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

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ABSTRACT

An important question in banking is how strict supervision affects bank lending. Supervisors forcing banks to recognize losses could choke off lending and amplify local economic woes. But strict supervision could also change how banks assess and manage loan portfolios and credit risk. Estimating such effects is challenging. We exploit the extinction of the thrift supervisor (OTS) to analyze the effects of strict supervision on bank lending and bank management. We first show that the OTS replacement indeed 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 those that changed bank management practices following the supervisory transition. We also show that the supervisory-induced increase in credit supply is not fully explained by a reallocation from mortgage to small business lending after the crisis and does reflect risk shifting to cope with shrinking margins. These findings suggest that stricter supervision operates not only through capital but can also correct deficiencies in bank management and lending practices, extending credit supply.

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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 more 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)). Yet, a stricter supervisor could also prompt banks to correct deficiencies in key areas of bank management, such as loan portfolio and credit risk management, leading to improvements in banks' lending practices and possibly to increases in credit supply. Thus, the economic consequences of stricter supervision, particularly for credit supply, are worth studying, but typically difficult to identify, especially when supervisory changes follow crises.

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 roughly 10% of all depository institutions with 8.5% of all U.S. deposits. It applied to banks across a wide spectrum of capital and liquidity levels, operating in different geographies.

The extinction of the OTS is an unique opportunity to examine how bank supervision shapes credit supply and local business activity. 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, we show that charter switches before and after the OTS extinction are rare and do not influence our analysis. Despite these

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[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.

advantages, the setting also comes with challenges. The biggest one is that the residential mortgage market was at the epicenter of the financial crisis and, at the same time, represents the key area of lending for thrifts. Thus, it is important to control for crisis-induced changes in lending markets 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 predecessor in enforcing loan loss recognition rules. Importantly, supervisory exams are not limited to loan loss recognition and could identify other deficiencies in bank management. Thus, a more rigorous supervisory approach could also question thrifts' existing management practices, prompting them to improve core areas, such as loan and credit risk management, and to adopt 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. Consistent with this evidence, we document that the OTS extinction is associated with an increase in board turnover and executive exit at former OTS banks. Collectively, our findings suggest that the supervisory transition prompted thrifts to make far-reaching changes, which have not been previously documented.

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 create a credit crunch, consistent with the capital channel shown in prior work (e.g., Caballero, Hoshi, and Kashyap, 2008). However, as the supervisory transition also prompted thrifts to revisit their governance, lending, and credit risk management practices, it is conceivable that these changes in bank management could lead to more lending and, in particular, to a reallocation of lending toward areas that require better screening and monitoring capabilities. In the end, it is an empirical question which channel dominates and hence whether stricter supervision hurts or boosts lending and local business activity.

We examine this important question using small business lending data provided under the Community Reinvestment Act (CRA). This data set contains information on new small business loans originated by each reporting banks in each U.S. county during a year. The

data are well suited to study how the OTS extinction and stricter supervision shaped bank lending because reporting guidelines under the CRA did not change over the relevant time period, thus, providing consistent and fairly granular information on new loans originated before and after the transition. Furthermore, small business loans constitute a substantial fraction of the commercial and industrial lending portfolio of commercial banks and thrifts representing, on average, more than 50% of all commercial and industrial (C&I) loans on banks' balance sheets.

The CRA data set is, however, not without shortcomings. Namely, we do not observe loans to individual borrowers and, therefore, we cannot rule out the possibility that their credit needs changed in the years following the supervisory transition. For this reason, we also cannot evaluate the risk profile of each borrower, which makes it difficult to assess the risks associated with new lending. Although we cannot fully rule out the possibility that lending changes for thrifts are partly driven by differences in the exposures to credit demand or by risk shifting to compensate for the additional costs of the new supervisory regime, the CRA data allow us to reasonably alleviate these concerns. In particular, we are able to compare lending by former OTS banks with lending by commercial banks in the same local area, which means both groups are exposed to similar local economic and demand conditions. Moreover, we can observe loan delinquencies at the bank portfolio level to evaluate whether changes in lending are likely related to changes in banks' risk taking.

We show that former OTS banks on average increase small business loan originations by roughly 10% relative to the period prior to 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 extinction of the OTS, 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. A potential 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. This collection of results is consistent with 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 jurisdictions, where the OCC field offices oversee commercial banks with large concentrations in residential lending.

This evidence is consistent with a portfolio reallocation based on supervisory preferences, which in turn raises the question of whether such a reallocation can also account for most or even all of the increase in small business lending by former OTS banks following the supervisory transition. To assess this possibility, we also 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. However, we find that the coefficient of interest is *not* significantly attenuated when we include a battery of different proxies for the supply of mortgages. Thus, the shift away from mortgages after the crisis and after the OTS extinction does not explain the increase in small business lending. We interpret the results 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.

To further gauge the role of the two explanations, we qualitatively assess some characteristics of the new loans extended by former OTS banks. For instance, if stricter supervision prompted former OTS banks to acquire skills and improve core aspects of bank management, which in turn allowed them to lend safely to riskier borrowers, the expansion of credit supply to small businesses should not increase delinquencies. If, in contrast, the new supervisors' preferences steered thrifts to lend to more difficult-to-evaluate small business borrowers, then this outcome is less likely. Similarly, if stricter supervision increased compliance costs without resulting in better capabilities to lend safely, loan delinquencies would likely increase because former OTS banks would have incentives to compensate for shrinking margins by lending to riskier borrowers. We show that the expansion of credit supply by former OTS banks after the supervisory transition does not come with higher credit risks or more risk taking and is also inconsistent with evergreening bad loans with existing customers. Thus, our evidence on the characteristics of the new lending corroborates our interpretation that the expansion of credit supply is driven by improvements in thrifts' loan and risk management.

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 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 induce changes in bank management that increase bank lending, suggesting that its economic effects 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; Cortés, Demyanyk, Li, Loutskina, and Strahan, 2019; Doerr, 2021) that exploits granular data as well as pre-determined 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.[2]

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.[3] 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

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[2]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.)

[3]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).

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.[4] 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 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.[5]

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[4]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.

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

We collect data on all enforcement actions issued by the main federal banking regulators and supervisors (OTS, OCC, FDIC, and FED) 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 use data on banks' small business lending activities bank 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 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.

We collect information on banks' mortgage originations using data provided under the Home Mortgage Disclosure Act (HMDA). The HMDA data set provides geographic and 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. To provide evidence on local economic effects of the OTS extinction, we use county-level data on entry and exit of establishments in a given year from the Census Bureau's Statistics on U.S. Businesses (SUSB) data. The SUSB survey is carried out on March 12 of each year. Following Chen et al. (2017), we call the entry and exit rate from March 12 of year X to March 12 of year X+1, the entry and exit rate of year X. We compute the entry and exit rates at the county level for all counties included in the SUSB.

4 Descriptive Statistics

The abolishment 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 40% 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 9.5% and 23% of their total assets, respectively. These two loan categories account for only 3.3% and 17.2% of the total assets of thrifts. The descriptive statistics highlight important differences across the two groups of banks, which we address explicitly in our empirical analyses.

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 Strict 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 Strict 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 interpretation 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, γ_i, which control for time-invariant, unobserved characteristics of each bank. We also add quarter fixed effects, δ_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, .369, 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, β_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 statistically and 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 Strict Supervision and Loan and Credit Risk Management

A novel aspect of our study is to highlight that stricter and more sophisticated supervision could also lead to far-reaching changes in bank 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.[6] 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 and through certain supervisory actions (e.g., Goldsmith-Pinkham, Hirtle, and Lucca (2016)).[7] 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

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

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

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 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, Change in Risk Rating System, and Loan Review 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 (Figure A.4).

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 Figure 3 and Table 6. Panel A of 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 ay 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. Next, we consider the evolution of these variables around the supervisory transition. Figure 3 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.

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 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 eight 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, more than 50% of all C&I loans on banks' balance sheets. 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 number and volume of new loans that banks originated, rather than slow-moving stocks of loans, as well as information on where banks originated the loans.

A simple plot of the time-series of small business loan originations by former OTS banks and commercial banks presented in Figure 4 shows that *total* small business lending of thrifts increases following the OTS extinction. Although commercial banks also grew their total

small business lending, their increase is rather modest. The small business lending of former OTS banks outpaces that of their commercial bank counterparts after the OTS extinction even though it exhibited very similar trends before. This plot already suggests a positive effect of the supervisory transition on small business lending. Of course, Figure 4 does not address that lending of thrifts could increase more rapidly because of differences in banks' business models or because former OTS banks are located in areas that experienced higher growth in demand for small business credit relative to areas where commercial banks are located.

We control for these effects by exploiting information on the amount of small business loans that CRA-reporting banks originate by county during a calendar year. Thus, we are able to 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:

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

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

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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.

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 from estimating this model in Figure 5. 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.[8]

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. The lending trends presented in Figure 4 already make this explanation unlikely as they show that both thrifts and commercial banks increase their origination of small business loans, though thrifts increase small business lending at a faster pace. To properly 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).[9] We report the results in Table 8 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.

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

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[8]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.

[9]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.

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 and more sophisticated 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 7.4.

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. We also qualitatively assess the characteristics of thrifts' new small business lending, which sheds further light on the potential channels.

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 9, 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). 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.[10] These results reconcile our findings with 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 6. 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

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

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 well 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 that the supervisory transition is more broadly associated with managerial changes in the sample of publicly-traded thrifts. 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 and loan 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 Figure 3 and 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 10 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.

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Our results pose the obvious question of what precluded the OTS from addressing bank management deficiencies 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.[11] 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. 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.[12] The necessary changes likely require thrifts to incur significant operating costs with uncertain benefits, especially if they maintained a business model focused on residential mortgage lending. Another and related possibility 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

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[11]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).

[12]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)).

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.[13]

This conjecture implies that former OTS banks reduced their exposure to the residential lending 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. Thus, 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 11. 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 11

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[13]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).

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.[14] Similarly, the results in Columns (3) and (4) suggest that the impact of the OTS extinction on small business 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 11 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 the 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 12 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.

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[14]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 9. If we re-estimate the analysis in Columns (1) and (2) of Table 11 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.

7.4 Qualitative Assessment of New Lending

In this subsection, we take a closer look at what type of small business lending is unlocked after the supervisory transition. The purpose of the analysis is to evaluate changes in the characteristics of the loans originated by former OTS banks and to see if those changes are consistent with the economic channels that we discussed in the previous subsections.

In particular, our preferred explanation suggests that former OTS banks were prompted to make changes to core bank practices, e.g., acquire costly skills and processes, which in turn allowed them to lend safely to riskier borrowers. Under this view, the expansion of credit supply to small business borrowers does not necessarily imply a decline in credit quality. A supervisory-induced portfolio reallocation has no clear prediction for credit quality, but delinquencies could go up if thrifts are pushed to make loans to hard-to-evaluate small business borrowers without having the capabilities to safely extend this type of credits.

