent Management | | New Directors | |
| Post | 0.325*** | 0.288*** | 0.317*** | 0.334*** | -0.029 | -0.027 |
| | (0.064) | (0.098) | (0.056) | (0.077) | (0.032) | (0.050) |
| Ln(Assets) | -0.041** | 0.269 | -0.019 | 0.129 | -0.014 | 0.042 |
| | (0.019) | (0.200) | (0.012) | (0.167) | (0.008) | (0.040) |
| Residential Share | 0.003 | -1.102 | 0.153 | -0.347 | -0.070 | 0.040 |
| | (0.172) | (0.670) | (0.132) | (0.534) | (0.098) | (0.208) |
| C&I Share | 0.041 | 0.011 | 0.050 | -3.898 | -0.192 | -1.767 |
| | (0.433) | (2.797) | (0.309) | (2.398) | (0.227) | (1.192) |
| CRE Share | 0.208 | -1.123 | 0.187 | -0.969* | -0.013 | -0.096 |
| | (0.217) | (0.904) | (0.133) | (0.567) | (0.114) | (0.367) |
| Tier1 Capital Ratio | -0.001*** | 0.000 | -0.000 | -0.000 | -0.000 | 0.000 |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.000) |
| Observations | 284 | 157 | 284 | 157 | 284 | 157 |
| Adjusted $R^2$ | 0.120 | -0.009 | 0.169 | 0.123 | -0.008 | -0.057 |
| Bank Fixed-Effects | No | Yes | No | Yes | No | Yes |

Table A.3: OTS Extinction and Strict Supervision: The Role of Local Economic Conditions

Table A.3 reports the coefficients of OLS regressions investigating whether the effect of the OTS extinction depends on the exposure of the bank to areas with different levels of house price decline in the 2007–2010 period. We stratify the sample based on a bank-specific measure of exposure to house price declines in the 2007-2010 period. The house price decline measure is computed as the weighted average on the house price declines in the counties where banks have a branch presence with the weights defined as the share of deposits of a bank in each county as of 2007. The Hi. Δ HPI sample is defined as banks whose weighted house price index fell by more than 17% between 2007 and 2010. The Med. Δ HPI sample is comprised of banks whose weighted house price index fell between two and seventeen percent between 2007 and 2010. The Low Δ HPI sample are those banks whose weighted house price index either rose or fell less than two percent between 2007 and 2010. All variables are defined similarly to those in Table 3 Standard errors are presented in parentheses, and are clustered at the level of the county, where banks are assigned into counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | Nonperforming Loan Ratio | | | Enf. Act. | | |
|---|---|---|---|---|---|---|
| | Hi. Δ HPI | Med. Δ HPI | Low Δ HPI | Hi. Δ HPI | Med. Δ HPI | Low Δ HPI |
| OTS × Post | 0.004*** | 0.002*** | 0.003*** | 0.007** | -0.000 | 0.004 |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.001) | (0.003) |
| Ln(Assets) | -0.001 | -0.000 | -0.001* | 0.001 | 0.001 | 0.004*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Residential Share | 0.020*** | 0.008*** | 0.007** | 0.010 | -0.006 | 0.006 |
| | (0.004) | (0.002) | (0.003) | (0.007) | (0.006) | (0.007) |
| CRE Share | 0.010*** | 0.004* | 0.006* | 0.002 | 0.003 | 0.001 |
| | (0.004) | (0.002) | (0.003) | (0.004) | (0.004) | (0.006) |
| C&I Share | -0.013** | -0.009** | 0.005 | -0.001 | 0.006 | 0.001 |
| | (0.005) | (0.004) | (0.004) | (0.007) | (0.005) | (0.009) |
| Tier1 Capital Ratio | -0.000 | -0.000 | -0.000*** | 0.000 | -0.000 | -0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Observations | 68473 | 136971 | 68554 | 61157 | 120132 | 60220 |
| Adjusted $R^2$ | 0.534 | 0.523 | 0.453 | 0.026 | 0.021 | 0.012 |
| Quarter Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes |

Table A.4: OTS Extinction and Strict Supervision: Heterogeneity across OTS Divisions

Table A.4 reports the coefficients of OLS regressions investigating whether the effect of the OTS extinction varies across the different OTS regional divisions. We stratify the sample based on whether the headquarters of the bank is located in one of the states covered by the West regional division of the OTS. All variables are defined similarly to those in Table 3 Standard errors are presented in parentheses, and are clustered at the level of the county, where banks are assigned into counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | Nonperforming Loan Ratio | | Enf. Act. | |
|---|---|---|---|---|
| | Central & NE & SE | West | Central & NE & SE | West |
| OTS × Post | 0.003*** | 0.005*** | 0.001 | 0.004* |
| | (0.001) | (0.001) | (0.002) | (0.002) |
| Ln(Assets) | -0.000 | -0.000 | 0.001** | 0.002*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| Residential Share | 0.020*** | 0.011*** | 0.004 | -0.005 |
| | (0.004) | (0.003) | (0.005) | (0.005) |
| CRE Share | 0.000 | -0.000 | -0.004 | 0.002 |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| C&I Share | -0.014*** | -0.003 | 0.003 | -0.004 |
| | (0.004) | (0.004) | (0.004) | (0.005) |
| Tier1 Capital Ratio | -0.000 | -0.000* | -0.000 | -0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Observations | 205544 | 135505 | 205544 | 135506 |
| Adjusted $R^2$ | 0.502 | 0.444 | 0.025 | 0.023 |
| Quarter Fixed-Effects | Yes | Yes | Yes | Yes |
| Bank Fixed-Effects | Yes | Yes | Yes | Yes |

## Table A.5: OTS Extinction and Loan Loss Recognition - Transition to OCC or FDIC

Table A.5 reports the coefficients of OLS regressions investigating whether the effect of the OTS extinction on loan loss recognition depends on whether the new supervisor of the former OTS banks was the OCC or the FDIC. $OTS \rightarrow OCC$ is an indicator variable that takes the value of one if the depository institution's primary regulator in the first and second quarter of 2011 was the Office of Thrift Supervision and it transitioned to the OCC following the OTS extinction. $OTS \rightarrow FDIC$ is an indicator variable that takes the value of one if the depository institution's primary regulator in the first and second quarter of 2011 was the Office of Thrift Supervision and it transitioned to the FDIC following the OTS extinction. All variables are defined similarly to those in Table 3 Standard errors are presented in parentheses, and are clustered at the level of the county, where banks are assigned into counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | LLP Ratio | NPL Ratio | Charge-Off Ratio | Enf. Act |
| OTS → OCC × Post | 0.0002** | 0.0041*** | 0.0003*** | 0.0029** |
| | (0.000) | (0.000) | (0.000) | (0.001) |
| OTS → FDIC × Post | 0.0005*** | 0.0009 | 0.0002*** | -0.0016 |
| | (0.000) | (0.001) | (0.000) | (0.002) |
| Ln(Assets) | 0.0002** | -0.0003 | -0.0001 | 0.0018*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Residential Share | 0.0001 | 0.0144*** | 0.0006*** | 0.0011 |
| | (0.000) | (0.002) | (0.000) | (0.004) |
| CRE Share | 0.0016*** | 0.0046*** | -0.0001 | 0.0015 |
| | (0.000) | (0.002) | (0.000) | (0.002) |
| C&I Share | 0.0023*** | -0.0069*** | -0.0002 | 0.0006 |
| | (0.000) | (0.003) | (0.000) | (0.003) |
| Tier1 Capital Ratio | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Observations | 312550 | 312550 | 312548 | 276439 |
| Adjusted $R^2$ | 0.1779 | 0.5044 | 0.1875 | 0.0224 |
| Quarter Fixed-Effects | Yes | Yes | Yes | Yes |
| Bank Fixed-Effects | Yes | Yes | Yes | Yes |

Table A.6: OTS Extinction and Strict Supervision: Interaction of Post with Loan Portfolio Composition

