

Competition and agency problems within banks: Evidence from insider lending

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September 2021, WP #831

ABSTRACT

This paper studies whether greater competition can mitigate agency problems within banks. We measure the intensity of the agency conflict within a bank by the volume of loans that the bank lends to its insiders (e.g., executives). We first check that these loans are a form of private benefit. By exploiting interstate branching deregulation, we then show that banks react to greater competition by reducing insider lending, especially when the entry of new competitors may more strongly affect bank profitability. Results are robust to using various identification approaches and alternative indicators of agency conflict. We conclude that competitive pressure reduces managerial self-dealing.

Keywords: Banks, Agency Problems, Private Benefits, Competition, Insider Loans.

JEL classification: G21, G28, G38.

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We would like to thank Elena Beccalli, Ettore Croci, Alberta Di Giuli, Johan Hombert, Björn Imbierowicz, Augustin Landier, Giovanni Petrella, and seminar participants at the ESCP Corporate Finance Webinar, the 4th Annual Workshop of the ESCB Research Cluster 3, and at the Catholic University of Milan for helpful comments. Salvadè acknowledges that part of this work was achieved through the Laboratory of Excellence on Financial Regulation (Labex ReFi) supported by PRES heSam under the reference ANR-10-LABX-0095.

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NON-TECHNICAL SUMMARY

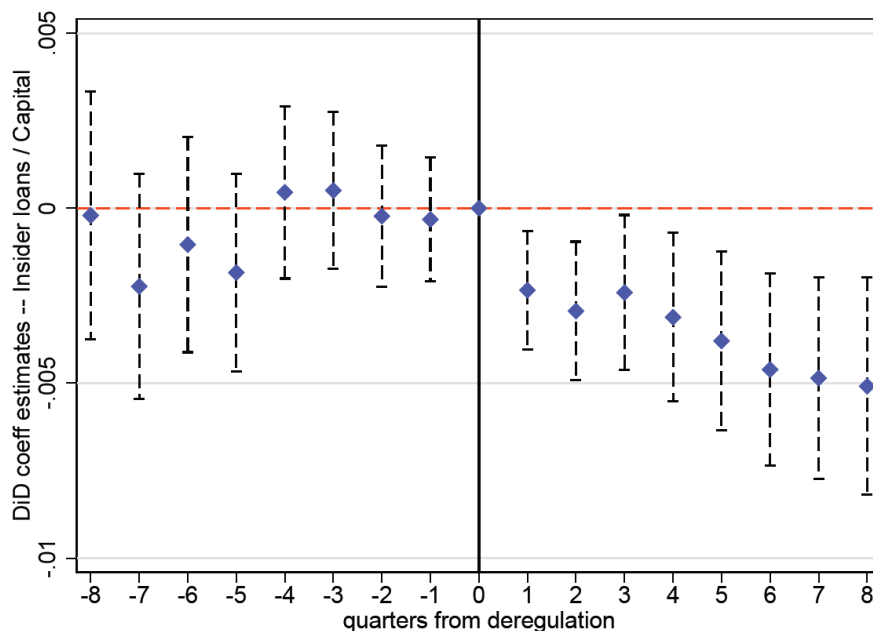
The separation of ownership and control within a corporation generates agency problems. In the banking industry, insiders' opportunistic behavior may be further exacerbated by the presence of deposit insurance, which reduces debtholders' incentives to monitor bank management. In this paper, we test whether competition can act as a spontaneous market force to reduce agency problems within banks.

We consider quarterly data on the universe of US commercial banks and thrifts from 1994Q2 to 2005Q2. Our proxy for the agency conflict within a bank, and, specifically, for the private benefits extracted by bank insiders, is the volume of loans that the bank lends to its executive officers, directors, principal shareholders, and their related interests (e.g., a company controlled by a director).

Our analysis starts by evaluating whether these loans are private benefits related to agency problems. We show that the volume of insider loans is larger in banks with high free cash flows and low growth opportunities: according to Jensen (1986), it is precisely in such institutions that insiders are more likely to extract private benefits. We also show that greater insider lending is associated with lower bank productivity and profitability. These results support the view that insider lending is a manifestation of self-dealing.

We then analyze the effect of competition on insider lending. We exploit the staggered relaxation of interstate branching restrictions: The Interstate Banking and Branching Efficiency Act (IBBEA) of 1994 favored the penetration of out-of-state banks in local banking markets and significantly increased the number of branches in each state. The relaxation of the constraints was, however, implemented at different points in time and with different intensity across states, enabling us to draw causal inferences.

Figure: Effect of greater competition on insider lending.



Notes: Time 0 is the last quarter before the bank's home state deregulates and is taken as the reference quarter. The sample period is 1994Q2 – 2005Q2. Confidence intervals are obtained by clustering standard errors at the bank level.

In our baseline difference-in-differences approach, we compare the level of insider lending between commercial banks headquartered in different states, which are thus exposed to different degrees of local banking market contestability depending on whether and how the home state implemented the IBBEA, at the same point in time. The figure summarizes our findings. The blue dots describe the evolution of insider lending depending on the time distance from the quarter in which the bank's home state deregulates (i.e., passes at least one of the provisions in line with the IBBEA for the first time). The figure also reports 95% confidence intervals. It appears very clearly that a significant decrease in the lending to insiders starts exactly after the bank's home state deregulates, and that the reduction amplifies the more time passes from deregulation. Overall, our estimations indicate that following full deregulation, the average bank decreases insider lending by at least 3.2%.