7.4.1 Supervisory Transition and Lending Rates

One way to assess qualitative changes to bank lending is to look at lending rates. Up until now, we have focused on lending volume and have not examined the loan interest rates set by former OTS banks relative to those set by commercial banks. In this subsection, we 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 13. 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. Importantly, the rate results do not suggest that the new small business loans are riskier and, hence, that the supervisory transition induced thrifts to make riskier business loans.

7.4.2 Supervisory Transition, Loan Delinquencies, and Bank Risk-Taking

As mentioned above, the bank management channel and the portfolio reallocation channel differ in their implications for future loan delinquencies. If the new supervisors push thrifts to make loans to hard-to-evaluate small business borrowers without having the capabilities, future loan delinquencies are likely to go up.

This prediction also follows from another potential explanation for our small business lending results. 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. Thus, under this alternative explanation, we also 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.

The preceding discussion suggests that studying the evolution of loan delinquencies in the commercial industrial (CI) 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 be in favor of former OTS banks taking on greater risks, either because they are pushed by their new supervisors to diversify into lending areas for they have less expertise or because they respond to shrinking margins. However, if loan delinquencies at first increase following the supervisory transition, but later converge toward the default rates of other commercial banks, then the evidence would less supportive of the portfolio reallocation channel and inconsistent with risk shifting due to shrinking margins.

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.[15] 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 former OTS banks quickly converges toward those of other 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 into 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.,

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[15]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.

force them recognize old "zombie loans"), followed by more normal loan delinquencies despite the post-transition expansion of credit supply.

7.4.3 Supervisory Transition and Local Business Activity

Continuing with the theme of the previous subsection, 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.[16] 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:

$$Y_{c,t} = \beta ShareOTS_c \times Post_t + \theta X_{c,t} + \gamma_c + \delta_t + \epsilon_{c,t} \tag{4}$$

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 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,

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[16]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.

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, δ_t, control for overall trends in the evolution of entry and exit rates and the county fixed effects, γ_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 14. 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, β, 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.[17]

8   Conclusion

An important question in banking is how strict supervision affects bank lending and in turn local business activity. Bank supervisors face a tradeoff 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 study this tradeoff by examining the elimination of the OTS, which was stipulated by the Dodd-Frank Act and took place in 2011. OTS extinction meant that former OTS banks were transferred to the OCC and the FDIC, which have a stricter supervisory approach. Strict and more sophisticated supervision could not only affect loan loss recognition and loan risk ratings, but also identify lingering deficiencies in key areas of bank management, such as the collection of borrower information, collateral monitoring, stress testing, loan and credit risk management, which could prompt former OTS banks to make broader changes. Such

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[17]In Internet Appendix E, we further show that the effects occur shortly after the supervisory transition and that the results are particularly pronounced in industries that are more dependent on external sources of financing.

changes could in turn affect credit supply. The forced transition allows us to analyze such economic consequences of strict supervision on bank management practices, bank lending and business activity.

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 to question and improve their existing practices in core areas of bank management, including 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 internal 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 small business loans.

In addition, we find that thrifts reduce their origination of mortgage loans following the supervisory transition. For at least some, this reduction is consistent with a supervisor-induced reallocation from residential to small business lending. However, this portfolio reallocation does not explain the overall increase in small business lending and appears to be a separate effect. Overall, the novel message of our study is that stricter supervision operates not only through the capital channel, but can also spur improvements in loan and risk management, leading to more lending and a reallocation of 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).

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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. Data are from the FFIEC Call Reports and from the Thrift Financial Reports. The shaded period is the financial crisis as defined by the NBER recession period.
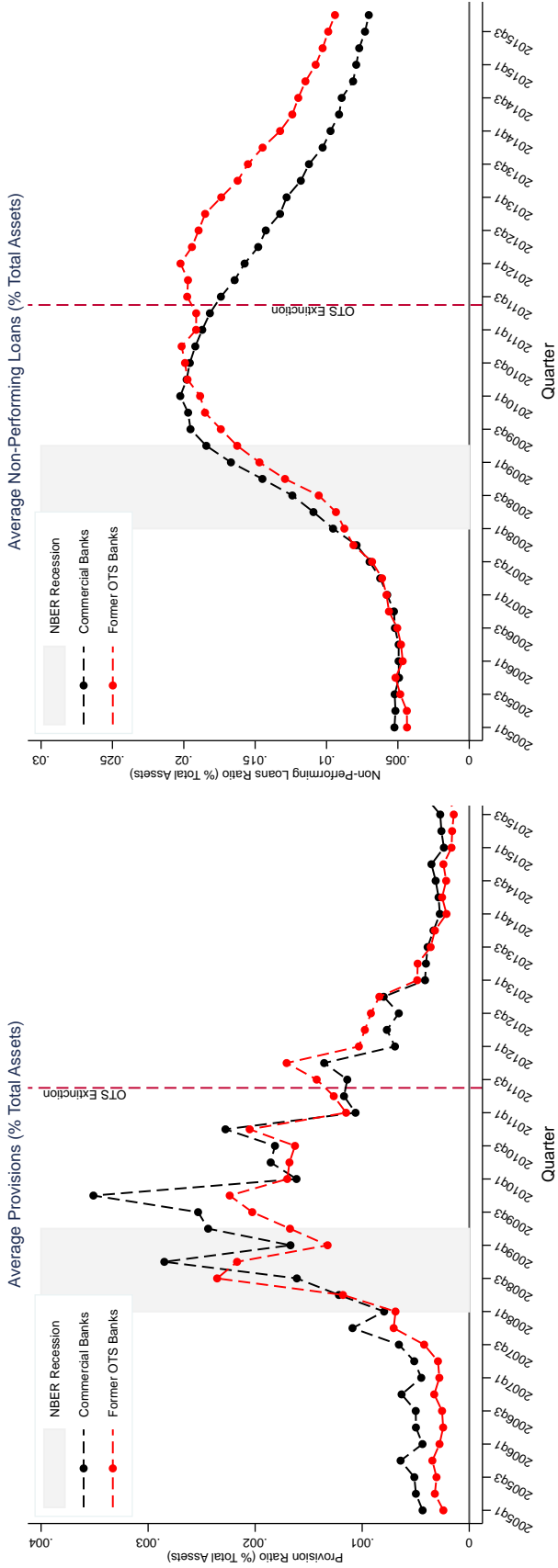
Figure 2: OTS Extinction and Loan Loss Recognition over Time

Figure 2 plots the estimated impact of OTS supervision on the loan loss provision ratio and nonperforming loan ratio in each quarter of the sample period using OLS regressions. The shallow circles represent the series of coefficients β_t from interacting a set of dummy variables representing each quarter in the sample with a dummy variable taking 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 in the following model specification: $Y_{it} = \gamma_t + \theta_i + \sum_t \beta_t OTSExtinction_{it} \times \gamma_t + \delta X_{it} + \epsilon_{it}$ and the vertical bands represent 90% confidence intervals for the point estimates in each quarter. The figure on the left represents the series of coefficients in a model, for which the loan loss provision ratio is the dependent variable. The figure on the right represents the series of coefficients in a model that uses nonperforming loan ratio as the dependent variable. The shaded period is the financial crisis as defined by the NBER recession period.

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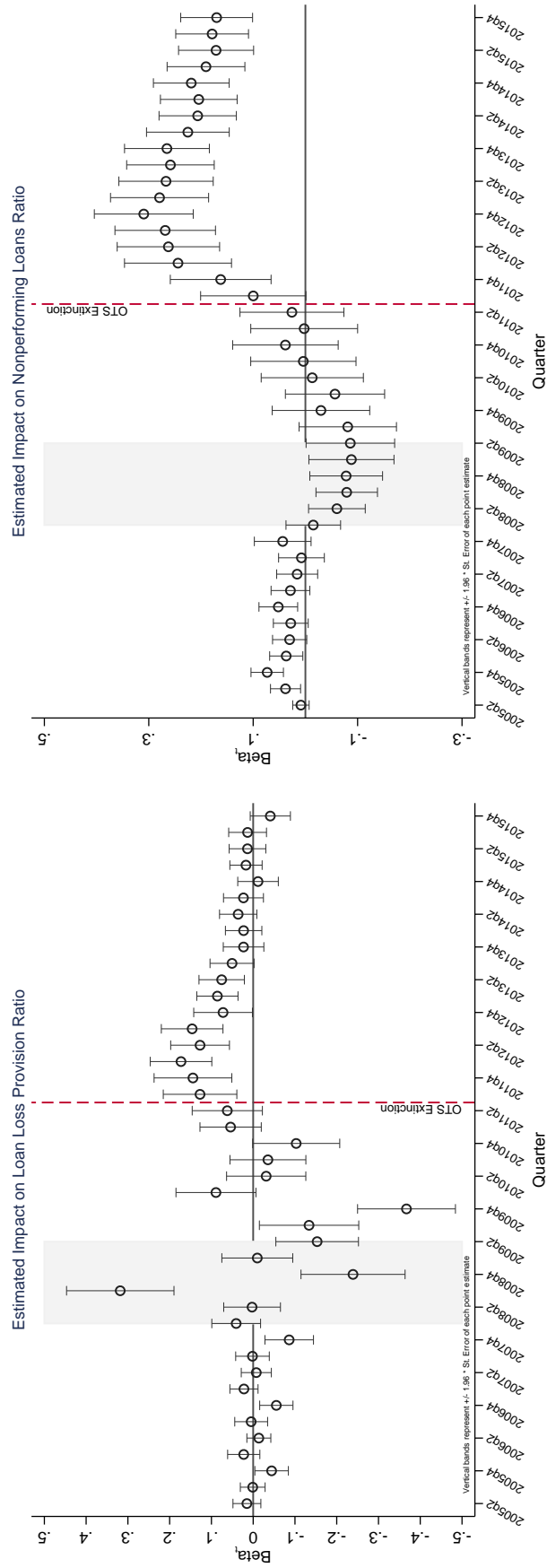
Figure 3: Impact of the Supervisory Transition on Board Turnover and Credit Risk Modeling over Time