Table A.6 reports the coefficients of OLS regressions investigating whether the effect of the OTS extinction is attenuated when we include controls for the interaction between the post-OTS extinction period and loan portfolio characteristics of banks. All variables are defined similarly to those in Table 3. Standard errors are presented in parentheses, and are clustered at the level of the county, where banks are assigned into counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | Nonperforming Loan Ratio | | | | | Enf. Act. | | |
|---|---|---|---|---|---|---|---|---|
| OTS × Post | 0.002*** | 0.004*** | 0.004*** | 0.002*** | 0.001 | 0.002* | 0.002* | 0.001 |
| | (0.001) | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Residential Share | 0.014*** | 0.016*** | 0.014*** | 0.012*** | -0.001 | 0.000 | 0.000 | -0.001 |
| | (0.003) | (0.003) | (0.002) | (0.003) | (0.004) | (0.004) | (0.004) | (0.004) |
| Residential Share × Post | 0.007*** | | | 0.007*** | 0.005*** | | | 0.005*** |
| | (0.001) | | | (0.001) | (0.002) | | | (0.002) |
| C&I Share | -0.009*** | -0.009*** | -0.008*** | -0.007*** | -0.001 | 0.000 | -0.001 | -0.001 |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.004) | (0.003) | (0.004) |
| C&I Share × Post | | -0.001 | | -0.005* | | -0.003 | | 0.001 |
| | | (0.003) | | (0.003) | | (0.003) | | (0.004) |
| CRE Share | 0.001 | 0.001 | -0.002 | -0.002 | -0.001 | -0.001 | -0.000 | -0.000 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| CRE Share × Post | | | 0.015*** | 0.016*** | | | -0.003** | -0.003* |
| | | | (0.001) | (0.002) | | | (0.001) | (0.002) |
| Ln(Assets) | -0.000 | -0.000 | -0.000 | -0.000 | 0.002*** | 0.002*** | 0.002*** | 0.002*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Tier1 Capital Ratio | -0.000 | -0.000 | -0.000 | -0.000 | -0.000 | -0.000 | -0.000 | -0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Observations | 341351 | 341351 | 341351 | 341351 | 304216 | 304216 | 304216 | 304216 |
| Adjusted $R^2$ | 0.482 | 0.481 | 0.484 | 0.485 | 0.024 | 0.024 | 0.024 | 0.024 |
| Quarter Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

# B Aggregate Small Business Lending at the Census-Tract Level and OTS Extinction

The main empirical analyses of the paper uses data on the annual amount of small business loans originated by each reporting financial institution in each U.S. county between 2005 and 2015. In addition to this data set, the CRA small business lending database also includes aggregate information on the total number and amount of small business loans originated by all reporting financial institutions at the census-tract level, which is a finer geographical delimitation area than the county. This additional data set does not allow us to observe the origination of small business loans of each bank but, on the other hand, the data set provides information on the annual aggregate amount of small business loans originated to borrowers within each census tract in the U.S..

We use this data set of aggregate small business lending at the census-tract level in robustness tests. These robustness tests allow us to better control for the possibility that the empirical results of the paper are driven by systematic differences in the location of former OTS banks within a county. We exploit the fact that most small business lending is originated by commercial banks that are close to the borrower's location (e.g., Petersen and Rajan, 1994, Granja et al., 2022, Nguyen (2019), Granja, Makridis, Yannelis, and Zwick, 2020) to devise an alternative empirical strategy that is based on the geographic exposure of each census tract to former OTS banks. Specifically, we use the share of deposits in each census tract that is held by former OTS banks as a measure of exposure of small business borrowers in each census tract to the OTS extinction. Our empirical tests then compare changes in aggregate small business lending in census tracts with a significant share of deposits held by former OTS banks with changes in aggregate small business lending in census tracts within the same county that have a smaller share of OTS deposits.

Formally, we estimate the following OLS specification:

$$Y_{ict} = \beta Share\ OTS \times Post_{it} + \delta X_{it} + \gamma_i + \delta_{ct} + \epsilon_{ict}(4) \tag{1}$$

where $i$ indexes for census-tract, $c$ indexes for county, and $t$ indexes for year. $Y$ represents the aggregate small business lending by all CRA-reporting institutions in each census-tract during the calendar year. $Share\ OTS$ is the share of deposits held by branches of former OTS banks in each census-tract as of June 30, 2010 and $Post$ is a dummy variable taking the value of one following the OTS extinction during the calendar year 2011, inclusive. $X_{it}$ is a vector of time-varying characteristics of the census-tract that includes quadratic controls for the number of branches and total amount of deposits held in branches located in the

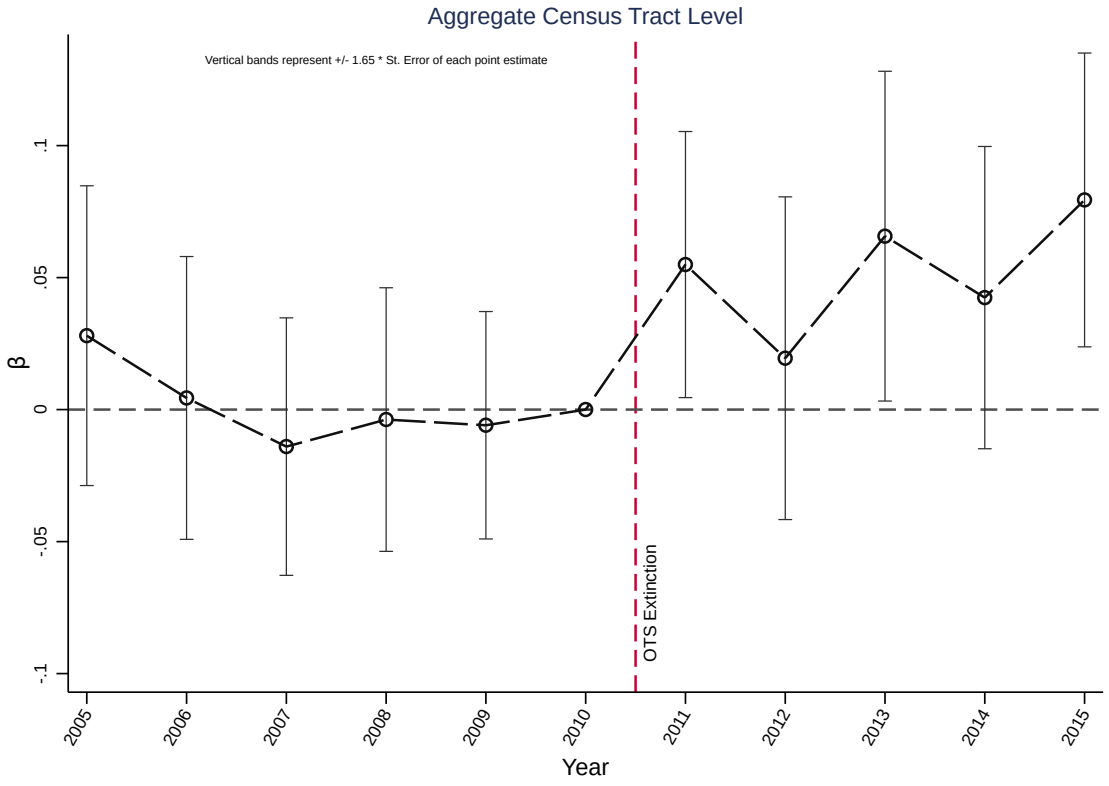
census-tract. The census-tract fixed effects, $\gamma_i$, control for unobserved heterogeneity at the census-tract level and the county-by-year fixed effects, $\delta_{ct}$, ensure that we compare census tracts within the same county that have different exposure to former OTS institutions.

Table B.1 reports the results of this analysis. The coefficients associated with the main variable of interest, $Share\ OTS$, further support the idea that the OTS extinction is associated with an increase in small business lending by former OTS banks. Following the OTS extinction, the aggregate small business lending increases approximately five percent more in census tracts whose deposits are 100% held in branches of former OTS banks relative to census tracts where former OTS banks do not have any branch. These effects are smaller than those of the main paper but could result from using an exposure variable.

We also modify the equation above to interact the $Share\ OTS$ variables with a series of year dummies that take the value of one in each of the sample years and zero otherwise. In Figure B.1, we plot the series of coefficients and corresponding standard errors from estimating this empirical specification. The plot suggests that there are no significant pre-trends and that the main effect is statistically significant and economically meaningful immediately following the OTS extinction and regulatory transition. This pattern supports the interpretation that the increase in small business lending is a direct cause of the regulatory change in supervision rather than mean-reversion in the performance of former OTS banks.