We find confirmation that the mechanism underpinning our results hinges precisely on bank competition by checking that the reduction in insider lending is more pronounced for banks that are a priori more challenged by the entry of new competitors. Then, we corroborate our findings in multiple ways. We address potential endogeneity concerns from a variety of angles, and consider an instrumental variables approach. Also, we explore whether using alternative measures of agency conflict delivers similar results.

Overall, in this paper we provide the first empirical evidence on the effect of greater local banking market contestability on the consumption of private benefits by bank insiders. All our results confirm that greater competition enforces discipline on bank insiders.

Concurrence et problèmes d'agence au sein des banques : Une illustration à partir de l'octroi de prêt en interne

RÉSUMÉ

Cet article étudie dans quelle mesure une concurrence accrue peut atténuer les problèmes d'agence dans le secteur bancaire. Nous mesurons l'intensité du conflit d'agence au sein d'une banque par le volume de prêts que la banque octroie à ses principales parties prenantes internes (comme les membres de son équipe dirigeante). Nous vérifions d'abord que ces prêts prennent la forme d'un bénéfice privé. Puis, en exploitant une vague de dérégulations bancaires aux US, nous montrons que les banques réagissent à une concurrence accrue en réduisant ces prêts internes, en particulier lorsque l'entrée de nouveaux concurrents pourrait affecter plus fortement la rentabilité des banques. Les résultats sont confortés par le recours à diverses approches d'identification et à des mesures alternatives de conflit d'agence. Nous concluons que la pression concurrentielle limite les opérations internes génératrices de bénéfices privés.

Mots-clés : banques, problèmes d'agence, bénéfices privés, concurrence, prêts en interne.

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I Introduction

The separation of ownership and control within a corporation generates agency problems (Jensen and Meckling, 1976). This means that corporate insiders may not always act in the best interests of the providers of the funds. Such misbehavior can take different forms ranging from low managerial effort to the extraction of private benefits and result in a waste of corporate resources and a reduction in corporate earnings. In the banking industry, insiders' opportunistic behavior may be further exacerbated by the presence of deposit insurance, which reduces debtholders' incentives to monitor bank management. In this paper, we test whether competition can act as a spontaneous market force to reduce agency problems within banks. Specifically, we provide the first empirical evidence on the effect of greater local banking market contestability on the consumption of private benefits by bank insiders.

Our proxy for the private benefits extracted by bank insiders is the volume of loans that the bank lends to its executive officers, directors, principal shareholders, and their related interests (e.g., a company controlled by a director). The first contribution of this paper lies in the evaluation of whether these loans are private benefits related to agency problems. We base our assessment on a battery of tests borrowed from Rajan and Wulf (2006). We show that the volume of insider loans is larger in banks with high free cash flows and low growth opportunities: according to Jensen (1986), it is precisely in such institutions that insiders are more likely to extract private benefits. We also show that greater insider lending is associated with lower bank productivity and profitability. These results support the view that insider lending is a manifestation of self-dealing. Based on this finding, we then analyze the impact of greater competition on agency problems within banks by assessing its effect on insider lending.

Since banks compete for loans and deposits, greater market contestability may lead to both higher deposit rates and lower loan rates and thus to a reduction in the intermediation margin. However, how bank insiders react to this threat to profitability is not obvious. On the one

hand, they may more efficiently use the funds they collect to protect bank profitability (Hart, 1983). As a consequence, insider lending may decline. On the other hand, since the likelihood of earning a high profit and consequently high dividends and salaries decreases, insiders' incentives to extract private benefits may increase, leading to greater insider lending (Golan et al., 2014).

We identify the causal effect of greater competition on insider lending by exploiting the staggered relaxation of interstate branching restrictions. The Interstate Banking and Branching Efficiency Act (IBBEA) of 1994 allowed commercial banks to establish branches outside their home state without requiring separate charters or capital. This favored the penetration of out-of-state banks in local banking markets and significantly increased the number of branches in each state (Célerier and Matray, 2019). However, the IBBEA left each state the possibility of implementing its provisions under more restrictive terms. As reported by Johnson and Rice (2008), between 1994 and 2005, states gradually moved towards a relaxation of the constraints but in a staggered way. This generated both cross-sectional and time-series variation in local banking market contestability, enabling us to draw causal inferences. Following Rice and Strahan (2010), we construct a *competition index*, which captures the number of provisions in line with the original act that a given state has passed at a given quarter.

We consider quarterly data on the universe of US commercial banks and thrifts from 1994Q2 to 2005Q2. Our main identification approach is the following difference-in-differences: we compare the level of insider lending between commercial banks headquartered in states with different levels of the competition index, which thus experience different degrees of competition, at the same point in time. As a useful sanity check, we also consider a triple-difference-in-differences approach. We build on the fact that the IBBEA legally affected commercial banks but not thrifts and on previous evidence indicating that customers substitute between commercial banks and thrifts only to a limited extent (Adams et al., 2007; Girotti and Meade, 2017). The combination of these two elements implies that the entry of new commercial banks into a local market should primarily affect incumbent commercial banks. We can then compare the level of insider lending

of commercial banks with that of thrifts with stock ownership headquartered in the same state as a function of the competition index of that state. A key feature of this estimation approach is that we can include a state-time fixed effect, which is a good control for state-specific dynamics. We find that greater competition causes *less* insider lending. This finding is confirmed by both empirical approaches. The effect is quantitatively meaningful: following full deregulation, the average bank decreases insider lending by at least 3.2%.