Figure 3 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.
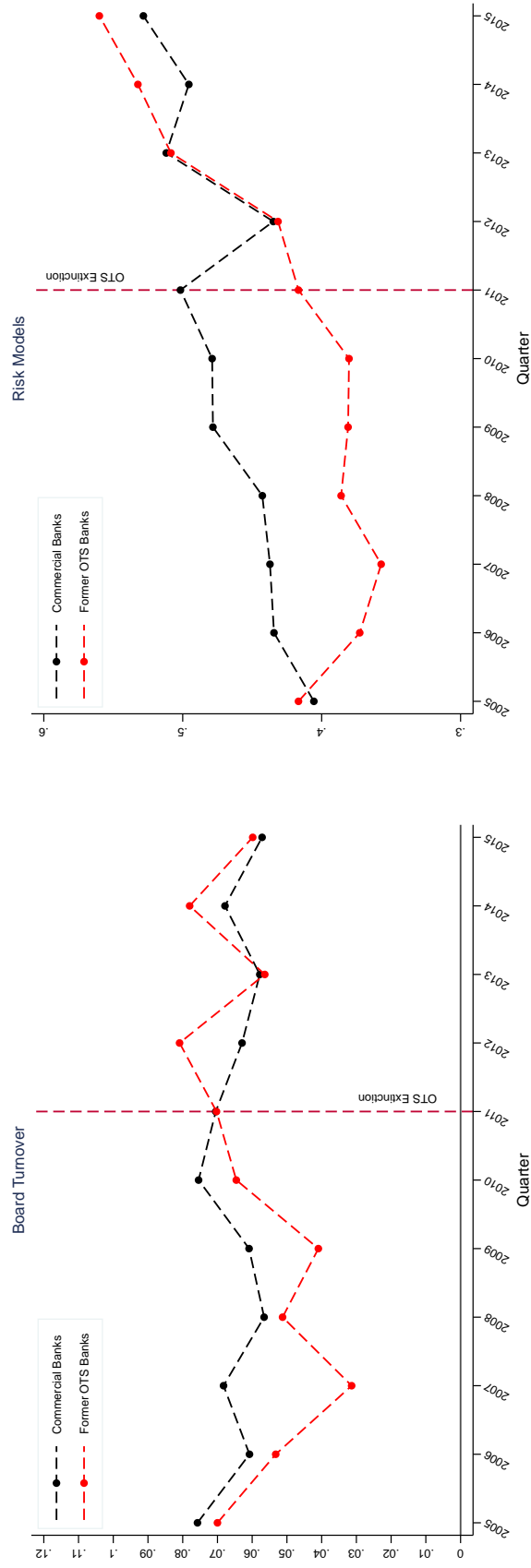
Figure 4: Total Annual Origination of Small Business Loans by Thrifts and Commercial Banks

Figure 4 plots an index of the total volume of small business loans originated by former OTS banks and commercial banks. Former OTS Banks are banks that reported the OTS as their primary supervisor during 2010. Commercial Banks are all other banks that report to the CRA dataset. To avoid that composition effects influence the figure, we define a balanced sample using only commercial banks and former OTS banks that were part of the CRA-reporting sample for the entire sample period.

Annual Origination of Small Business Loans by Former OTS Banks and Commercial Banks
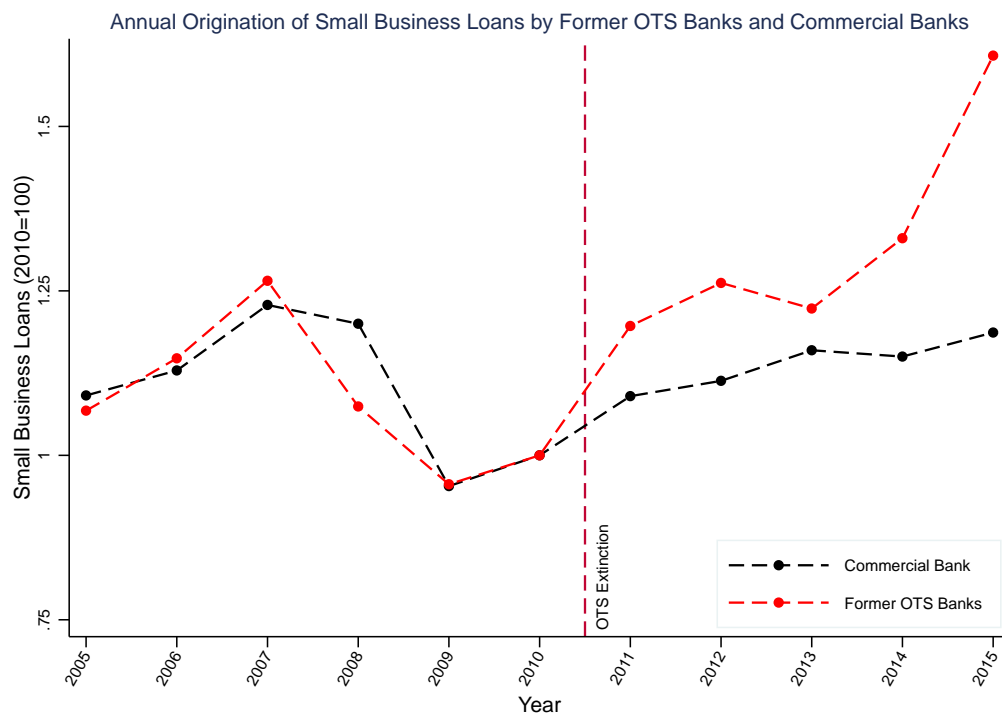
Figure 5: Small Business Lending and OTS Extinction: Impact over Time

Figure 5 plots the estimated impact of OTS supervision on small business lending in each year of the sample period. The shallow circles represent the series of coefficients β_t from expanding the model specification in Column (3) of Table 7 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 supervisor in 2010 was the Office of Thrift Supervision and the vertical bands represent 90% confidence intervals for the point estimates in each quarter. Data on small business lending come from the Community Reinvestment Act Small Business Lending Dataset.

Individual Bank Level

Vertical bands represent +/- 1.65 * St. Error of each point estimate
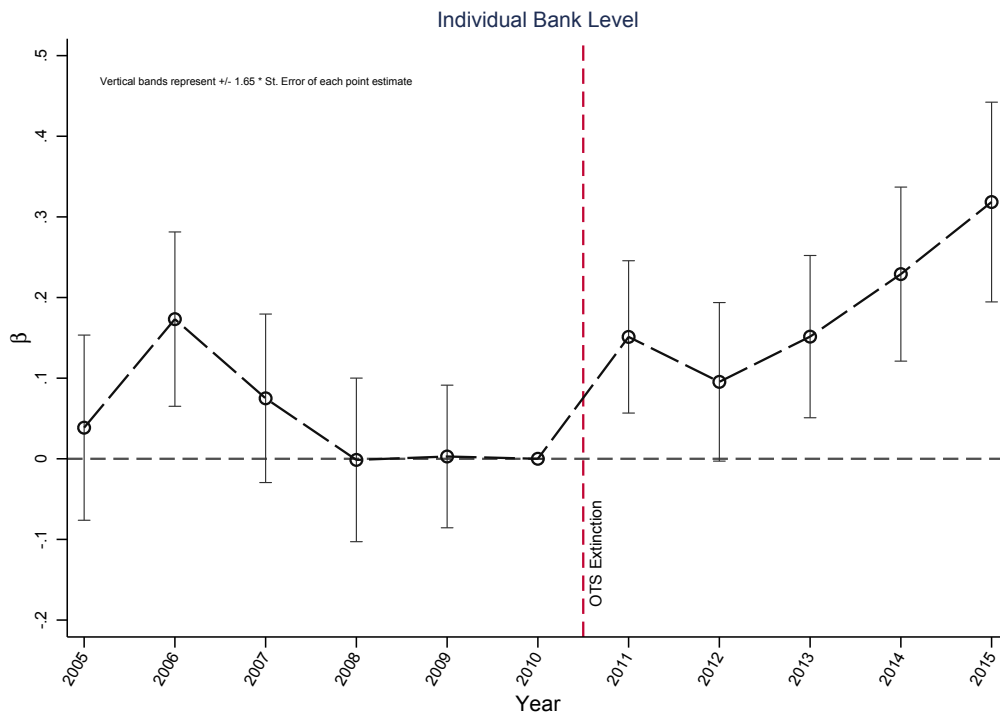
OTS Extinction

Figure 6: Small Business Lending and OTS Extinction: Impact by Capitalization

Figure 6 plots the impact of OTS supervision on small business lending across different levels of capitalization defined by the Tier 1 capital ratio of each bank in the fourth quarter of 2010. The shallow circles represent the series of coefficients β_i from expanding the model specification in column (3) 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 regulator in 2010 was the Office of Thrift Supervision 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 Tier1 bin. Data on small business lending come from the Community Reinvestment Act Small Business Lending Dataset and data on Tier 1 capital ratios come from Call Reports and Thrift Financial Reports.
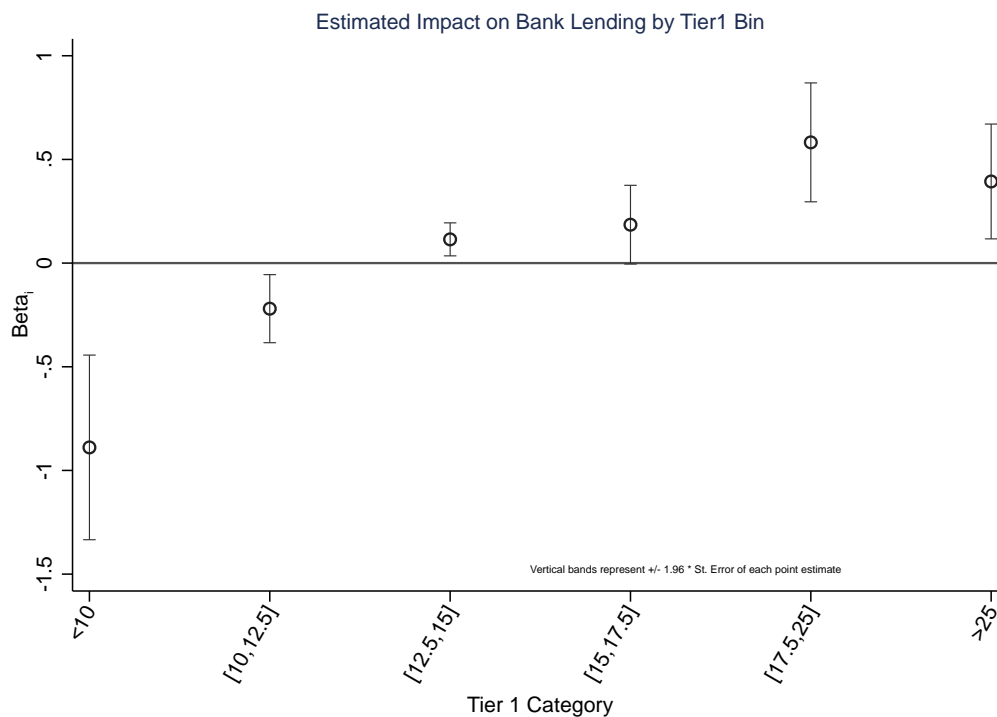
Figure 7: OTS Extinction and Delinquencies in the C&I Lending Portfolio

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 2005Q1 to 2019Q4 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. Data are from the FFIEC Call Reports and from the Thrift Financial Reports. The shaded period is the financial crisis as defined by the NBER recession period.