Figure B.1: Small Business Lending and OTS Extinction: Estimated Impact over Time in the Census Tract sample

Figure B.1 plots the average impact of OTS supervision on small business lending in each year of the sample period. The shallow circles represent the series of coefficients $\beta_t$ from expanding the model specification in column (2) of Table B.1 to include a set of interaction variables between year dummies and the share of deposits held in former OTS institution in each census tract as of June 30th, 2010. Data on small business lending is from the Community Reinvestment Act Small Business Lending Dataset



## Table B.1: OTS Extinction and Aggregate Small Business Lending by Census Tract

Table B.1 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on small business lending at the census tract level. The dependent variable *Ln(Aggregate Total Loans by Tract)* is the aggregate total amount of small business loans (loans whose principal amount is below $1 million) originated by all depository institutions that report to the CRA data set in a census tract over a calendar year. *Share OTS* is the share of deposits held in former OTS institution in each census tract as of June 30th, 2010. We map each branch in the Summary of Deposits (SOD) to its respective census tract using the Census Geocoder available in the United Census Bureau website. We drop 1,773 branch addresses that account for 1.15% of the total number of branches because their latitude and longitude data are missing or their address is improperly recorded. We use the census tract of each branch location to compute measures of the exposure of each census tract to former OTS banks. *Post* is an indicator variable that takes the value of one for all years after 2011 (inclusive). *Ln(HPI)* is the natural logarithm of a house price index (HPI) at the census tract level The HPI is calculated using the all-transactions indexes at the census tract level provided by the Federal Housing Finance Agency. Baseline controls include linear and quadratic terms for the total number of branches and total amount of deposits held in each census-tract. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Ln(Aggregate Total Loans by Tract) | | | |
| Share OTS × Post | 0.058*** | 0.047** | 0.056** | 0.039* |
| | (0.021) | (0.019) | (0.024) | (0.021) |
| Ln(HPI) | | | 0.424*** | 0.249*** |
| | | | (0.025) | (0.031) |
| Observations | 241541 | 235871 | 193318 | 188552 |
| Adjusted $R^2$ | 0.843 | 0.858 | 0.839 | 0.853 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | Yes | No |
| County-Year Fixed Effects | No | Yes | No | Yes |
| Census Tract Fixed Effects | Yes | Yes | Yes | Yes |

# C Concurrent Economic Events and Regulatory Interventions

This section presents empirical results that further examine if the main results of the paper can be attributed to the supervisory transition or whether they might emanate from other concurrent events and regulatory interventions that occurred around the same time of the OTS extinction. Chen et al. (2017) show that the top-4 banks in the U.S. economy – JPMorgan, Citibank, Bank of America, and Wells Fargo – significantly reduced their small business lending following the financial crisis. In Figure C.1, we repeat the analysis of figure 3 after excluding the Top-4 banks in the U.S. economy to investigate if there are differences between the evolution of small business lending of former OTS banks and other commercial banks when we exclude these large banks that could have a disproportionate impact in the control group. Moreover, in columns (1)-(3) of Table C.1, we extend the analysis of Panel B of Table 7 by including an interaction term between the *Post* variable and an indicator variable that takes the value of one for the top-4 largest banks in the economy. In columns (4)-(6), we assess whether the results might be driven by differential exposure of former OTS banks and other commercial banks to the Trouble Asset Relief Program (TARP). This empirical analysis also suggests that the estimated coefficients of our main variable of interest are not affected by the lending effects in the post-period of receiving TARP funds in 2008 and 2009.

Banks that were exposed to house price shocks contracted their supply of small business lending both in local areas that were exposed to large house price shocks and in areas that were not exposed to house price shocks due to balance sheet transmission of local house price through their branch networks (e.g., Bord et al. (2021)). In our main empirical specifications, we control for bank fixed effects and changes in house prices at the local level, but we do not address the possibility that the overall house price shocks between 2007 and 2010 affected the geographies of former OTS banks differently than they affected the geographies of other commercial banks and that those shocks percolated through banks' branch networks and manifested in systematic differences in small business lending activities of former OTS banks and commercial banks in the aftermath of the financial crisis. In Table C.2, we assess the possibility that these economic forces affect our main results, we computed a bank-level exposure to house price shocks between 2007 and 2010. In columns (1) and (2), we find that our main results are robust to excluding the bottom quartile of banks sorted by their exposure to the house price declines in their branch networks and in columns (3) and (4) we also find that our results are not sensitive to coarse-exact matching banks based on a bank's overall exposure to house-price shocks.

In Table C.3 we investigate the potential confounding impact of other provisions that were

passed with the Dodd-Frank Act. The Dodd-Frank Act significantly increased regulatory scrutiny for banks with total assets above $10 billion as they became subject to the direct supervision of the Consumer Financial Protection Bureau and were required to implement periodic stress tests. Moreover, remaining barriers to interstate de novo branching by commercial banks were removed allowing commercial banks to freely expand banks across state jurisdiction. These other rules were not implemented at the same time as Title III as they were enacted at the time of the passage of Dodd-Frank into law. Nevertheless, we evaluate and report on the robustness of our results to the adoption of these other Dodd-Frank provisions in Table C.3. We repeat the main analysis after conditioning on the potential effect of the passage of the Dodd-Frank Act on banks whose total assets are above $10 billion (columns (1)–(3)) and on the potential effect coming from greater ability of commercial banks in certain states to establish new branches across state lines (columns (4)–(6)). We find that the inclusion of these additional control variables has very little impact on the estimated coefficients on our main variable of interest.

In Table C.4 we investigate the possibility that the main results are explained by more and stricter CRA inspections following the supervisory transition. Panel A shows that the likelihood a CRA rating downgrade increases following the OTS extinction but the increase is not statistically significant at conventional levels. In Panel B, we follow the work of Agarwal, Benmelech, Bergman, and Seru (2012) and examine if former OTS banks might be increasing small business lending in advance of CRA inspections by their new supervisors. We do not find that the impact of OTS extinction on the small business lending of former OTS banks is subsumed by the inclusion of a dummy variable indicating a CRA inspection year.

In Table C.5 we examine whether former OTS banks expand their supply of small business lending relatively more in areas where local competitors were more capital constrained, and in turn less willing to extend credit to small businesses. Such pattern might indicate that former OTS banks had greater lending opportunities and room for growth in areas where traditional lenders were unwilling or unable to lend. Consistent with this idea, columns (1) and (2) suggest that the expansion of small business lending by former OTS banks is stronger in areas where competitors had relatively less capital. In columns (3) and (4), we partition the sample based on a bank's exposure to competitors that significantly reduced their aggregate supply of small business loans in a county between 2007 and 2010. These results are reminiscent of the findings in Buchak et al. (2018a) who suggest that the expansion of shadow banks was more pronounced in areas where commercial banks contracted their supply of mortgages relatively more.

Figure C.1: OTS Extinction - Main Figures excluding Top 4 banks

Figure C.1 repeats the empirical analyses of figure 3 of the paper after excluding the top-4 banks in the economy.

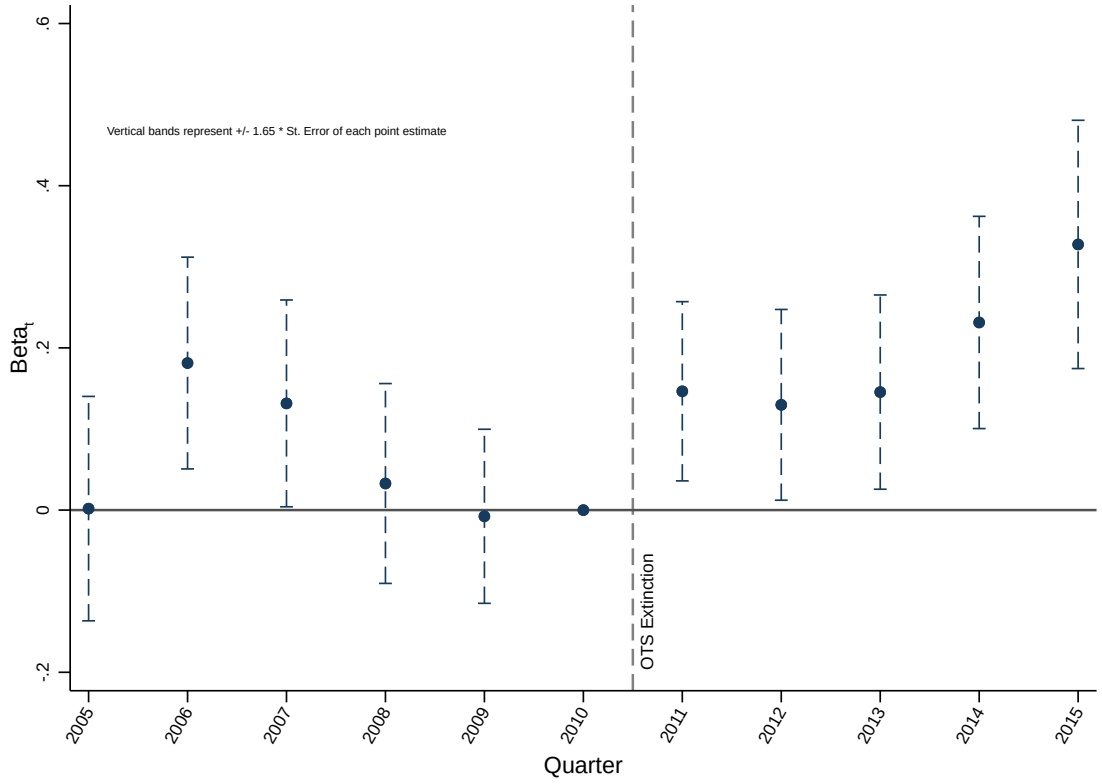


Table C.1: Robustness - OTS Extinction and Small Business Lending controlling for Top 4 Banks and TARP Recipient Banks