Next, we check whether the mechanism underpinning our results hinges precisely on bank competition. We do so by testing whether the reduction in insider lending is more pronounced for banks that are a priori more challenged by the entry of new competitors. We first differentiate among banks depending on their market power. The entry of new competitors is a threat to monopolistic rents. Therefore, especially dominant banks and banks located in more concentrated markets should reduce wasteful corporate practices to preserve their level of profitability. We also differentiate among banks depending on their funding structure. Branching deregulation translated into greater competition for local deposits. Banks that obtained a larger part of their funding in the form of local retail deposits were thus more exposed and experienced a greater risk of not being able to fund profitable investments. This means, in particular, that such banks should make wiser use of the scarce resources collected. In line with our conjectures, we find that the competition index has more pronounced effects on banks with greater market power and on banks that rely more heavily on retail deposit funding. This corroborates the idea that banks reduce insider lending precisely to cope with greater market contestability.

Clearly, the estimated effects can be interpreted as causal only if branching deregulation is exogenous to insider lending. We address potential endogeneity concerns from a variety of angles. We first dismiss the concern of reverse causality. Following Kroszner and Strahan (1999), we estimate a duration model to determine which state-level factors explain the timing of interstate branching deregulation across states. The estimations suggest that insider lending does not drive deregulation. We then address the concern of endogeneity due to omitted vari-

ables: we include all determinants of deregulation identified by Kroszner and Strahan (1999) as additional explanatory variables in our difference-in-differences, and we conduct placebo tests similar to those developed by Cornaggia et al. (2015). Finally, we address residual endogeneity concerns by implementing an instrumental variable estimation. Our results are robust to all these checks.

Finally, we explore whether using alternative measures of agency conflict delivers similar results. We establish that greater competition reduces managerial rent extraction in bank executive compensation and diminishes investment and operational inefficiencies. Overall, these results confirm that greater competition enforces discipline on bank insiders.

This paper is related to several strands of literature. The first strand includes empirical analyses of whether market forces can shape managers' incentives or even substitute for governance mechanisms (Chhaochharia et al., 2017; Giroud and Mueller, 2011). These studies emphasize that when they are less likely to be disciplined by market forces, corporate managers engage in value-destroying operations more often (Masulis et al., 2007) or prefer to enjoy the quiet life (Bertrand and Mullainathan, 2003; Giroud and Mueller, 2010). In the specific case of banks, when competition is low, Berger and Hannan (1998) and Koetter et al. (2012) find that cost and profit efficiencies are also low. While these studies assess the effect of competition on agency problems from the angle of investment and operational inefficiencies, we are, to the best of our knowledge, the first to empirically investigate the link between market contestability and private benefits. Our primary contribution to the literature lies in discovering that greater competition reduces corporate self-dealing.

This paper also contributes to a large literature that focuses on the effects of banking deregulation.¹ Existing analyses show that interstate branching deregulation led to a reduction in corporate loan rates (Chu, 2018) and in banks' intermediation margin (Dick, 2006) but had no effects on the volume of loans and bank profitability (Dick, 2006; Rice and Strahan, 2010). The

¹See, e.g., Jayaratne and Strahan (1996), Stiroh and Strahan (2003), and Kroszner and Strahan (2014).

fact that banks maintained profitability while they experienced a reduction in the intermediation margin suggests improved profit efficiency, which has also been documented by Berger and Mester (2003). Our findings provide one further step towards understanding this process: when challenged by greater competition, banks reduce profit inefficiencies by constraining managers' self-dealing behaviors.

Finally, since insider lending has been shown to relate positively to the risk of bank failure (e.g., General Accounting Office, 1994; La Porta et al., 2003), this paper also connects with the literature on the effect of competition on bank risk. Two alternative views have emerged in the literature. The competition-fragility view argues that by decreasing profit margins, greater competition increases banks' risk taking (Beck et al., 2006; Jiménez et al., 2013). Conversely, the competition-stability view argues that greater competition decreases the bank risk profile and improves banks' asset quality (Boyd and De Nicro, 2005; Goetz, 2018). Our findings support the competition-stability view and contribute to this literature by showing that one underpinning mechanism lies in the way greater competition affects agency problems within banks, specifically the extraction of private benefits by bank insiders.

The remainder of this paper is organized as follows. Section II reviews the relevant theoretical literature and defines the testable hypotheses. Section III describes the sample and tests whether insider loans are private benefits. Section IV details interstate branching deregulation and our identification strategy. Section V presents the results and the robustness checks we conduct. Section VI validates our results using alternative measures of agency conflict. Finally, Section VII concludes the paper.

II Theoretical Background and Testable Hypotheses

Banks compete for raising deposits and for providing loans. Greater competition can lead to an increase in deposit rates and to a reduction in loan rates, thereby threatening banks' franchise value (Demsetz et al., 1996). The question we ask is whether, given this threat to

profitability, greater competition can reduce managers' incentives to divert corporate resources for their personal benefit. The theoretical literature provides mixed results: managers can react in opposing ways when corporate revenues become more uncertain due to greater competition.

The first way is that they might implement operations associated with higher profit efficiency to protect (or increase) the firm's profitability and market share. Hart (1983) shows that managers who must meet profit targets have less space to engage in opportunistic behaviors when competition increases. Although Scharfstein (1988) establishes that Hart's result strongly depends on the model assumptions, Schmidt (1997) identifies the conditions under which, by threatening firm profitability and increasing the risk of firm liquidation, greater competition unambiguously induces managers to work harder and to implement cost-reducing activities.

Managers may react in a second, opposing, way. According to Golan et al. (2014), a higher degree of competition can increase managerial slack and the extraction of private benefits. Schmidt (1997) explains that greater competition can in fact reduce the profitability of implementing cost-reducing activities and induce managers to exert less effort. Additionally, Willig (1987) predicts that greater competition can exacerbate agency problems when it reduces the demand faced by the firm.