Panel A. Non-Performing C&I Loan Ratio

Panel B. C&I Charge-Off Ratio
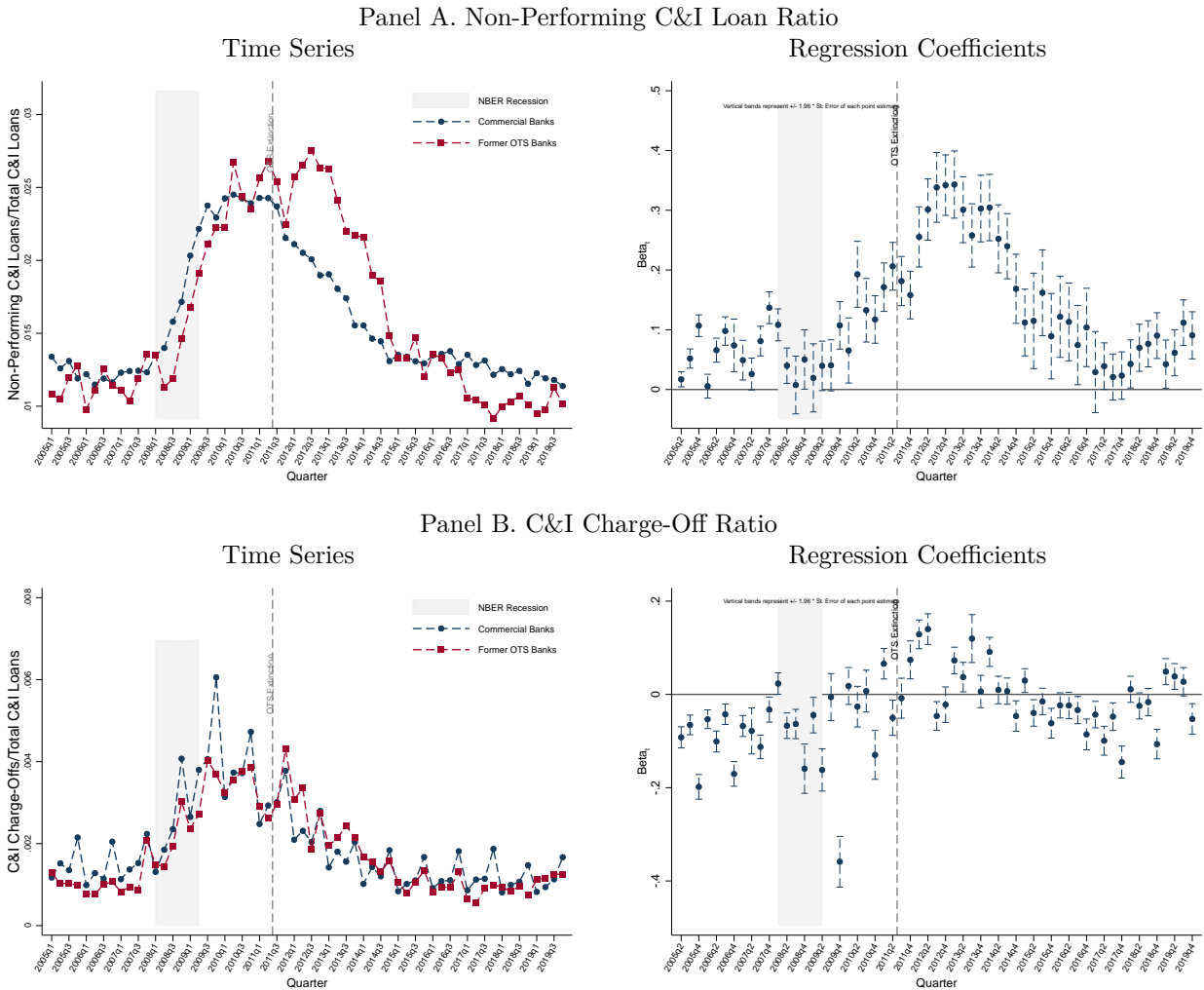
Table 1: Transition Matrix for Former OTS Banks and Commercial Banks

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 to the control group of commercial banks.

	Former - OTS Banks							Commercial Banks				
Date	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	
	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	0.63%	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 defined as the ratio between Loan Loss Provisions (RIAD4230) and total assets (RCFD2170). *Charge-Off Ratio* is the ratio of total charge-offs (RIAD435) and total assets (RCFD2170). *Nonperforming Loan Ratio* is defined as the sum of total loans that are 90 days past due and still accruing (RCFD1407) and total nonaccrual loans (RCFD1407) divided by total assets (RCFD2170). *ALLL Ratio* is the ratio of the allowance for loan and lease losses (RIAD3123) and total assets (RCFD2170). *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	276,222	1,980,338	31,310,266	66,037	142,466	337,932
Share CRE	265,682	0.233	0.170	0.091	0.207	0.346
Share C&I	273,895	0.095	0.0885	0.041	0.075	0.122
Share Residential	265,682	0.17	0.129	0.082	0.151	0.234
Tier1 Capital Ratio	265,681	22.27	120.3	11.27	13.91	18.48
Loan Loss Provision Ratio	267,250	0.0011	0.00369	0	0.00034	0.00096
Charge-Off Ratio	265,680	0.0011	0.00350	0	0.00020	0.00084
Nonperforming Loan Ratio	273,827	0.012	0.0197	0.0013	0.0056	0.0145
ALLL Ratio	264,776	0.010	0.0069	0.0064	0.0087	0.0116
Former OTS Banks						
Total Assets	24,689	1,175,943	5,858,742	79,662	167,900	427,344
Share CRE	24,689	0.172	0.152	0.050	0.137	0.258
Share C&I	24,689	0.033	0.051	0	0.012	0.048
Share Residential	24,689	0.418	0.209	0.271	0.426	0.568
Tier1 Capital Ratio	24,689	29.63	66.96	13.61	18.38	28.13
Loan Loss Provision Ratio	24,689	0.0010	0.00313	0	0.00021	0.00081
Charge-Off Ratio	24,688	0.0009	0.0026	0	0.00009	0.00067
Nonperforming Loan Ratio	24,689	0.013	0.0210	0.0017	0.0064	0.0164
ALLL Ratio	22,486	0.007	0.0067	0.0031	0.0058	0.0091

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*, *Nonperforming Loan Ratio*, *Charge-Off Ratio*, and *ALLL Ratio*, respectively. *Loan Loss Provision Ratio* is defined as the ratio between Loan Loss Provisions (RIAD4230) and total assets (RCFD2170). *Nonperforming Loan Ratio* is defined as the sum of total loans that are 90 days past due and still accruing (RCFD1407) and total nonaccrual loans (RCFD1407) divided by total assets (RCFD2170). *Charge-Off Ratio* is the ratio of total charge-offs (RIAD435) and total assets (RCFD2170). *Enf. Act* is an indicator variable if the bank received a cease and desist or a consent order during the quarter. *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)
	Loan Loss Provision Ratio		Nonperforming Loan Ratio		Charge-Off Ratio	
OTS × Post	0.018***	0.018***	0.333***	0.369***	0.023***	0.026***
	(0.002)	(0.002)	(0.017)	(0.019)	(0.002)	(0.002)
Ln(Assets)		0.003		-0.016		0.011***
		(0.003)		(0.046)		(0.004)
Residential Share		0.020		1.299***		0.051**
		(0.014)		(0.207)		(0.023)
C&I Share		0.144***		-0.793***		-0.056**
		(0.022)		(0.232)		(0.022)
CRE Share		0.108***		0.147		-0.061***
		(0.012)		(0.145)		(0.014)
Tier1 Capital Ratio		0.000		-0.000		-0.000
		(0.000)		(0.000)		(0.000)
Observations	343712	341700	350287	341700	342142	341698
Adjusted R^2	0.294	0.294	0.507	0.510	0.304	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(Nbr. 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(Nbr. 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. *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)
	I(Enforcement Action=1)		Ln(Nbr. Words)		I(Stress-Test=1)	
OTS × Post	0.002***	0.002***	0.392***	0.482***	0.132**	0.137**
	(0.000)	(0.000)	(0.133)	(0.119)	(0.054)	(0.056)
Ln(Assets)		0.001***		0.522***		-0.005
		(0.000)		(0.048)		(0.014)
Residential Share		-0.000		0.637		-0.142
		(0.002)		(0.488)		(0.164)
CRE Share		-0.001		-0.589		0.100
		(0.002)		(0.548)		(0.130)
C&I Share		-0.000		-0.237		-0.204
		(0.005)		(0.933)		(0.138)
Tier1 Capital Ratio		-0.000		-0.000***		-0.000
		(0.000)		(0.000)		(0.000)
Observations	352720	341701	2701	2651	2701	2651
Adjusted R^2	0.027	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 regulated entities. The dependent variables are: *Borrower Info* is an indicator variable 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 an indicator variable that takes the value of one if the enforcement actions contains a stipulation requesting the bank to monitor the collateral that borrowers pledge in lending agreements. *Exceptions* is an indicator variable that takes the value of one if the enforcement actions contains a stipulation requesting the bank to implement a system to track and monitor exceptions to the loan portfolio policies that were granted by the bank to its borrowers. Δ *Risk Rating System* is an indicator variable that takes the value of one if the enforcement actions contains a stipulation requesting the bank makes changes to their internal risk rating systems. *Concentration Limits* is an indicator variable 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. *Loan Review System* is an indicator variable that takes the value of one if the enforcement actions contains a stipulation requesting the bank to implement an independent loan review system. *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+RCON2746) 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)	(7)	(8)	(9)	(10)	(11)	(12)
	Borrower Info		Collateral Monitoring		Exceptions		Concentration Limits		Δ Risk Rating System		Loan Review System	
Post	0.306***	0.330***	0.376***	0.413***	0.356***	0.186**	0.102	0.110	0.387***	0.281***	0.160***	0.168*
	(0.056)	(0.087)	(0.053)	(0.078)	(0.052)	(0.078)	(0.063)	(0.108)	(0.058)	(0.071)	(0.060)	(0.091)
Ln(Assets)	-0.074***	0.144	-0.059***	-0.026	-0.056***	-0.397**	-0.038**	-0.004	-0.002	0.052	-0.019	-0.268
	(0.016)	(0.114)	(0.015)	(0.121)	(0.014)	(0.150)	(0.015)	(0.275)	(0.014)	(0.178)	(0.018)	(0.172)
Residential Share	0.208	-1.372**	0.093	-0.546	0.287*	0.612	0.035	0.059	-0.029	-0.407	0.130	-0.766
	(0.203)	(0.588)	(0.192)	(0.590)	(0.160)	(0.434)	(0.188)	(0.768)	(0.168)	(0.596)	(0.175)	(0.828)
C&I Share	0.238	7.580***	0.042	8.627***	0.641*	0.528	0.403	-2.399	-0.398	-0.173	-0.103	5.188*
	(0.413)	(2.637)	(0.408)	(2.819)	(0.368)	(2.234)	(0.507)	(2.594)	(0.364)	(2.468)	(0.373)	(2.800)
CRE Share	0.299	-1.223	0.358*	-0.414	0.328*	-2.203***	0.558**	0.682	0.359**	0.048	0.748***	0.402
	(0.222)	(0.906)	(0.213)	(0.695)	(0.174)	(0.641)	(0.224)	(1.002)	(0.179)	(0.666)	(0.205)	(0.909)
Tier1 Capital Ratio	-0.001***	-0.000	-0.001***	-0.001*	-0.000*	-0.002***	-0.001*	-0.000	-0.000**	-0.000	-0.000*	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Observations	279	152	279	152	279	152	279	152	279	152	279	152
Adjusted R^2	0.144	0.265	0.179	0.307	0.188	0.362	0.035	0.057	0.208	0.224	0.055	0.176
Bank Fixed-Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 6: OTS Extinction and Changes in Bank Management