Table C.1 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on the supply of small business lending by former OTS banks after conditioning on the interaction between indicator variables representing whether the bank is among the top 4 banks in the United States and whether the bank received TARP funds and the post-treatment indicator. *Top 4* is an indicator variable that takes the value of one for the top 4 banks in the United States (Chen et al., 2017). *TARP Recipient Bank* is an indicator variable that takes the value of one if the bank or its bank holding company received funds from the TARP program. All other variables are defined as in Table 7 of the main paper. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Ln(Total Loans) | | | | | |
| OTS × Post | 0.233*** | 0.122*** | 0.152*** | 0.200*** | 0.080** | 0.073* |
| | (0.041) | (0.039) | (0.041) | (0.041) | (0.039) | (0.043) |
| Top 4 Bank × Post | 0.155*** | 0.185*** | 0.040 | | | |
| | (0.017) | (0.017) | (0.082) | | | |
| TARP Recipient Bank × Post | | | | -0.009 | -0.016 | -0.156*** |
| | | | | (0.014) | (0.015) | (0.020) |
| Observations | 139277 | 130989 | 116550 | 139277 | 130989 | 116550 |
| Adjusted $R^2$ | 0.756 | 0.865 | 0.881 | 0.755 | 0.864 | 0.882 |
| Baseline Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | No | Yes | No | No |
| County Fixed Effects | Yes | No | No | Yes | No | No |
| Bank Fixed Effects | Yes | No | No | Yes | No | No |
| County-Year Fixed Effects | No | Yes | Yes | No | Yes | Yes |
| Bank-County Fixed Effects | No | Yes | Yes | No | Yes | Yes |
| Coarsened Exact Matching | No | No | Yes | No | No | Yes |

Table C.2: OTS Extinction and Small Business Lending: Controlling for Exposure to House Price Declines

Table C.2 repeats the analysis of Table 5 after accounting for a bank's exposure to house price declines between 2007 and 2009 across its branch network. In columns (1) and (2) we exclude banks in the bottom quartile of the house price decline distribution. In columns (3) and (4), we match observations based not only on their share of C&I lending and total assets but also based on their exposure to house price decline between 2007 and 2009. All other variables are defined as in Table 7 of the main paper.Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Ln(Total Loans) | | | |
| OTS × Post | 0.226*** | 0.136*** | 0.184*** | 0.160*** |
| | (0.042) | (0.041) | (0.041) | (0.043) |
| Ln(HPI) | 0.398*** | 0.159 | 0.236*** | 0.563** |
| | (0.060) | (0.205) | (0.060) | (0.233) |
| Observations | 96868 | 89732 | 91549 | 84898 |
| Adjusted $R^2$ | 0.752 | 0.862 | 0.768 | 0.874 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | Yes | No |
| County Fixed Effects | Yes | No | Yes | No |
| Bank Fixed Effects | Yes | No | Yes | No |
| County-Year Fixed Effects | No | Yes | No | Yes |
| Bank-County Fixed Effects | No | Yes | No | Yes |
| Coarsened Exact Matching | No | No | Yes | Yes |
| Excluded Observations? | Bottom Qrt HPI | Bottom Qrt HPI | None | None |

Table C.3: Robustness - OTS Extinction and Small Business Lending - Impact of Other Dodd-Frank Provisions

Table C.3 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on the supply of small business lending by former OTS banks after conditioning on indicator variables representing whether the bank holds total assets above $10 billion and as a result is subject to the regulation of the Consumer Protection Financial Bureau (CFPB) and whether the county is located in a state that allowed *de novo* branching. The dependent variable *Ln(Total Loans)* is the total amount of small business loans (loans whose principal amount is below $1 million) originated by a depository institution in a county over a calendar year. *Post Dodd-Frank (2010)* is an indicator variable that takes the value of one for all years after 2010 (inclusive). The CFPB and the interstate branching deregulation were enacted immediately after the passage of Dodd-Frank into law on July, 21st, 2010. *Above 10bi* is an indicator variable that takes the value of one if the bank is over $10 billion in assets and therefore subject to the supervision of the CFPB. *DeNovo Branching State* is an indicator variable that takes the value for all bank-county combinations that are part of a state that did not allow de novo interstate branching prior to the passage of Dodd-Frank. We obtain this list of states from Strahan and Rice (2010) and also exclude New York from this list because it deregulated de novo branching in 2008. All other variables are defined as in Table 7 of the main paper. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Ln(Total Loans) | | | | | |
| OTS × Post | 0.202*** | 0.084** | 0.150*** | 0.204*** | 0.089** | 0.153*** |
| | (0.041) | (0.039) | (0.041) | (0.041) | (0.039) | (0.041) |
| Above 10bi × Post Dodd-Frank (2010) | -0.040*** | -0.027* | -0.033* | | | |
| | (0.015) | (0.015) | (0.019) | | | |
| DeNovo Branching State × Post Dodd-Frank (2010) | | | | -0.061*** | 0.555*** | 0.702*** |
| | | | | (0.014) | (0.053) | (0.064) |
| Observations | 137953 | 129393 | 116096 | 139277 | 130989 | 116550 |
| Adjusted $R^2$ | 0.756 | 0.865 | 0.882 | 0.755 | 0.864 | 0.881 |
| Baseline Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | No | Yes | No | No |
| County Fixed Effects | Yes | No | No | Yes | No | No |
| Bank Fixed Effects | Yes | No | No | Yes | No | No |
| County-Year Fixed Effects | No | Yes | Yes | No | Yes | Yes |
| Bank-County Fixed Effects | No | Yes | Yes | No | Yes | Yes |
| Coarsened Exact Matching | No | No | Yes | No | No | Yes |

## Table C.4: OTS Extinction and CRA Ratings

Panel A of Table C.4 reports the coefficients of OLS regressions. The dependent variable in columns (1) and (2), *Bad CRA Rating* takes the value of one if the bank was assigned less than a satisfactory CRA Rating (Rating of 3 or 4) in the aftermath of the CRA examination The dependent variable in columns (3) and (4), *CRA Rating Downgrade* is an indicator variable that takes the value of one if the bank's CRA rating was downgraded in the last examinations. Panel B follows Agarwal et al. (2012) and examines if the relation between OTS Extinction and CRA examinations is more pronounced during examination years. All other variables are defined as in previous tables. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

### Panel A: Impact of OTS Extinction on CRA Ratings

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Bad CRA Rating | | CRA Rating Downgrade | |
| OTS × Post | -0.002 | -0.002 | 0.001 | -0.001 |
| | (0.005) | (0.005) | (0.009) | (0.009) |
| Ln(Assets) | | 0.004 | | -0.002 |
| | | (0.003) | | (0.002) |
| Residential Share | | -0.025 | | -0.042* |
| | | (0.015) | | (0.024) |
| C&I Share | | 0.000 | | 0.048 |
| | | (0.030) | | (0.044) |
| CRE Share | | -0.002 | | -0.010 |
| | | (0.016) | | (0.023) |
| Tier1 Capital Ratio | | -0.000 | | -0.000* |
| | | (0.000) | | (0.000) |
| Observations | 10889 | 10889 | 10889 | 10889 |
| Adjusted $R^2$ | 0.027 | 0.027 | -0.011 | -0.011 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| Bank Fixed Effects | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes |

### Panel B: OTS Extinction and Small Business Lending - Controlling for CRA Exam Years

| | (1) | (2) | (3) |
|---|---|---|---|
| | Ln(Total Loans) | | |
| OTS × Post | 0.229*** | 0.123*** | 0.223*** |
| | (0.044) | (0.042) | (0.045) |
| OTS × Post × CRA Exam Year | -0.094* | -0.130** | -0.253*** |
| | (0.055) | (0.052) | (0.054) |
| Observations | 136822 | 129168 | 116428 |
| Adjusted $R^2$ | 0.756 | 0.864 | 0.881 |
| Baseline Controls | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | No |
| County Fixed Effects | Yes | No | No |
| Bank Fixed Effects | Yes | No | No |
| County-Year Fixed Effects | No | Yes | Yes |
| Bank-County Fixed Effects | No | Yes | Yes |
| Coarsened Exact Matching | No | No | Yes |

Table C.5: OTS Extinction and Small Business Lending: Local Credit Supply by Competitor