These opposing views lead us to two testable hypotheses regarding the effect of greater competition on agency problems when the firms considered are banks:

Hypothesis 1 Greater competition leads bank managers to more efficiently use the funds they collect, which implies less extraction of private benefits by insiders.

Hypothesis 2 Greater competition is associated with a lower likelihood of earning high profits and, consequently, of obtaining high dividends and salaries. Therefore, it induces bank insiders to extract more private benefits.

The empirical analysis we will conduct has the objective of testing which hypothesis prevails.

III Data

A Sample Description

We collect balance sheet and income statement information on the universe of banks insured by the Federal Deposit Insurance Corporation (FDIC). The sample includes both commercial banks and thrifts, filers of either the Reports of Condition and Income (Call Reports) or the Thrift Financial Reports. This information is available on the website of the FDIC under the Statistics on Depository Institutions (SDI) dataset on a quarterly basis. The period we consider is from 1994Q2 to 2005Q2, which includes significant changes in local banking market competition, as will be described in the following.

In the US, lending to bank insiders has been part of the focus of bank regulators and members of Congress since at least the 1970s. Indeed, the Financial Institutions Regulatory and Interest Rate Control Act set strict controls on insider lending transactions in 1978. By the end of 1992, such restrictions had crystallized into Regulation O, which applies to both state and federally chartered commercial banks, savings associations, and savings banks, not just member banks of the Federal Reserve System.²

Regulation O defines an insider loan as any extension of credit by a bank to its executive officers, directors, principal shareholders, or their related interests (e.g., a company controlled by a director). This regulation has the objective of limiting insider lending, and in Subsection Z.A of the Online Appendix, we detail its main prescriptions. In brief, Regulation O imposes that insider loans must be made on the same terms (including interest rate and collateral) as those prevailing for comparable transactions with other clients. It also stipulates that every bank may lend to insiders up to the amount of the bank's Tier 1 and Tier 2 capital.

By regulation, each bank must report the amount of insider loans outstanding. This is

²The Office of the Comptroller of the Currency (at 12 C.F.R. § 31.2), the FDIC (at 12 C.F.R. § 337.3), and the Office of Thrift Supervision (at 12 C.F.R. § 563.43) have each promulgated regulations subjecting the banks they regulate to Regulation O.

included in the SDI dataset as item *lnexamt*. Following the lending limit set by Regulation O, we define as a baseline measure of insider lending activity the ratio of insider loans to the sum of Tier 1 (item *rbct1j*) and Tier 2 capital (item *rbct2*). This ratio describes the extent to which a bank engages in insider lending given its actual capacity to do so. As an alternative measure, in line with Goetz et al. (2013), we consider the ratio of insider loans to total loans (item *lnlsnet*).

Throughout our analysis, we employ several other variables: the quarterly return on assets, the number of deposits managed per employee, the log of total assets, the ratio of retail deposits to total assets, and the ratio of Tier 1 capital to risk-weighted assets. Table Z1 of the Online Appendix provides the definitions of all these variables based on the SDI item codes. For each variable, we drop the values below the first percentile and above the 99th percentile.³

We complement the SDI dataset with information derived from the Summary of Deposits (SOD) dataset. This dataset, which is also made available by the FDIC, displays every branch location of every FDIC-insured bank (irrespective of whether it is a commercial bank or thrift) and the amount of deposits collected therein as of June 30 of every year. We use SOD to derive two proxies for bank market power: the normalized Herfindahl-Hirschman Index (HHI) of the local deposit market in which the bank operates and the bank's local deposit market share, both defined based on the amounts of deposits raised. We define local deposit markets as counties.⁴ When banks operate in more than one county, we compute a weighted average based on the amount of deposits collected in each county. Since SOD is available only at a yearly frequency, we attribute the values as of June 30 of a given year not only to the second quarter of that year but also to the subsequent three quarters.

As we discuss in the following, to ensure that the thrifts in the sample have a governance structure similar to that of commercial banks, we retain only thrifts with stock ownership. We

³We derive the values corresponding to the first and 99th percentiles for each quarter. We thus allow the distribution of each variable to change over time.

⁴We choose counties and not metropolitan statistical areas (MSAs) for urban markets based on the results of Célerier and Matray (2019): These authors show that there are significant differences in access to banking services across the counties within the same MSA, implying that the banking market is more local than the MSA.

present the summary statistics of our sample in Table I. On average, a commercial bank lends 0.125 units of capital to insiders. This activity attains a lower level in stock thrifts, which on average lend to insiders 0.05 units of capital. In commercial banks, insider loans represent slightly more than 2% of total loans. Relative to thrifts, on average, commercial banks collect more retail deposits, are more profitable and less capitalized and slightly smaller.

B Insider Loans and Private Benefits

We start by analyzing whether insider loans represent a misuse of bank resources and are insiders' private benefits. To confirm this *agency view* of insider lending, we implement a battery of tests in the spirit of those developed by Rajan and Wulf (2006).

Managerial excess is not the only possible explanation for insider lending. It could be that insider loans are part of an incentive package to reward or induce insiders to behave in the best interests of the bank (*incentive view*). We discriminate between these views by focusing on the cross-section of commercial banks as of 1994Q2, which is the last quarter before significant changes in local banking market contestability were realized. We regress our baseline measure of insider lending activity on selected bank characteristics. The aim of this analysis is not to identify casual links but rather to check whether insider lending is more present under some bank characteristics. In all estimations, we include state fixed effect to control for differences in average insider lending across states and regulator fixed effects to control for regulators' behavior (Rosen, 2003).