Panel A provides summary statistics of the main outcome variables in this analysis for the group of former OTS banks and for the group of commercial bank. Panel B of Table 6 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, similar to Bhat et al., 2018. *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. 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*, which we define in Table 3. These variables are measured at an annual frequency as of the fourth quarter of the respective year. We control for the board size non-parametrically by including board size fixed-effects in equations (1)–(4) and we also control for the natural logarithm of number of words in the 10-K in Columns (5) and (6). 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	0.0646	0.0838	12887	0.0602	0.0875	2507	0.00440	2.385
Exec. Exit	0.0785	0.269	12887	0.0558	0.230	2507	0.0227	3.951
Risk Model	0.458	0.498	13827	0.429	0.495	2557	0.0285	2.659

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	0.021***	0.021***	0.040***	0.040***	0.076***	0.084***
	(0.004)	(0.004)	(0.011)	(0.012)	(0.022)	(0.023)
Observations	3462	3436	3462	3436	3790	3749
Adjusted R^2	0.072	0.073	0.041	0.036	0.668	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. 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 where that bank has a branch network presence. The HPI is calculated using the all-transactions indexes at the zip code level provided by the Federal Housing Finance Agency. We calculate the HPI for each bank in each county by weighting the HPI of each zip code where the bank has a branch by the share of county deposits that the bank holds in that zip code. The index is designed to capture potential and absorb potential systematic differences in the location strategies of former OTS and commercial banks within a county location. Baseline controls include linear and quadratic terms for the number of branches and the 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)	(5)	(6)
	Ln(Total Loans)					
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

Table 8: OTS Extinction and Small Business Lending: Excluding the Largest Banks

Table 8 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 excluding the top 4 banks in the United States (columns (1)–(3)) or alternatively excluding the top 20 banks by volume of small business lending over the entire period of analysis (columns (4)–(6)). 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 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)	(4)	(5)	(6)
				Ln(Total Loans)		
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 9: OTS Extinction and Small Business Lending: Role of Capitalization

Table 9 reports the coefficients of OLS regressions. Columns (1) and (2) repeat the analysis of Column (2) of Table 7 after stratifying the sample based on above- and below-median levels of Tier 1 Capital Ratio of the former OTS banks subsample prior to the OTS extinction and Columns (3) and (4) repeat the analysis of Column (2) of Table 7 after stratifying the sample based on above- and below-median levels of the Tier 1 leverage ratio (Tier 1 Capital divided total non-risk weighted assets) of the former OTS banks subsample prior to the OTS extinction. 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. 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)
			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 10: OTS Extinction and Small Business Lending: Role of Changes in Bank Management

Panel A of Table 10 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, similar to Bhat et al., 2018. *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. 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*, which we define in Table 3. These variables are measured at an annual frequency as of the fourth quarter of the respective year. We control for the board size non-parametrically by including board size fixed-effects in equations (1)–(4) and we also control for the natural logarithm of number of words in the 10-K in Columns (5) and (6). Panel B of this Table investigates the role that changes in bank management play in mediating the association between the OTS extinction and small business lending. Columns (1) and (2) of Panel B repeat the analysis of Column (2) of Table 7 after stratifying the sample based on below- and above-median post-OTS extinction board turnover. Columns (3) and (4) of Panel B repeat the analysis of Column (2) of Table 7 after stratifying the sample based on whether an executive director of the bank left the company following the regulatory transition. Columns (5) and (6) of Panel B repeat the analysis of Column (2) of Table 7 after stratifying 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 (as defined in Panel A) in at least one year after the OTS extinction but *not* in any of the years prior to the regulatory transition. All variables in this analysis are defined 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. In Panel A, we assign banks to counties by the location of their headquarters. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: Changes in Bank and Loan Management following OTS Extinction

	(1)	(2)	(3)	(4)	(5)	(6)
	Board Turnover		Exec. Exit		Risk Model	
OTS × Post	0.021***	0.021***	0.040***	0.040***	0.076***	0.084***
	(0.004)	(0.004)	(0.011)	(0.012)	(0.022)	(0.023)
Observations	3462	3436	3462	3436	3790	3749
Adjusted R^2	0.072	0.073	0.041	0.036	0.668	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

Panel B: Bank Lending following OTS Extinction: Role of Management Changes

	(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 11: OTS Extinction and Small Business Lending: Portfolio Reallocation

Table 11 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 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 real estate lending shares of commercial banks (national banks) and former OTS banks. *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. 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)
		Ln(Total Loans)		
	Large Diff. C&I	Small Diff. C&I	Large Diff. Residential	Small Diff. Residential
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 12: OTS Extinction and Small Business Lending: Controlling for Mortgage Lending

Table 12 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. 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 primary regulator 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). *% 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. 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)	(5)
			Ln(Total Loans)		
OTS × Post	0.088**	0.087**	0.089**	0.094**	0.095**
	(0.039)	(0.038)	(0.038)	(0.038)	(0.038)
% (Residential + CRE)		-0.256**	-0.552***	-0.586***	-0.592***
		(0.099)	(0.101)	(0.101)	(0.101)
Ln(Mortgage Originations)			0.101***	0.100***	0.101***
			(0.005)	(0.005)	(0.005)
Av. Bank Mort. Rej. Rate				-0.325***	-0.340***
				(0.029)	(0.031)
Av. Bank-County Mort. Rej. Rate					0.042
					(0.028)
Observations	130989	129389	125314	124959	124959
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

Table 13: OTS Extinction and Lending Rates

Table 13 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

Table 14: OTS Extinction and Entry and Exit of Local Business Establishments

Table 14 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.

	(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	9,593	9,593	9,593	9,593
Adjusted R-squared	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

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.

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?

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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.1 , 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.

Finally, we conduct 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.2, 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.3, 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.4 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.5 we find that including interactions between the *Post* dummy and the financial characteristics vector, X, does not affect the statistical significance of the estimated coefficients.

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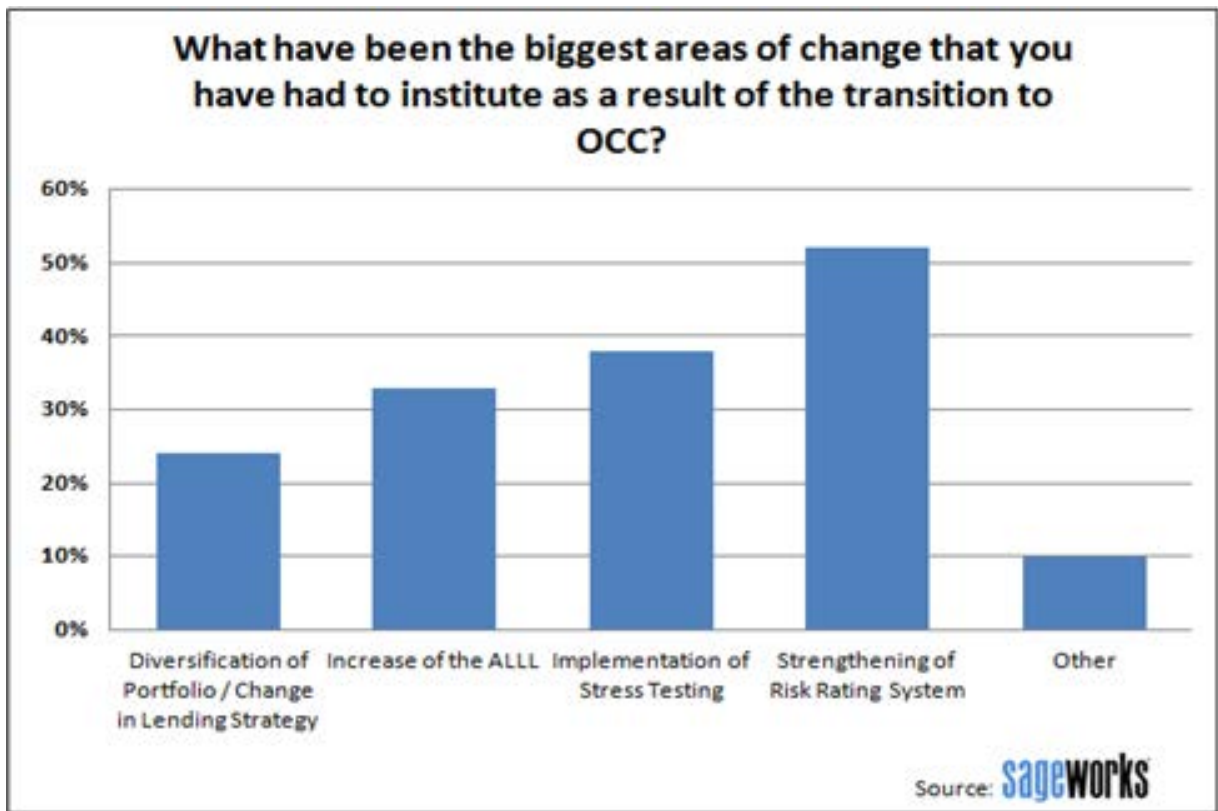
Figure A.2: Example passages from OCC Enforcement Action on Former OTS