Table C.5 reports the coefficients of OLS regressions. Columns (1) and (2) repeat the analysis of column (2) of Table 7 after partitioning the sample based on above- and below-median levels of the weighted average Tier1 Capital Ratio of local competitors, where the weights assigned to each local competitor are based on the share of deposits of that competitor in the county. Columns (3) and (4) repeat the analysis of column (2) of Table 7 after partitioning the sample based on above- and below-median level of the predicted negative lending shock in the county, which is measured using the same methodology as in Greenstone, Mas, and Nguyen (2015). All other variable are defined as in Table 7. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Ln(Total Loans) | | | |
| | Hi Comp. Cap. | Low Comp. Cap. | Small Credit Shock | Large Credit Shock |
| OTS × Post | 0.043 | 0.097* | 0.047 | 0.119** |
| | (0.060) | (0.056) | (0.055) | (0.054) |
| Observations | 65320 | 55614 | 65575 | 65414 |
| Adjusted $R^2$ | 0.859 | 0.866 | 0.862 | 0.866 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| County-Year Fixed Effects | Yes | Yes | Yes | Yes |
| Bank-County Fixed Effects | Yes | Yes | Yes | Yes |

# D OTS Extinction and Lending in the Residential Mortgage Market

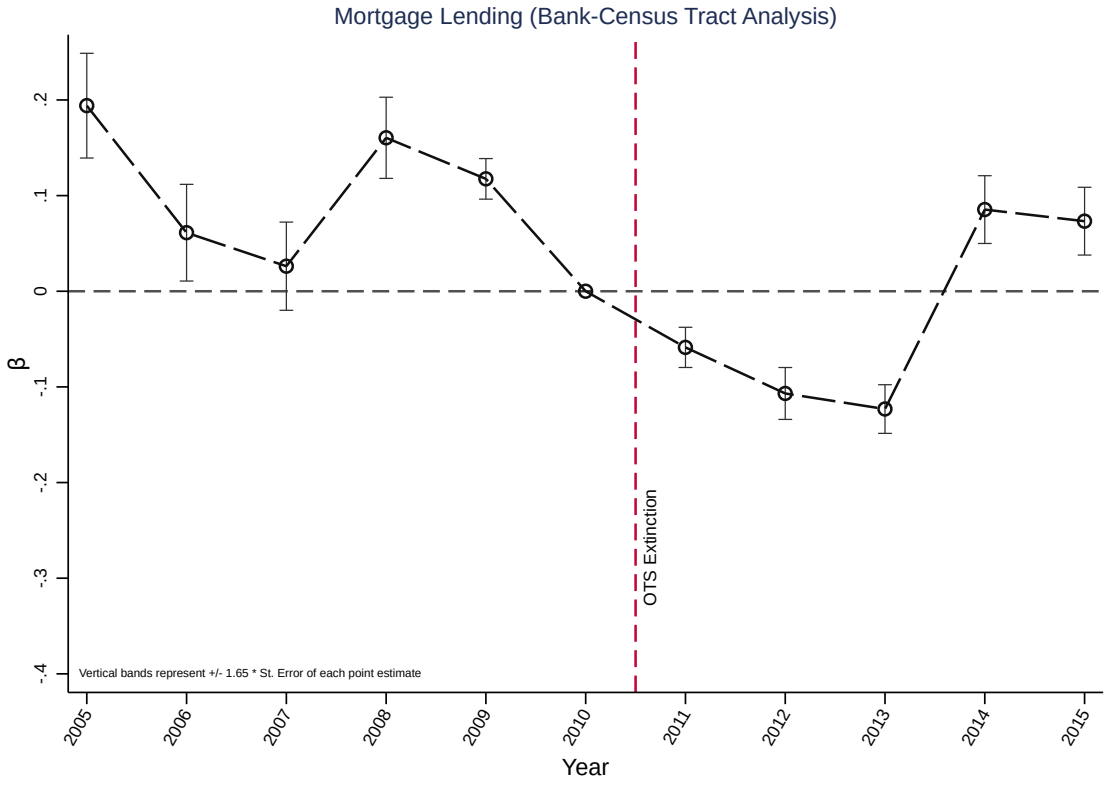
In this section we use the Home Mortgage Disclosure Act (HMDA) dataset to investigate if former OTS banks reduced their exposure to the residential lending market following the regulatory transition. In Table D.1, we estimate an empirical specification akin to equation (3), comparing changes in mortgage lending by former OTS banks with changes in mortgage lending by commercial banks operating in the same narrowly-defined geographic regions (census tracts). We use census tracts because this finer geographic demarcation is available from HMDA. We also estimate models comparing at the county level and the results are quantitatively and qualitatively similar. Depending on the specification, we estimate that the origination of mortgage loans by former OTS banks declines, on average, between four and fifteen percent after the regulatory transition, relative to commercial banks in the same census tract and year. In Table D.2, we examine whether former OTS banks were more likely to reject an application following the OTS extinction. In columns (1) and (2), we find that the former OTS banks increase their likelihood of mortgage rejection by approximately one percentage point after the supervisory transition. These results are consistent with the idea that former OTS banks shifted some lending from mortgages to small businesses. However, we note that this coefficient is substantially attenuated and is no longer statistically significant when we condition on tract×year and bank×tract fixed effects. In Figures D.1 and D.2, we plot the coefficients and respective confidence intervals of regression specifications that use the same dependent variables as in Tables D.1 and D.2 but include a series of interactions between the OTS dummy and year dummies. The results suggest that the decline in mortgage lending is not necessarily sharp around the regulatory transition, unlike what we see for small business lending. Thus, the results for mortgages are less aligned with the OTS extinction.

We also examine the evolution of the loan rates around the supervisory transition for different types of loan products. RateWatch obtains weekly advertised loan rates on multiple loan products from a survey of 100,000 bank branches. We use this data set and loan rate information on the most common residential loan product, the 30-Year Fixed Rate Mortgage with principal amount of $175,000, and the most common commercial loan product, the secured commercial-equipment loan with a $250,000 principal amount, to better understand what the supervisory transition meant for loan pricing. We implement a difference-in-differences specification similar to that used in previous analyses. We report the results in Table D.3. We find that following the supervisory transition, former OTS banks increase their advertised mortgage lending rates relative to commercial banks by approximately 9–10 basis points, whereas they reduce their interest rates on commercial lending products relative to

commercial banks by 23–30 basis points. These results mirror our findings for the respective lending volumes and are consistent with our interpretation that following the OTS extinction, former OTS banks expanded their supply of commercial loans and contracted their supply of residential mortgages. The rate results also do not suggest that the new small business loans are riskier and, hence, that the supervisory transition induced thrifts to make riskier business loans.

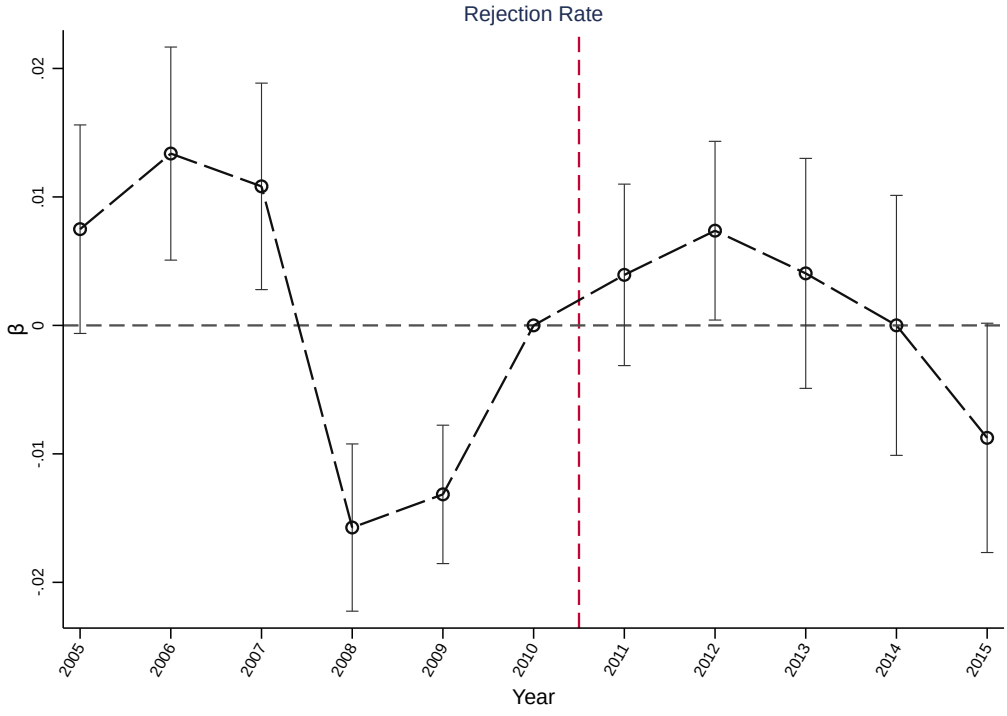
## Figure D.1: OTS Extinction and Mortgage Lending (Census Tract): Estimated Impact over Time

Figure D.1 plots the average impact of OTS supervision on mortgage lending in each year of the sample period. The shallow circles represent the series of coefficients $\beta_t$ from expanding the model specification in column (3) of Table D.1 to include a set of interaction variables between year dummies and a dummy variable taking the value of one if the depository institution's primary regulator in the first and second quarter of 2011 was the Office of Thrift Supervision and the vertical bands represent 90% confidence intervals for the point estimates in each quarter.