We start by examining whether insider lending is a way to incentivize or reward managers. If this were the case, insider lending should be conducive to higher profitability and higher productivity. We measure bank profitability by the quarterly return on assets. Although it is difficult to derive simple measures of productivity for banks from their balance sheets, we consider the number of deposits managed per employee. The idea is that deposits are a key output for banks, and servicing them requires effort. A greater number of deposits managed

per employee is therefore indicative of higher productivity. As shown in columns (1) and (2) of Table II, the coefficients on the return on assets and the number of deposits managed per employee are both negative and statistically significant, suggesting that insider lending attains higher levels in less profitable and less productive banks. These results reject the incentive view.

Column (3) shows that these findings hold if we control for the log of bank total assets, which serves as a proxy for bank size. Its coefficient is positive and statistically significant at the 10% level. This is in line with the agency view for at least two reasons. First, a larger amount of resources may offer insiders greater opportunities to pursue private benefits at the expense of minority shareholders (Zhang et al., 2015). Additionally, the organizational structure becomes more complex with size, leading to greater asymmetric information and to less effective monitoring of the bank's management (Goetz et al., 2013).

We validate the agency view as follows. Based on the Jensen and Meckling (1976) agency theory, Jensen (1986) predicts that managers are more likely to misappropriate corporate resources in firms with high free cash flows and low growth opportunities. Indeed, since they do not need to raise funding and have few alternative investment opportunities, such firms are less subject to the monitoring activity of outside investors. This implies that if insider loans are private benefits related to agency problems, they should be greater in volume in banks with higher cash flows and fewer investment opportunities.

We measure bank cash flows by the sum of pretax net operating income and loan loss provisions. We proxy for each bank's investment opportunities by the deposit-weighted average personal income growth from 1994 to 1997 of the counties in which the bank operates in 1994Q2.⁵ The idea is that banks more exposed to booming areas have a greater opportunity to expand their lending and deposit activities. Following Rajan and Wulf (2006), we also compute an indicator variable called *Jensen*, which identifies banks with free cash flows above the sample median and growth opportunities below the sample median.

⁵County-level personal income information is from the Bureau of Economic Analysis.

The estimated coefficients on these variables are shown in columns (4) and (5) of Table II. In line with the agency view, the volume of insider loans is positively related to the bank’s cash flows and negatively related to the bank’s growth opportunities (column (4)). Importantly, column (5) shows that *Jensen* enters positively and its coefficient is statistically significant: the volume of insider loans is larger in banks characterized by the combination of high cash flows *and* few growth prospects. Similar results emerge in column (6), when we use the ratio of insider loans to total loans as the dependent variable.

These tests validate the idea that insider loans are a form of private benefit. In Subsection Z.B of the Online Appendix, we review a few empirical results obtained in the literature on the relationship between insider lending and bank risk. In line with our findings, it appears that high levels of insider lending are often associated with poor administration by bank management and a high risk of failure. Overall, this suggests that the volume of insider loans lent by a bank can be used as a proxy for agency problems within the bank.⁶

IV Empirical Strategy

A Interstate Branching Deregulation

Until at least the 1980s, US regulation limited the ability of commercial banks to expand geographically. It affected both *intrastate* (i.e., within state borders) and *interstate* (i.e., across state borders) banking and branching operations (Kane, 1996; Johnson and Rice, 2008). Banking operations refer to the establishment or acquisition of a separate charter, while branching operations refer to the establishment or acquisition of a branch office that is not separately chartered or capitalized. The environment changed with the Riegle-Neal IBBEA of 1994.

IBBEA’s provisions targeted both banking and branching operations. First, the act removed the last vestiges of state restrictions on interstate bank acquisitions that the wave of deregulation

⁶Note that the agency costs implied by insider loans are borne especially by *minority* shareholders. As explained by Laeven (2001), bank managers indeed have an incentive to favor large shareholders when engaging in insider lending. For this reason, Regulation O includes the loans to the bank’s large shareholders within the category of insider loans.

lation of the 1980s had progressively relaxed.⁷ Second, in terms of interstate branching, the act permitted the consolidation of existing out-of-state subsidiaries, which would have become branches of the lead bank of an existing multibank holding company (MBHC), and *de novo* branching.

The date of effectiveness for interstate branching provisions was set to June 1, 1997, and states could ‘opt in early’ or ‘opt out’ by passing state laws any time between September 1994 and June 1, 1997 (trigger date). While by opting out, states would not have allowed any cross-border branching, by opting in early, states had the possibility to set restrictions relative to the original provisions contained in the act. Thus, while opening the way to interstate branching, the IBBEA gave states considerable leeway on how to permit it.

States could set stricter provisions on four subjects. They could set a minimum age requirement for the institution object of consolidation, not to exceed 5 years. They could decrease the statewide deposit cap, set in the act to 30%. Finally, on the *de novo* branching and on the acquisition of individual branch provisions, states needed, if willing, to explicitly opt in.

Clearly, setting stricter provisions relative to those contained in the IBBEA would have erected anti-competitive barriers and restricted entry. Between 1994 and 2005, as reported by Johnson and Rice (2008) and Rice and Strahan (2010), states, even in the case of early opt out, gradually moved towards a relaxation of the constraints. However, the changes were not uniform, and at the same point in time, some states were more deregulated than others.