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.
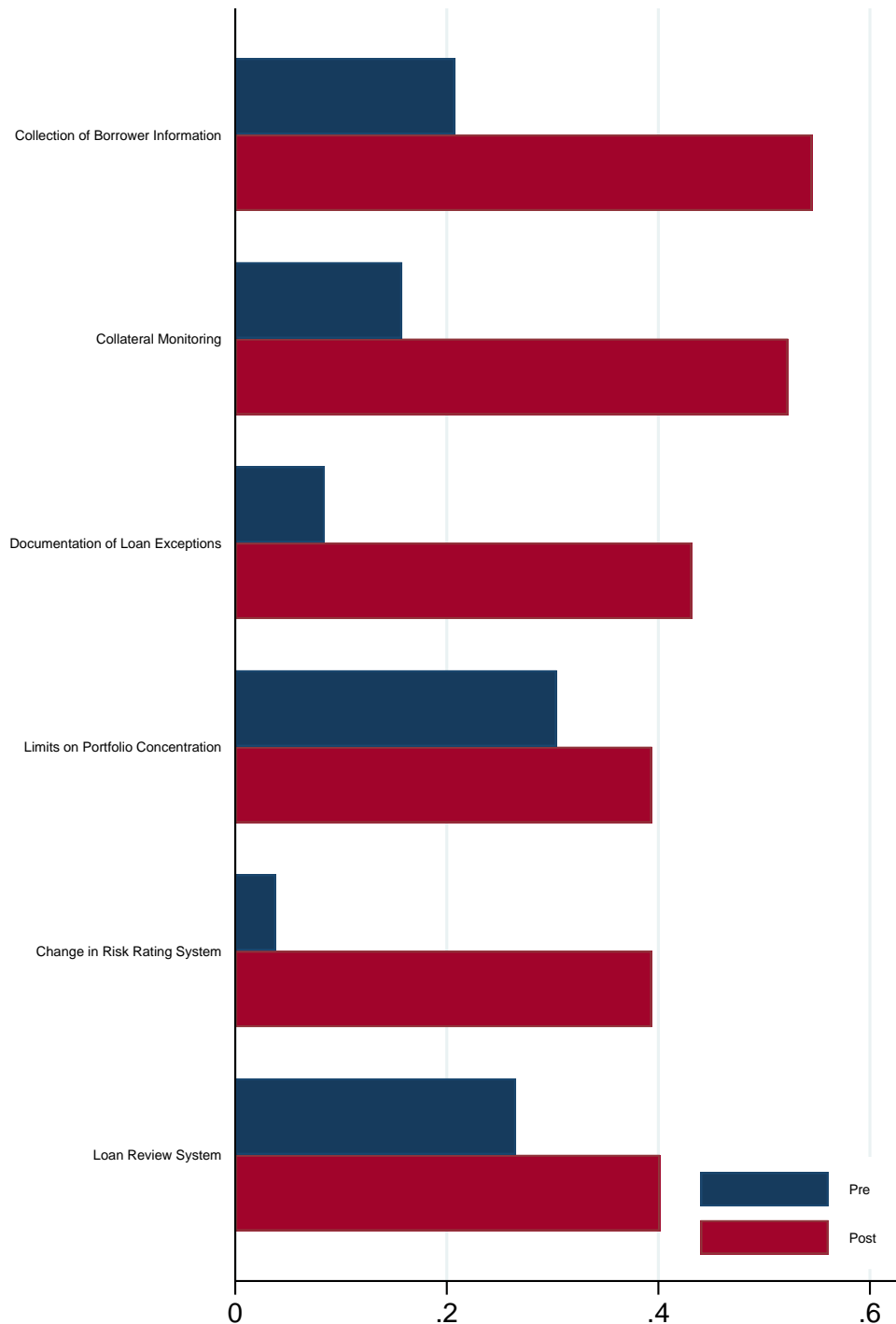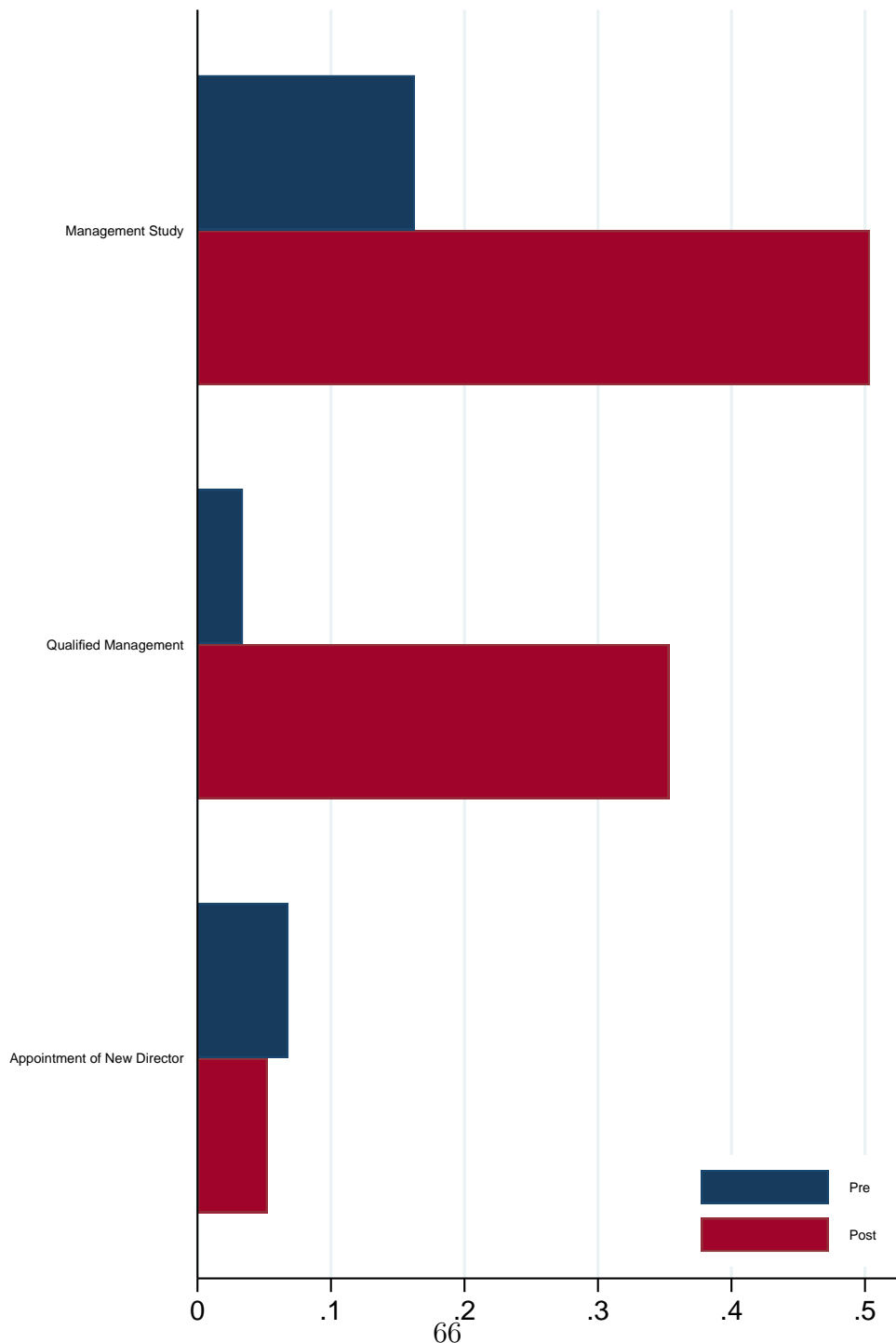
Table A.1: Enforcement Actions Before and After the OTS Extinction: Management Qualifications

Table A.1 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.2: OTS Extinction and Strict Supervision: The Role of Local Economic Conditions

Table A.2 reports the coefficients of OLS regressions investigating whether the effect of the OTS extinction depends on the exposure of the bank to areas with significant 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. HPI decline sample is defined as banks whose weighted house price index fell by more than 17% between 2007 and 2010. The Med. HPI decline sample is comprised of banks whose weighted house price index fell between two and seventeen percent between 2007 and 2010. The Low HPI decline sample are those banks whose weighted house price index either rose or fell less than two percent between 2007 and 2010. The dependent variables are the *Nonperforming Loan Ratio* and *Enf. Act.* *Nonperforming Loan Ratio* is defined as the sum of total loans that are 90 days past due and still accruing (RCFD1407) and total nonaccrual loans (RCFD1407) divided by total assets (RCFD2170). *Enf. Act.* is an indicator variable if the bank received a cease and desist or a consent order during the quarter. *Post* is an indicator variable that takes the value of one for all quarters after 2011Q3 (inclusive). *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 Tier 1 capital ratio of the financial institution (RCFD7206). 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. HPI Shock	Med. HPI Shock	Low HPI Shock	Hi. HPI Shock	Med. HPI Shock	Low HPI Shock
OTS × Post	0.383***	0.227***	0.305***	0.008***	0.000	0.004***
	(0.052)	(0.021)	(0.024)	(0.001)	(0.000)	(0.001)
Ln(Assets)	-0.055	-0.023	-0.080	0.005***	0.003**	0.004**
	(0.057)	(0.052)	(0.057)	(0.001)	(0.001)	(0.002)
Residential Share	1.675***	0.750***	0.599**	0.011	-0.006	0.007
	(0.388)	(0.183)	(0.255)	(0.009)	(0.004)	(0.007)
CRE Share	0.828***	0.392**	0.611**	0.001	0.005	-0.000
	(0.270)	(0.164)	(0.260)	(0.006)	(0.004)	(0.006)
C&I Share	-1.161***	-0.788**	0.439	-0.020	0.001	0.002
	(0.422)	(0.309)	(0.324)	(0.013)	(0.008)	(0.009)
Tier1 Capital Ratio	-0.000	-0.000	-0.003***	-0.000	-0.000	-0.000**
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Observations	68359	137036	68692	68359	137036	68693
Adjusted R^2	0.561	0.515	0.476	0.016	0.013	0.008
Quarter Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table A.3: OTS Extinction and Strict Supervision: Heterogeneity across OTS Divisions

Table A.3 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. The dependent variables are the *Nonperforming Loan Ratio* and *Enf. Act. Nonperforming Loan Ratio* is defined as the sum of total loans that are 90 days past due and still accruing (RCFD1407) and total nonaccrual loans (RCFD1407) divided by total assets (RCFD2170). *Enf. Act.* is an indicator variable if the bank received a cease and desist or a consent order during the quarter. *Post* is an indicator variable that takes the value of one for all quarters after 2011Q3 (inclusive). *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 Tier 1 capital ratio of the financial institution (RCFD7206). 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	0.301***	0.421***	0.002***	0.005***
	(0.028)	(0.022)	(0.001)	(0.000)
Ln(Assets)	-0.008	0.003	0.003***	0.006***
	(0.064)	(0.046)	(0.001)	(0.001)
Residential Share	1.618***	0.944***	0.007*	-0.000
	(0.355)	(0.222)	(0.004)	(0.006)
CRE Share	0.079	0.059	-0.007*	-0.004
	(0.204)	(0.253)	(0.004)	(0.005)
C&I Share	-1.276***	-0.282	-0.008	-0.018**
	(0.329)	(0.336)	(0.007)	(0.007)
Tier1 Capital Ratio	-0.000	-0.000**	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	204938	136762	204938	136763
Adjusted R^2	0.529	0.472	0.016	0.018
Quarter Fixed-Effects	Yes	Yes	Yes	Yes
Bank Fixed-Effects	Yes	Yes	Yes	Yes