## Figure D.2: OTS Extinction and Mortgage Lending (Likelihood of Application Rejection): Impact over Time

Figure D.2 plots the average impact of OTS supervision on the rejection rate of mortgage loans in each year of the sample period. The shallow circles represent the series of coefficients $\beta_t$ from the following model specification: $Reject_{ibct} = \alpha_{bc} + \gamma_{ct} + \delta X_i + \sum_t \beta_t OTS_b \times Year_t + \epsilon_t$, where $i$ indexes for the mortgage application $i$ in census tract $c$ to bank $b$ during year $t$. The vector $X_i$ includes a number of characteristics of the applicantion, namely loan occupancy status, property type, lien status, loan-to-income ratio, applicant's ethnicity, and applicant's race. $OTS$ is an indicator variable that takes the value of one if the depository institution's primary supervisor in the first and second quarter of 2011 was the Office of Thrift Supervision and the vertical bands represent 90% confidence intervals for the point estimates in each quarter. *Year* is a series of indicator variables that takes the value of one for each year between 2005 and 2015.



## Table D.1: OTS Extinction and Mortgage Lending (Census Tract)

Table D.1 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on the volume of mortgage loans. The dependent variable, *Ln(Total Mortgage Loans)*, is the total amount of mortgage loans originated by a depository institution in a census tract over a calendar year. *OTS* is an indicator variable that takes the value of one if the primary supervisor of the depository institution in the first and second quarter of 2011 was the Office of Thrift Supervision. *Post* is an indicator variable that takes the value of one for all years after 2011 (inclusive). Baseline controls include linear and quadratic terms for the number of branches and total amount of deposits of each bank in each county. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) |
|---|---|---|---|
| | Ln(Total Mortgage Loans) | | |
| OTS × Post | -0.037** | -0.129*** | -0.159*** |
| | (0.017) | (0.021) | (0.022) |
| Observations | 5289970 | 4835833 | 4818314 |
| Adjusted $R^2$ | 0.527 | 0.672 | 0.650 |
| Baseline Controls | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | No |
| Census-Tract Fixed Effects | Yes | No | No |
| Bank Fixed Effects | Yes | No | No |
| Census-Tract×Year Fixed Effects | No | Yes | Yes |
| Bank×Census Tract Fixed Effects | No | Yes | Yes |
| Coarsened Exact Matching | No | No | Yes |

## Table D.2: OTS Extinction and Mortgage Lending (Likelihood of Application Rejection)

Table D.2 reports the results of empirical analyses investigating the relation between the OTS extinction and the probability of rejection of a mortgage loan application. The coefficients are obtained from the OLS estimation of the following specification model: $Reject_{ibct} = \delta X_i + \beta OTS_b \times Post_t + FixedEffects + \epsilon_t$, where the subscripts index for the mortgage application $i$ in census tract $c$ to bank $b$ during year $t$. The vector $\delta X_i$ includes a number of characteristics of the application, namely loan occupancy status, property type, lien status, loan-to-income ratio, applicant's ethnicity, and applicant's race. *OTS* is an indicator variable that takes the value of one if the depository institution primary supervisor in the first and second quarter of 2011 was the Office of Thrift Supervision. *Post* is an indicator variable that takes the value of one for all years after 2011 (inclusive). Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) |
|---|---|---|---|
| | Application Rejection | | |
| OTS × Post | 0.009*** | 0.010*** | 0.002 |
| | (0.003) | (0.003) | (0.004) |
| Loan to Income Ratio | 0.002*** | 0.002*** | 0.002*** |
| | (0.000) | (0.000) | (0.000) |
| Observations | 38684393 | 38683683 | 38675108 |
| Adjusted $R^2$ | 0.110 | 0.123 | 0.136 |
| Application Controls | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | No |
| Bank Fixed Effects | Yes | Yes | No |
| Census-Tract Fixed Effects | No | Yes | No |
| Bank × Census-Tract Fixed Effects | No | No | Yes |
| Census-Tract × Year Fixed Effects | No | No | Yes |

## Table D.3: OTS Extinction and Lending Rates

Table D.3 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on interest rates of the most common mortgage lending and commercial lending product in the RateWatch dataset. The dependent variables are *Rate 30 Yr.* and *Rate Com. Equip.*. *Rate 30 Yr.* is the interest rate reported by a rate setter office of a depository institution on a 30 year fixed rate mortgage loan with principal amount of $175k. *Rate Com. Equip.* is the interest rate reported by a rate setter office of a depository institution on a loan secured by commercial equipment whose loan principal amount is $250k. *OTS* is an indicator variable that takes the value of one if the depository institution primary supervisor in the first and second quarter of 2011 was the Office of Thrift Supervision. *Post* is an indicator variable that takes the value of one for all months after July 2011 (inclusive). Baseline controls include linear and quadratic terms for the number of branches and total amount of deposits of each bank in each county. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Rate 30 Yr. Fixed | | Rate Com. Equip. | |
| OTS × post | 0.090** | 0.104** | -0.231* | -0.304** |
| | (0.039) | (0.044) | (0.139) | (0.146) |
| Observations | 128404 | 128168 | 14038 | 13978 |
| Adjusted $R^2$ | 0.895 | 0.909 | 0.742 | 0.775 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| Bank Fixed Effects | Yes | No | Yes | No |
| Branch (Rate-Setter) Fixed Effects | No | Yes | No | Yes |
| Month Fixed Effects | Yes | Yes | Yes | Yes |

# E OTS Extinction and Local Business Activity: Additional results

The bank management channel implies that the increase in small business lending is not driven by thrifts' evergreening bad loans with existing business customers but rather that they expand their commercial lending activities to new customers and potentially to new businesses in the same county. That is, under the bank management channel, we expect to see thrifts cut their troubled lending and make new and better loans. Thus, in this subsection, we study whether the documented increase in small business lending after thrifts' supervisory transition reflects more lending to new firms.

Although we cannot directly observe borrower identities, we can investigate how greater exposure to former OTS banks following the OTS extinction is associated with changes in the aggregate entry and exit rates of businesses at the county level. Entry of new businesses is likely to be sensitive to changes in the availability of credit to small businesses as their owners are typically credit constrained. At the same time, business exits could be an indication that banks are less willing to extend or rollover existing credits for troubled borrowers. Thus, corresponding increases in the entry and exit rates in counties with greater exposure to former OTS banks would be consistent with the idea that thrifts are terminating delinquent loans and financing new businesses following the OTS extinction.

We calculate the entry (exit) rate as the ratio of new entrants (exits) in the county to the number of existing businesses in the county and compute the exposure of a county to former OTS banks as the share of deposits in a county that is held in branches of former OTS banks as of June 30, 2010. [1] In Figure E.1, we plot the spatial distribution of the county exposure to former OTS banks. The plot suggests that spatial correlation or regional clustering is not a great concern in this setting as counties with high exposure to former OTS banks are scattered throughout the United States. We exclude counties with no exposure to former OTS banks from the analysis as these counties might be structurally different from banks with some OTS exposure. We examine the relation between these two variables using the following regression specification:

$$Y_{c,t} = \beta ShareOTS_c \times Post_t + \theta X_{c,t} + \gamma_c + \delta_t + \epsilon_{c,t} \tag{1}$$

where $Y_{c,t}$ represents the entry and exit rate of new establishments in county $c$ during year $t$, ShareOTS is the share of deposits held in branches of former OTS banks as of June 30, 2010, Post is a dummy variable taking the value of one following the OTS extinction during

[1] We compute the county exposure to former OTS banks using deposit levels in 2010, rather than those of an earlier year to avoid including WaMu and Indymac in these computations.

the calendar year 2011, inclusive. $X_{c,t}$ is a vector of controls, comprising the number of bank branches and level of deposits held in the county, the number of establishments in the county, and the size composition of the establishments operating in the county measured by the number of establishments in the county that employ 1–4, 5–9, 10–19, 20–49, 50–99, 100–249, and 250–499 people. The year fixed effects, $\delta_t$, control for overall trends in the evolution of entry and exit rates and the county fixed effects, $\gamma_c$, control for time-invariant, unobservable characteristics of each county. As before, we cluster the standard errors at the county level.