Building on Rice and Strahan (2010), we construct a *competition index* that measures how many provisions in line with the IBBEA a given state has passed at a given point in time in the period from 1994Q2 to 2005Q2.⁸ The index ranges from 0 to 4, with 4 being the most

⁷Expansions were then conditional on fulfilling federal level requirements. First, the acquiring multibank holding company had to be ‘adequately capitalized’ and ‘adequately managed’. Second, the deposits managed by the holding company after the acquisition should have not exceeded the national cap of 10% of total deposits insured by the FDIC. Third, the resulting holding company should have not exceeded a statewide cap of 30% of total deposits in the state. State restrictions could target the minimum age of the acquired bank (not to exceed 5 years). These provisions became effective on September 29, 1995, even if in conflict with state laws.

⁸For comparison, the index created by Rice and Strahan (2010) is based on how many of the four barriers each state has set at a given point in time. That index is thus specular to ours.

deregulated setting. Table Z2 of the Online Appendix reports the time-varying index for each state, together with the dates at which the state changed its legislation.

B Econometric Approach

The process of branching deregulation offers us an ideal setting to test whether and how bank competition affects insider lending. Indeed, to the extent that it measures the ease of entry in the banking market of a state, the competition index is a shifter for the degree of competition of that market. This brings us to the following difference-in-differences equation:

$$insider\ lending_{jt} = \beta\ competition\ index_{st} + \delta X_{st} + \theta Z_{jt} + \eta_j + \eta_t + \varepsilon_{jt} \quad (1)$$

where $insider\ lending_{jt}$ denotes either the ratio of insider loans to the sum of Tier 1 and Tier 2 capital (our baseline measure of insider lending) or the ratio of insider loans to total loans. $competition\ index_{st}$ measures how many provisions in line with the IBBEA the home state s of bank j has passed at time t . The higher the index is, the higher the degree of bank competition in the state. X_{st} includes state-time-specific control variables, while Z_{jt} includes bank-time-specific control variables. η_j is the bank fixed effect, while η_t is the time fixed effect. ε_{jt} denotes the idiosyncratic error term.

X_{st} includes the level and first difference of the log of state quarterly personal income. Z_{jt} includes controls for bank market power: the log of the HHI of the local deposit market in which the bank operates and the log of the bank's local deposit market share. It also includes proxies for bank profitability (quarterly return on assets), size (log of total assets), funding structure (ratio of retail deposits to total assets), and risk (ratio of Tier 1 capital to risk-weighted assets), both in levels and in first differences.⁹ The bank fixed effect controls for all bank characteristics that are not time-varying in the period analyzed, for example, the bank business model. The

⁹The objective is to capture the bank's dynamics over time.

time fixed effect controls, instead, for aggregate shocks and common trends affecting the banking industry.

The parameter of interest in Equation (1) is β . It captures how the degree of contestability of the banking market in which the bank is headquartered (and has most of its activities) affects the bank’s insider lending activity. We will estimate Equation (1) on the sample of commercial banks only. Indeed, the regulation on branching restrictions, and consequently its staggered removal, affected these institutions but not other lenders. The identification of β works by comparing the insider lending dynamics of commercial banks headquartered in different states, which consequently experience different degrees of relaxation of the interstate branching restrictions over time. Note that the bank fixed effect absorbs the ‘treated’ dummy of standard difference-in-differences models, while the time fixed effect absorbs the overall deregulation trend experienced by all banks in the period, irrespective of the state in which they are headquartered.

The fact that the regulation on branching restrictions applied only to commercial banks offers us a second source of identification. When a state deregulates and allows entry of out-of-state banks, the new entrants are commercial banks. As consumers substitute between commercial banks and thrifts only to a limited extent (see, e.g., Adams et al. (2007) and Girotti and Meade (2017)), the new entrants especially challenge incumbent commercial banks. The *intensity* of the deregulation treatment should then be greater for commercial banks. This argument leads us to the following triple-difference-in-differences equation:

$$\begin{aligned}
 \textit{insider lending}_{jt} &= \gamma \textit{competition index}_{st} \times \textit{comm}_j \\
 &+ \zeta X_{st} \times \textit{comm}_j + \theta Z_{jt} + \lambda Z_{jt} \times \textit{comm}_j + \eta_j + \eta_t \times \textit{comm}_j + \eta_{st} + \varepsilon_{jt}
 \end{aligned} \tag{2}$$

where \textit{comm}_j is a dummy 0/1 capturing whether credit institution j is a commercial bank.

The identification strategy behind Equation (2) is to benchmark the insider lending dynamics of commercial banks with that of thrifts headquartered in the same state. The key parameter of interest γ captures the *differential* effect that the greater competition has on commercial banks

relative to that it has on thrifts. To make the comparison of the two types of credit institutions appropriate and not contaminate γ with the effect of confounders, we need to allow the other explanatory variables to have a different effect on the two types of credit institutions. For this reason, Equation (2) includes the interactions of X_{st} , Z_{jt} , and η_t with $comm_j$.¹⁰

There is a key difference between Equation (1) and Equation (2). Since in Equation (2) the comparison is between institutions headquartered in the same state, which we hypothesize may experience a different intensity of the treatment, we can include the state-time fixed effect η_{st} . Its inclusion is a key advantage of the triple-difference-in-differences approach. Indeed, it allows us to fully partial out the effect of every state-specific time-varying factor, for example local economic dynamics. Of course, under the hypothesis that the factor affects commercial banks and thrifts' insider lending in the same way.

However, the inclusion of η_{st} does not permit us to assess the effect that the competition index has on thrifts. This could be problematic if deregulation strongly affected *all* institutions with a similar magnitude. If that were the case, by bringing Equation (2) to the data, we would find an estimate of γ not significantly different from zero. We would then draw an incorrect conclusion on the effect of deregulation. This is why we prefer to keep the difference-in-differences as a baseline approach and consider the triple-difference-in-differences as a useful sanity check to reach a more robust conclusion.