Table A.4: OTS Extinction and Loan Loss Recognition - Transition to OCC or FDIC

Table A.4 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. The dependent variables are the *Loan Loss Provision Ratio*, *Nonperforming Loan Ratio*, *Charge-Off Ratio*, and *ALLL Ratio*. *Loan Loss Provision Ratio* is defined as the ratio between Loan Loss Provisions (RIAD4230) and total assets (RCFD2170). *Nonperforming Loan Ratio* is defined as the sum of total loans that are 90 days past due and still accruing (RCFD1407) and total nonaccrual loans (RCFD1407) divided by total assets (RCFD2170). *Charge-Off Ratio* is the ratio of total charge-offs (RIAD435) and total assets (RCFD2170). *Enf. Act* is an indicator variable if the bank received a cease and desist or a consent order during the quarter. *OTS → 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 → 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. *Post* is an indicator variable that takes the value of one for all quarters after 2011Q3 (inclusive). *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 Tier 1 capital ratio of the financial institution (RCFD7206). 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)
	Loan Loss Provision Ratio	Nonperforming Loan Ratio	Charge-Off Ratio	Enf. Act
OTS → OCC × Post	0.016***	0.393***	0.026***	0.003***
	(0.002)	(0.019)	(0.002)	(0.000)
OTS → FDIC × Post	0.041***	0.073***	0.026***	0.001**
	(0.002)	(0.021)	(0.002)	(0.000)
Ln(Assets)	0.002	-0.024	0.011***	0.004***
	(0.003)	(0.040)	(0.004)	(0.001)
Residential Share	0.014	1.215***	0.044**	0.003
	(0.014)	(0.214)	(0.021)	(0.003)
CRE Share	0.137***	0.429***	-0.024*	0.001
	(0.010)	(0.134)	(0.012)	(0.003)
C&I Share	0.170***	-0.602***	-0.030	-0.007
	(0.020)	(0.215)	(0.020)	(0.006)
Tier1 Capital Ratio	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	312734	312734	312732	312735
Adjusted R^2	0.279	0.515	0.300	0.015
Quarter Fixed-Effects	Yes	Yes	Yes	Yes
Bank Fixed-Effects	Yes	Yes	Yes	Yes

Table A.5: OTS Extinction and Strict Supervision: Interaction of Post with Loan Portfolio Composition

Table A.5 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. The dependent variables are the *Nonperforming Loan Ratio* and *Enf. Act.* *Nonperforming Loan Ratio* is defined as the sum of total loans that are 90 days past due and still accruing (RCFD1407) and total nonaccrual loans (RCFD1407) divided by total assets (RCFD2170). *Enf. Act.* is an indicator variable if the bank received a cease and desist or a consent order during the quarter. *Post* is an indicator variable that takes the value of one for all quarters after 2011Q3 (inclusive). *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). We also include controls for the natural logarithm of total assets (RCFD2170) and the Tier 1 capital ratio of the financial institution (RCFD7206). 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	0.196***	0.360***	0.434***	0.231***	0.002***	0.003***	0.002***	0.001***
	(0.025)	(0.019)	(0.013)	(0.025)	(0.001)	(0.000)	(0.000)	(0.001)
Residential Share	1.079***	1.290***	1.106***	0.892***	0.005*	0.007**	0.008**	0.006*
	(0.212)	(0.222)	(0.202)	(0.204)	(0.003)	(0.003)	(0.003)	(0.003)
C&I Share	-0.838***	-0.756***	-0.761***	-0.662***	-0.008	-0.009	-0.008	-0.011**
	(0.220)	(0.235)	(0.219)	(0.224)	(0.005)	(0.006)	(0.006)	(0.006)
CRE Share	0.108	0.133	-0.118	-0.140	-0.000	-0.000	0.001	0.001
	(0.143)	(0.143)	(0.148)	(0.151)	(0.003)	(0.003)	(0.003)	(0.003)
Residential Share × Post	0.747***			0.777***	0.005***			0.005***
	(0.097)			(0.083)	(0.002)			(0.002)
C&I Share × Post		-0.194		-0.477**		0.003		0.010**
		(0.191)		(0.194)		(0.004)		(0.005)
CRE Share × Post			1.308***	1.387***			-0.007***	-0.008***
			(0.113)	(0.118)			(0.002)	(0.003)
Observations	341700	341700	341700	341700	341701	341701	341701	341701
Adjusted R^2	0.511	0.510	0.513	0.514	0.017	0.017	0.017	0.017
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, γ_i, control for unobserved heterogeneity at the census-tract level and the county-by-year fixed effects, δ_{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 β_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

Aggregate Census Tract Level

Vertical bands represent +/- 1.65 * St. Error of each point estimate
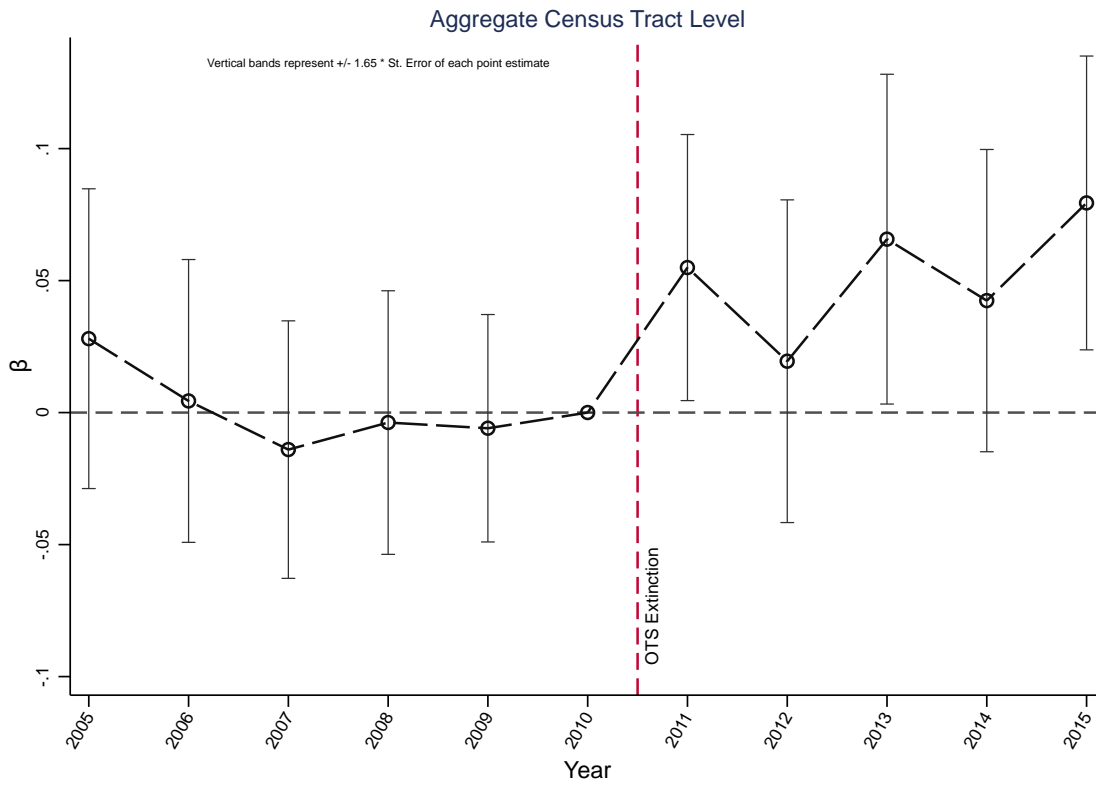
OTS Extinction

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 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	0.054***	0.051***	0.046*	0.038*
	(0.021)	(0.019)	(0.024)	(0.022)
Ln(HPI)			0.424***	0.250***
			(0.025)	(0.031)
Observations	241,922	236,254	193,608	188,845
Adjusted R-squared	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 figures 4 and 5 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 Table 8 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 R.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 figures 4 and 5 of the paper after excluding the top-4 banks in
the economy.

Panel A. Time Series
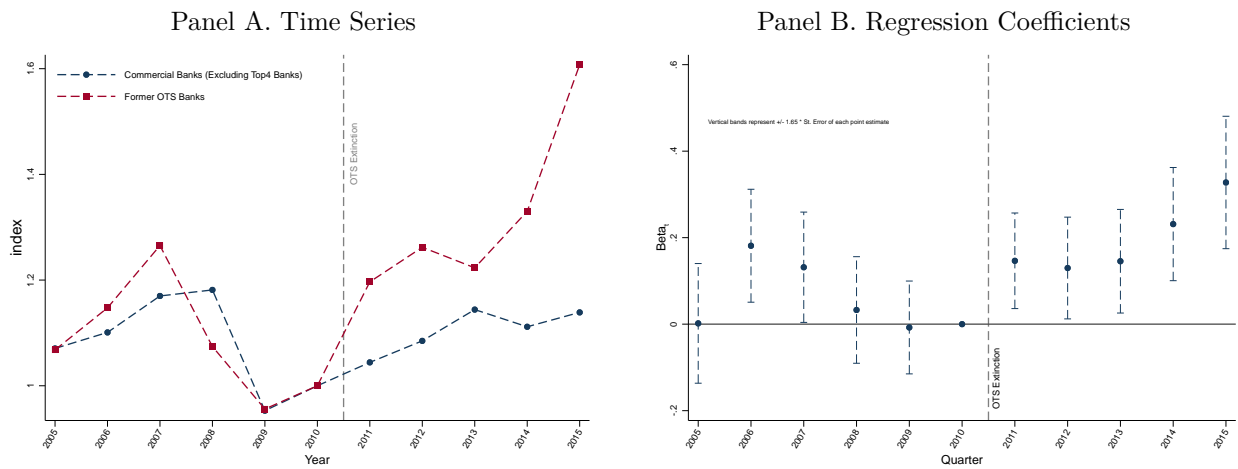
Panel B. Regression Coefficients

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 indicator variables representing whether the bank is among the top 4 banks in the United States and whether the bank received TARP funds. 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. *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). *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. 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)	(5)	(6)
	Ln(Total Loans)
OTS × Post	0.233***	0.122***	0.152***	0.200***	0.079**	0.072*
	(0.041)	(0.039)	(0.041)	(0.041)	(0.039)	(0.043)
Top 4 × Post	0.155***	0.185***	0.040			
	(0.017)	(0.017)	(0.082)			
TARP Recipient Bank × Post				-0.010	-0.016	-0.157***
				(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. 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 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)	(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. *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). *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. 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)	(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	0.007	0.006	0.065	0.062
	(0.007)	(0.007)	(0.063)	(0.062)
Ln(Assets)		0.001		-0.023
		(0.004)		(0.025)
Residential Share		-0.037		-0.115
		(0.033)		(0.182)
C&I Share		-0.001		0.012
		(0.057)		(0.209)
CRE Share		-0.021		-0.073
		(0.027)		(0.118)
Tier1 Capital Ratio		-0.000		0.000
		(0.000)		(0.002)
Observations	7594	7563	2113	2105
Adjusted R^2	0.038	0.039	-0.009	-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	0.230***	0.122***	0.222***
	(0.044)	(0.042)	(0.045)
CRA Exam Year	-0.001	0.003	-0.025***
	(0.005)	(0.005)	(0.008)
OTS × Post × CRA Exam Year	-0.095*	-0.130**	-0.252***
	(0.055)	(0.052)	(0.054)
Observations	139277	130989	116550
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 stratifying 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 stratifying 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). 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. 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). 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)
			Ln(Total Loans)	
	Hi Competitor Cap.	Low Competitor Cap.	Low Neg Lending Shock	Hi Neg Lending 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

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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.