We report the results of this analysis in Table E.1. We present results using OLS and weighted least squares (WLS), weighing each observation by the level of employment in the county. We find considerable increases in business entries and exits in counties most exposed to former OTS banks. The main coefficients of interest, $\beta$, are statistically significant and suggest that the OTS extinction is positively related to local entry and exit rates for business establishments. The economic magnitudes are also meaningful: the semi-elasticities of the entry and exit rates of establishments in response to a standard deviation increase in the share of former OTS deposits in the county are 0.60% and 0.55%, respectively. These findings suggest that the increase in small business lending does not simply translate into greater flow of credit to existing establishments, but rather is consistent with a pattern in which former OTS banks reduce the extent to which they evergreen loans of troubled incumbents and instead supply credit to new businesses.

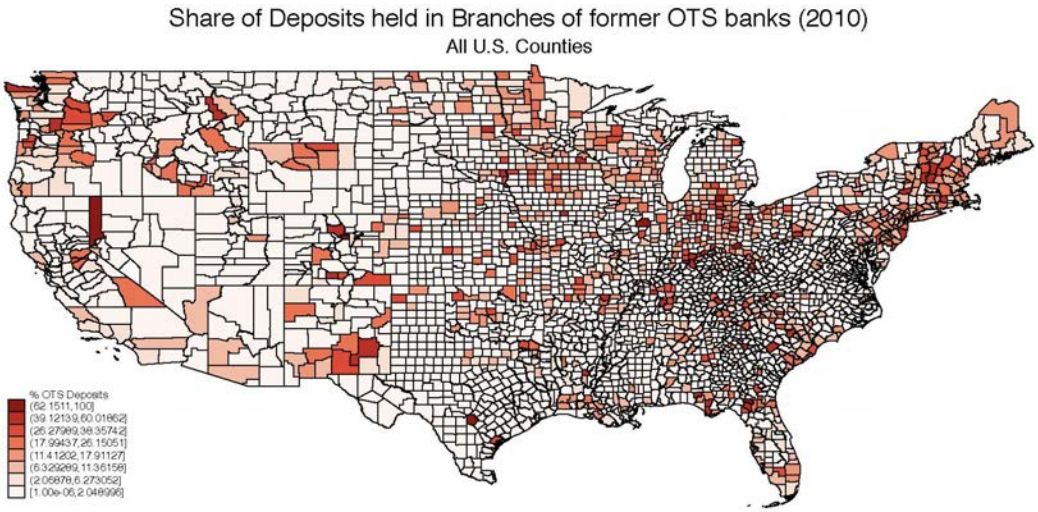
We further estimate how the effects of greater exposure to former OTS banks on entry and exit rates change over time. We interact the county exposure to former OTS banks with a series of indicator variables that take the value of one in each year of the sample and we plot the corresponding coefficients and respective standard errors in figure E.2. Consistent with the notion that stricter supervision increased lending and business dynamism, we find that greater exposure to former OTS banks is significantly and positively associated with entry and exit rates following the OTS extinction, but not prior to the supervisory transition.

We conclude our analysis with an additional test to gauge whether the increase in business dynamism is related to new lending. If the supervisory transition increases business dynamism, the effects should be particularly pronounced in industries that are more dependent on external sources of financing. We exploit data from the Survey of Business Owners on the dependence from external sources of finance at the 2-digit SIC industry level and we then sort industries by below- and above-median external dependence. The strategy, which is akin to that of Rajan and Zingales (1998), is to examine whether the exposure to former OTS banks is associated with a larger effect on entry and exit rates in industries that are more dependent on external financing. We repeat the specification of Table E.1 in the below- and above-median external financing subsamples using data on entry and exit rates at the industry-county level. We

report these results in Table E.2. We find that the effect of greater county exposure to former OTS banks on entry rates is greater in industries that require greater access to external sources of finance, which suggests a financing channel and supports our interpretation of the business dynamism results. However, for the exit rates, the coefficient magnitudes for the OTS extinction effect are not much different across both subsamples, which we view as a caveat to our interpretation.

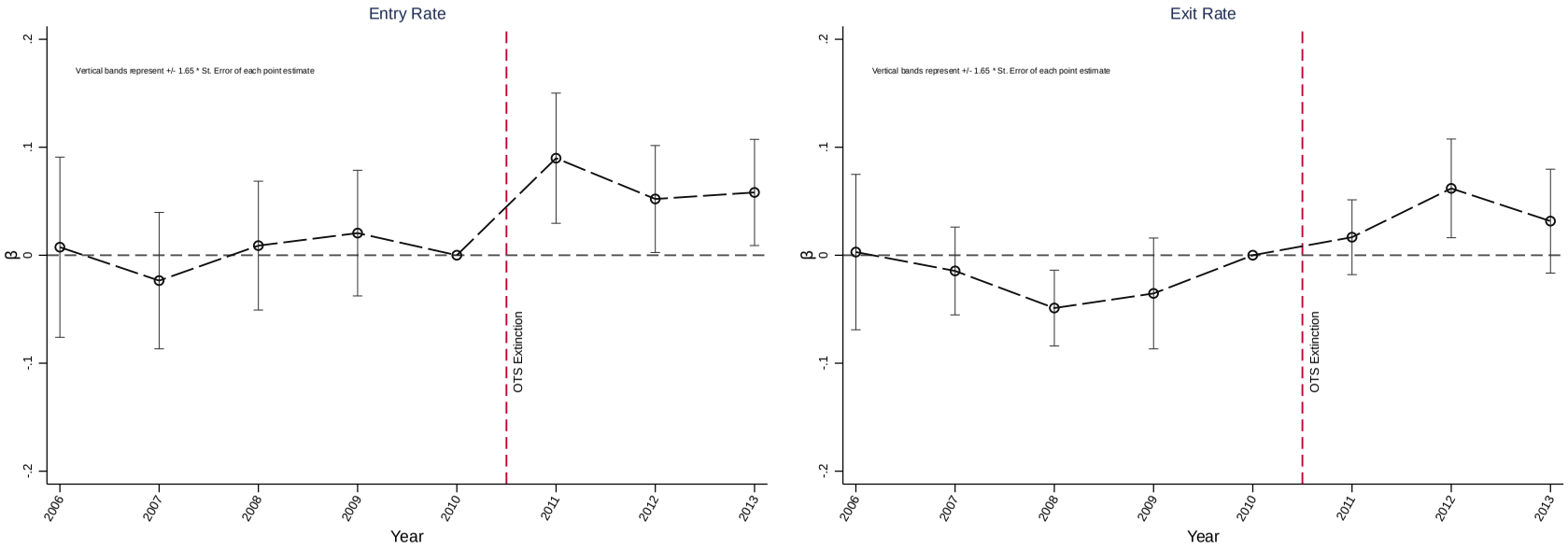
## Figure E.1: Geographic Distribution of OTS Deposit Share

Figure E.1 represents the fraction of total bank deposits in a county accounted for by depository institutions whose primary supervisor was the OTS in 2010. Data on branch deposits of OTS banks is from the Federal Deposit Insurance Corporation's Summary of Deposits Database.



## Figure E.2: OTS Extinction and Business Entry and Exit Rates: Impact over Time

Figure E.2 plots the average impact of exposure to OTS commercial banks on entry and exit of (business) establishments at the county level in each year of the sample period. In the left figure, the shallow circles represent the series of coefficients $\beta_t$ from expanding the model specification in column (2) of Table E.1 to include a set of interaction variables between year dummies and the share of deposits held in former OTS institution in each county as of June 30th, 2010. and the vertical bands represent 90% confidence intervals for the point estimates in each quarter. In the right figure, the shallow circles represent the series of coefficients $\beta_t$ from expanding the model specification in column (4) of Table E.1 to include a set of interaction variables between year dummies and the share of deposits held in former OTS institution in each county as of June 30th, 2010. Data on entry and exit of businesses at the county level is from the Census Bureau's Statistics of U.S. Businesses and data on the share of deposits in former OTS institutions is from the FDIC's Summary of Deposits.