The identifying assumption of the triple-difference-in-differences is that the difference between insider lending of commercial banks and thrifts (headquartered in the same state) would follow the same trend in all states in the absence of the deregulation process. Since the ownership type may imply differences in the governance structure and thus affect the insider lending activity of the credit institution, we exclude thrifts with mutual ownership from our analysis.

¹⁰The attribute of being a commercial bank is time-invariant for the majority of credit institutions. There are a few cases, however, in which an institution starts as a thrift and later becomes a commercial bank. In these cases, the bank fixed effect does not absorb the effect of belonging to a differentially treated group in the state. Therefore, to have a clean identification of γ , the equation that we bring to the data also includes the interaction of the state fixed effect η_s with $comm_j$.

In this way, we obtain a sample of credit institutions composed of commercial banks and thrifts with stock ownership, whose insider lending dynamics are more comparable.

V Results

A Main Result: Does Greater Competition Affect Insider Lending?

We start by presenting the results of the baseline difference-in-differences, which we report in columns (1) to (4) of Table III. Each column represents a different degree of saturation. In the most parsimonious setting (column (1)), in addition to the competition index, we only account for state and time fixed effects. In this setting, the ‘treated’ dummy is absorbed by the state fixed effect. In the most saturated setting (column (4)), we include bank and time fixed effects as well as state and bank controls. Effectively, this setting corresponds to Equation (1). Standard errors are clustered at the bank level to account for serial correlation within banks.

Overall, the four columns lead to the same conclusion: A higher degree of bank competition reduces insider lending. They thus provide support for Hypothesis 1. While we find that adding the bank fixed effect reduces the magnitude of the effect of the competition index, the estimated coefficient maintains its statistical significance in all columns. When we consider our alternative measure of insider lending in column (5), the result is unchanged. According to our most preferred setting (column (4)), the quantitative effect is considerable: for an average bank, which lends 0.125 units of capital, full deregulation (i.e., *competition index* = 4) implies a reduction in insider lending of 3.2%.

The competition index measures how many provisions in line with the IBBEA a given state has passed at a given point in time. It is likely, however, that the greatest reaction of banks is to the first deregulation move, while the reaction to additional adjustments is only marginal. Moreover, it could be that the increase in competition does not exactly coincide with the number of provisions passed in line with the IBBEA.

To test whether our results are robust to these two arguments, we construct the variable *Deregulation*. This is a dummy 0/1 that identifies whether a state has passed at least one of the provisions in line with the IBBEA at a given point in time. This dummy thus equals one after the first deregulation move and does not impose differences in the treatment intensity. We replace the competition index in Equation (1) with this alternative measure of deregulation and present the related estimation results in column (6). This measure of deregulation is negatively associated with insider lending, thus confirming our previous findings.

Columns (4) to (6) also report the parameter estimates on the log HHI of the local deposit market in which the bank operates and the log of the bank's deposit market share. While the coefficient on the former is statistically insignificant, that on the latter is positive, and in the case of columns (4) and (6), it is also statistically significant at 10%. This indicates that when the bank can exercise market power by virtue of its larger market share, it lends more to its insiders. This result provides further support for the hypothesis that insider lending and the degree of bank competition are negatively related. Moreover, the fact that it is the market share more than market concentration that alters insider lending provides some support for the idea that bank conduct is better explained by the relative-market-power paradigm than by the structure-conduct-performance paradigm.¹¹

B Timing the Impact of Deregulation

The identifying assumption behind our analysis is that branching deregulation is exogenously determined. This implies that changes in insider lending should not lead deregulation. While we devote Subsection V.E below to addressing potential endogeneity concerns in detail, we implement here a first test that consists of timing the impact of deregulation. Specifically, we check whether insider lending dynamics shows a pre-deregulation trend. If such a trend appeared, the validity and causality of the results presented in Table III would be compromised.

¹¹Berger (1995) details the differences between the two paradigms and studies which better explains the relationship between profits and structure in the US banking market. He also finds some support for the relative-market-power paradigm.

We bring to the data a modified version of Equation 1:

$$insider\ lending_{jt} = \sum_t \beta_t \mathbb{1}_{st}^{Dereg} + \eta_j + \eta_t + \varepsilon_{jt} \quad (3)$$

where we replace the competition index with a set of dummy variables $\sum_t \mathbb{1}_{st}^{dereg}$. $\mathbb{1}_{st}^{dereg}$ is equal to one t quarter after (or before if t is negative) the state s in which the bank is headquartered deregulates (i.e., passes at least one of the provisions in line with the IBBEA for the first time). $t = 0$ is the quarter immediately before the bank's home state deregulates and is taken as the reference quarter. By estimating the β_t coefficients, we can then assess at what point in time banks reduce lending to their insiders relative to the time their home state deregulates.

We estimate Equation (3) on the sample composed of commercial banks and by using our baseline measure of insider lending. Figure 1 plots the β_t coefficients for t between -8 and +8 (expressed in quarters). It appears very clearly that a significant decrease in the lending to insiders starts exactly *after* the bank's home state deregulates. Interestingly, the effect on insider lending materializes to a significant extent immediately after the bank's home state deregulates but also amplifies in magnitude the more time passes from deregulation.

Importantly, the level of insider lending is constant before deregulation, which is consistent with the assumption that changes in insider lending do not lead deregulation. Furthermore, the absence of a trend before time 0 also suggests that the effects that we find in Table III are *not* due to a pre-trend in the dynamics of insider lending. Overall, the dynamics in Figure 1 argues in favor of causality between deregulation and level of insider lending.