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 β_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.

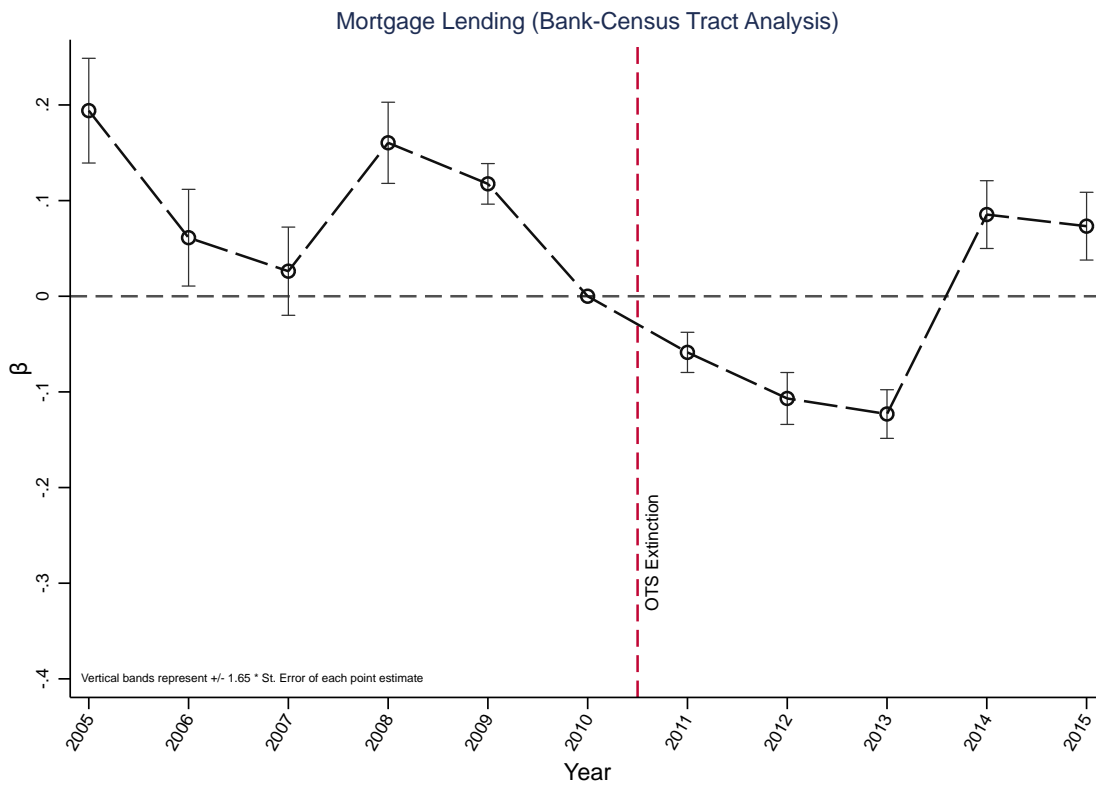Mortgage Lending (Bank-Census Tract Analysis)

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 β_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.
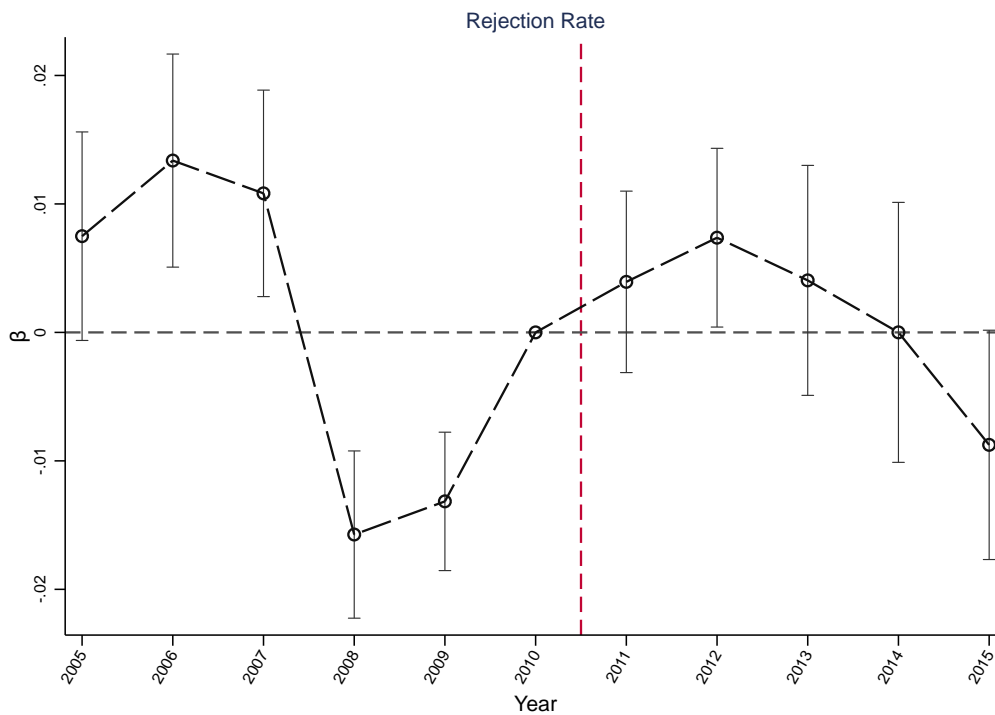

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Table D.1: OTS Extinction and Mortgage Lending (Census Tract)

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 δX_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

E OTS Extinction and Local Business Activity: Additional results

This section reports results of additional analyses examining the relation between the OTS extinction and local business activity. We 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. 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 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 14 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.1. 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.

Share of Deposits held in Branches of former OTS banks (2010)
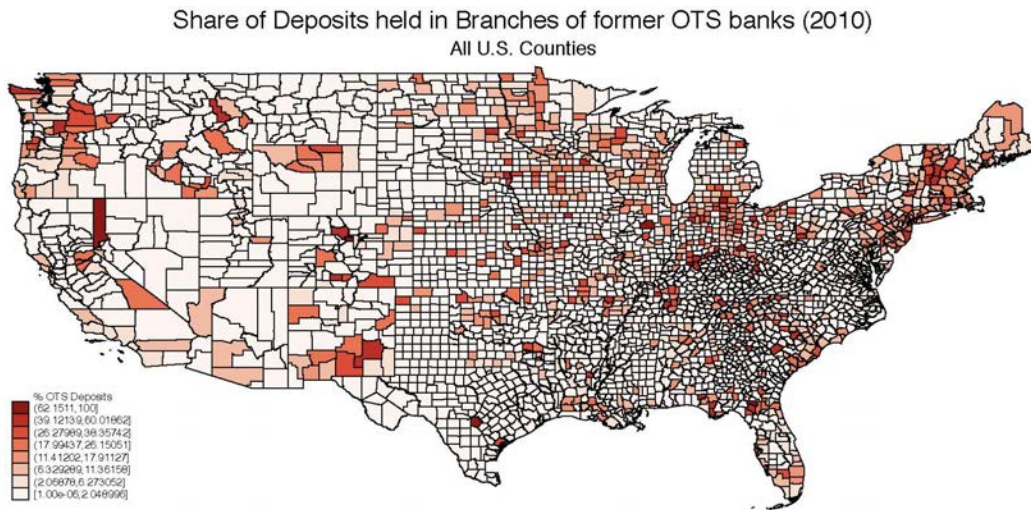All U.S. Counties

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 β_t from expanding the model specification in column (2) of Table 14 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 β_t from expanding the model specification in column (4) of Table 14 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.
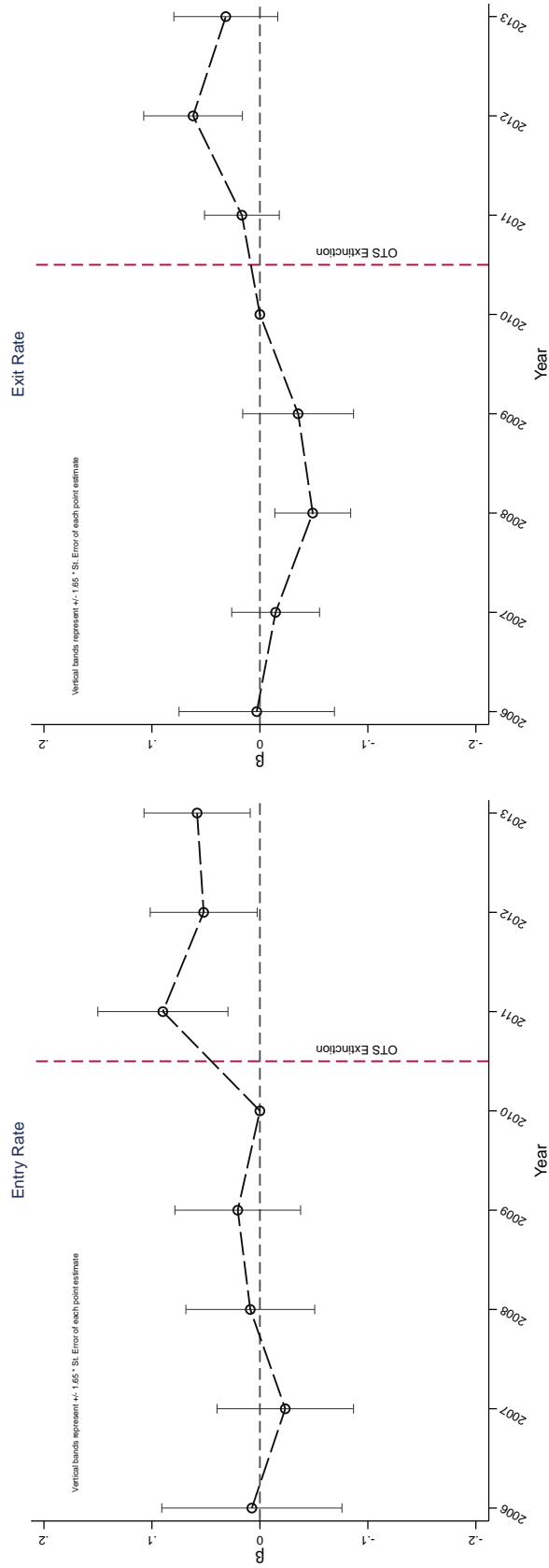
Table E.1: OTS Extinction, Entry and Exit, and Dependence on External Finance

Table E.1 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 *, repr esent 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. *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). *Ln(Total Assets)* is the natural logarithm of the total assets of the bank. 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)
	Ln(Total Loans)			
OTS × Post	0.228***	0.135***	0.243***	0.162***
	(0.041)	(0.039)	(0.050)	(0.049)
Ln(Total Assets)	0.002	0.198***		
	(0.017)	(0.019)		
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 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 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 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. 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). 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)	(5)	(6)
	Δ SBL Amount		SBL Amount/Total Assets		Trimmed Ln(Amount)	
OTS $\times$ 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