## Table E.1: OTS Extinction and Entry and Exit of Local Business Establishments

Table E.1 reports the coefficients of OLS and WLS regressions. The specifications Columns (2) and (4) present coefficients from specification where each county observation is weighted by the total employment in that county. The dependent variable in Columns (1) and (2), *Ln(Entry Rate)*, is the natural logarithm of the entry rate of new establishments in a given county and year. Entry rate is the ratio between the number of new establishments and the number of existing establishments at the beginning of the year. The dependent variable in Columns (3) and (4), *Ln(Exit Rate)*, is the natural logarithm of the exit rate of establishment in a given county and year. Exit rate is defined as the ratio between the number of establishment that exit the market and the total number of establishments at the beginning of the year. *Share OTS* is the share of county deposits held in former OTS institution as of June 30th, 2010. *Post* is an indicator variable that takes the value of one for all years between 2006 and 2013 and zero for all years between 2006 and 2010. Baseline controls include linear and quadratic terms for the total number of branches and total amount of deposits held in each county and controls for the logarithm of the number of establishments in the county that employ 1–4, 5–9, 10–19, 20–49, 50–99, 100–249, 250–499 people, and total number of establishments in the county.Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Ln(Entry Rate) | | Ln(Exit Rate) | |
| Share OTS × Post | 0.055* | 0.064** | 0.090*** | 0.056** |
| | (0.031) | (0.025) | (0.026) | (0.022) |
| Observations | 9594 | 9593 | 9594 | 9593 |
| Adjusted $R^2$ | 0.792 | 0.936 | 0.738 | 0.919 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| Employment Weighted | No | Yes | No | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes |
| County Fixed Effects | Yes | Yes | Yes | Yes |

## Table E.2: OTS Extinction, Entry and Exit, and Dependence on External Finance

Table E.2 reports the coefficients of WLS regressions in which each observation is weighted by the total employment in that county. The dependent variable in columns (1) and (2), *Ln(Entry Rate)*, is the natural logarithm of the entry rate of new establishments in a given county and year. Entry rate is the ratio between the number of new establishments and the number of existing establishments at the beginning of the year. The dependent variable in columns (3) and (4), *Ln(Exit Rate)*, is the natural logarithm of the exit rate of establishment in a given county and year. Exit rate is defined as the ratio between the number of establishment that exit the market and the total number of establishments at the beginning of the year. The models of specifications (1) and (3) use entry and exit rates in the subset of 2-digit NAICS industries with high dependence of external sources of finance and the models of specifications (2) and (4) use entry and exit rates in the subset of 2-digit NAICS industries with low dependence of external sources of finance. Industries are classified as high/low dependence on external sources of finance based on their above/below-median use of external financial capital according to the Census Bureau's 2010 Survey of Business Owners. We define external capital to include bank and government loans, loans from family and friends, credit cards, venture capital investment or grants and only consider employer firms in the Survey of Business Owners dataset. *Share OTS* is the share of county deposits held in former OTS institution as of June 30th, 2010. *Post* is an indicator variable that takes the value of one for all years between 2006 and 2013 and zero for all years between 2006 and 2010. Baseline controls include linear and quadratic terms for the total number of branches and total amount of deposits held in each county and controls for the logarithm of the number of establishments in the county that employ 1–4, 5–9, 10–19, 20–49, 50–99, 100–249, 250–499 people, and total number of establishments in the county. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | Hi Ext. Fin. | Low Ext. Fin. | Hi Ext. Fin. | Low Ext. Fin. |
|---|---|---|---|---|
| | Ln(Entry Rate) | | Ln(Exit Rate) | |
| Share OTS × Post | 0.096** | 0.033 | 0.060** | 0.056** |
| | (0.040) | (0.023) | (0.025) | (0.024) |
| Observations | 8381 | 8388 | 8385 | 8392 |
| Adjusted $R^2$ | 0.786 | 0.856 | 0.744 | 0.842 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| Employment Weighted | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes |
| County Fixed Effects | Yes | Yes | Yes | Yes |

# F Supplemental Analysis

In this section, we report the results of supplemental analyses examining the sensitivity of the main results to alternative specifications, sample weighting, and measures of the dependent variable. In columns (1) and (2) of Table F.1 we examine if the results might be driven by a size effect. We repeat the main empirical specification after including an interaction term between the *Post* dummy and the natural logarithm of a bank's total assets. The results suggest that the results are not driven by systematic differences in the small business lending activities of large and small banks before and after the OTS extinction.

We equally weight each bank county combination in our main specifications. In columns (3) and (4) of Table F.1, we examine the robustness of our results to weighting each observation by the total amount of lending that a bank makes in the county during the sample period, thus putting more weight in counties where a bank lends relatively more and less weight in counties where a bank lends sporadically. The results suggest that the results are not sensitive to this alternative weighting scheme.

We address the potential concern that the results might be driven by increased merger activity of former OTS banks following the OTS extinction. To this effect, we use the subsample of surviving banks and we adjust the lending of each surviving bank in the sample by including all loans of all banks that they acquired prior to 2016. The results reported in Table F.2 indicate that the main results in the paper are robust to using this alternative sample that accounts for the potential effects of mergers and acquisitions on the reported lending activities of each bank.

Finally, we address the concern that the results might be driven by right skewness of the dependent variable with a small fraction of banks originating the vast majority of loans in the sample. In Table F.3, we repeat the analysis using other measures of the dependent variable. In columns (1) and (2) and estimate the main regression using the growth rate of origination of small business loans. In columns (3) and (4), we scale the total annual small business lending of a bank in a county by its total assets. In columns (5) and (6), we address right-skewness by trimming the sample at the 95th percentile. The main results remain statistically significant across these three alternative measures of the dependent variable.

Table F.1: Robustness - OTS Extinction and Small Business Lending Interaction with Size and Weighting Observations

Table F.1 reports the coefficients of OLS regressions investigating the effect of the OTS extinction after controlling for the effects of bank size. Columns (1) and (2) report results after controlling for the total assets of banks and interactions of this variable. Columns (3) and (4) report coefficients of a WLS regression where each bank-county pair is weighted by the total amount of lending that a bank makes in the county during the sample period. The dependent variable *Ln(Total Loans)* is the total amount of small business loans (loans whose principal amount is below $1 million) originated by a depository institution in a county over a calendar year. All variables are defined as in Table 7. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Ln(Total Loans) | | | |
| OTS × Post | 0.228*** | 0.135*** | 0.243*** | 0.162*** |
| | (0.041) | (0.039) | (0.050) | (0.049) |
| Post × Ln(Total Assets) | 0.009*** | 0.008*** | | |
| | (0.003) | (0.003) | | |
| Observations | 137953 | 129393 | 139277 | 130989 |
| Adjusted $R^2$ | 0.756 | 0.865 | 0.894 | 0.935 |
| Baseline Controls | Yes | Yes | Yes | Yes |
| County-Year Fixed Effects | Yes | Yes | Yes | Yes |
| Bank-County Fixed Effects | Yes | Yes | Yes | Yes |

Table F.2: Robustness - OTS Extinction and Small Business Lending - Proforma Banks after Mergers and Acquisitions

Table F.2 reports the coefficients of OLS regressions investigating the effect of the OTS extinction on the supply of small business lending by former OTS banks using the proforma lending of banks that accounts for mergers and acquisitions throughout the period. The dependent variable *Ln(Total Loans)* is the total amount of small business loans (loans whose principal amount is below $1 million) originated by the surviving depository institution in a county over a calendar year. All other variables are defined as in Table 7. Baseline controls include linear and quadratic terms for the number of branches and total amount of deposits of each bank in each county. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) |
|---|---|---|---|
| | Ln(Total Loans) | | |
| OTS × Post | 0.229*** | 0.155*** | 0.177*** |
| | (0.043) | (0.039) | (0.042) |
| Observations | 135384 | 127890 | 117019 |
| Adjusted $R^2$ | 0.746 | 0.855 | 0.866 |
| Baseline Controls | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | No |
| County Fixed Effects | Yes | No | No |
| Bank Fixed Effects | Yes | No | No |
| County-Year Fixed Effects | No | Yes | Yes |
| Bank-County Fixed Effects | No | Yes | Yes |
| Coarsened Exact Matching | No | No | Yes |

## Table F.3: Robustness - Addressing Skewness in the Dependent Variable

Table F.3 repeats the main analysis in the paper and investigates the relation between the OTS extinction and small business lending for alternative definitions of the outcome variable. The specifications of columns (1) and (2) use the change in small business lending as the main outcome variable. Columns (3) and (4) define the dependent variable as the total amount of small business lending in a county and year scaled by total bank assets, and (5) and (6) trims the distribution of originations at the 95th percentile. All other variables are defined as in Table 7. Standard errors are presented in parentheses, and are clustered at the county level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Δ SBL Amount | | SBL Amount/Total Assets | | Trimmed Ln(Amount) | |
| OTS × Post | 0.044* | 0.055** | 0.001*** | 0.001*** | 0.197*** | 0.072* |
| | (0.025) | (0.028) | (0.000) | (0.000) | (0.041) | (0.040) |
| Observations | 116605 | 108508 | 137962 | 129402 | 132290 | 123881 |
| Adjusted $R^2$ | 0.032 | -0.039 | 0.667 | 0.876 | 0.711 | 0.835 |
| Baseline Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | No | Yes | No | Yes | No |
| County Fixed Effects | Yes | No | Yes | No | Yes | No |
| Bank Fixed Effects | Yes | No | Yes | No | Yes | No |
| County-Year Fixed Effects | No | Yes | No | Yes | No | Yes |
| Bank-County Fixed Effects | No | Yes | No | Yes | No | Yes |