We provide a more formal test on the timing of the impact of deregulation in column (7) of Table III. For the sake of compactness, we replace the set $\sum_t \mathbb{1}_{st}^{dereg}$ with four dummy variables: one identifying more than 2 years before the bank's home state deregulates, one for the 2 years preceding such event, one for the 2 years following such event, and finally, one for more than 2 years following such event. We see that only the coefficients on the two latter dummies are

significantly different from zero. This confirms that the level of insider lending is constant in the pre-deregulation period. Only when their home state deregulates do banks react.

C Validation Of Results: Triple-Difference-in-Differences Estimation

We present the results related to the triple-difference-in-differences in Table IV. We start by commenting on columns (1) to (5). Each column represents a different degree of saturation. In the most parsimonious setting (column (1)), in addition to the competition index, we account for state and time fixed effects, together with their interactions with the dummy identifying commercial banks. The most saturated setting (column (5)) effectively corresponds to Equation (2).

The key coefficient is that on *competition index* \times *comm*. It measures the differential impact that the greater competition induced by deregulation has on commercial banks relative to that it has on stock thrifts. Consistent with our previous results, we find that commercial banks reduce insider lending in a significant manner in all settings considered. Relative to the difference-in-differences results, we find a greater magnitude of the effect: according to column (5), for the average bank, full deregulation implies a reduction in insider lending of 6.4%.

In columns (1) to (4), we do not include the state-time fixed effect. This enables us to estimate the coefficient on the competition index not interacted with the dummy *comm*. We find a statistically insignificant parameter estimate. This means that branching deregulation has no appreciable effect on stock thrifts' insider lending, suggesting that market conditions are unaltered for these institutions. Implicitly, this result corroborates the hypothesis that consumers substitute between commercial banks and thrifts only to a limited extent.

We challenge these triple-difference-in-differences results by considering our alternative measure of insider lending in column (6) and by replacing the competition index with the deregulation dummy in column (7). Both columns confirm the previous results. Taken together, these triple-difference-in-differences estimations indicate that the inclusion of the state-time fixed ef-

fect, and thus the removal of possible state-level confounders, does not alter our result that branching deregulation prompts commercial banks to reduce insider lending.

As indicated in Subsection IV.B, the identifying assumption of the triple-difference-in-differences approach is that the difference between insider lending of commercial banks and stock thrifts (headquartered in the same state) would follow the same trend in all states in the absence of the deregulation process. Clearly, this assumption cannot be tested. However, we can check how the difference between insider lending of commercial banks and stock thrifts evolve before and after deregulation. To do so, we modify Equation (2) as follows. We replace the competition index with the set of dummy variables $\sum_t \mathbb{1}_{st}^{dereg}$, where $\mathbb{1}_{st}^{dereg}$ is a dummy 0/1 taking a value of one t quarter after (or before if t is negative) bank j 's home state deregulates.¹²

Figure 2 plots the parameter estimates on the interaction terms for t between -8 and +8 (expressed in quarters). We see that the estimated coefficients are not significantly different from zero in the pre-deregulation period. This suggests that over that period the difference between insider lending of commercial banks and stock thrifts trends in the same way in all states (i.e., the gap between states is constant). This is consistent with the identifying assumption of the triple-difference-in-differences. Only when the state deregulates, the pattern modifies and there is indication that commercial banks reduce lending to their insiders. Column (8) of Table IV reports the estimation results related to a regression in which we replace $\sum_t \mathbb{1}_{st}^{dereg}$ with four dummy variables, each identifying a subperiod from deregulation. We see that the estimated coefficients on the two pre-deregulation periods are statistically insignificant. These results provide additional evidence in favor of our identifying assumption.

¹²Specifically, the modified equation is written as follows:

$$insider\ lending_{jt} = \sum_t \gamma_t \left(\mathbb{1}_{st}^{Dereg} \times comm_j \right) + \eta_j + \eta_t \times comm_j + \eta_{st} + \varepsilon_{jt} \quad (4)$$

D Characterization of the Mechanism

In this subsection, we test whether the mechanism that governs our findings hinges precisely on bank competition. Specifically, we investigate whether the reduction in insider lending following deregulation is more pronounced for banks that are a priori more challenged by the entry of new competitors.

D.1 Market Power

Operating in a more concentrated local market and/or holding a greater market share allow a bank to exercise market power and set higher lending rates and lower deposit rates to enjoy a higher intermediation margin (Demirgüç-Kunt et al., 2004). Existing evidence on the implications of IBBEA suggests that deregulation led to a reduction in corporate loan rates (Rice and Strahan, 2010) and in the intermediation margin (Dick, 2006). This means that banks with greater market power were especially exposed to the risk of a decrease in profitability. Our hypothesis is then that if the reduction in insider lending makes part of the process through which banks protect their profitability from new market conditions, it should be stronger in banks with greater power in their home market.

We measure the power that a bank can exercise in its home market by the normalized deposit HHI and by the deposit market share, both derived from only the counties in the bank's home state. We divide the sample of commercial banks between those below and those above the sample median for each of these two indicators, as evaluated at the quarter before the bank's home state deregulates. We bring Equation (1) to each subsample and use our baseline measure of insider lending as the dependent variable. Note that by separately estimating Equation (1) on each subsample, we allow for the effect of the competition index, as well as that of state and bank controls and the time fixed effect, to differ between the subsamples.

The results are displayed in columns (1) to (4) of Table V. We find that the coefficient on the competition index is statistically significant only in the case of banks with more concentrated

home markets (i.e., that display a higher HHI) and of banks with a greater market share in the home markets. Overall, this validates our predictions and supports the hypothesis that the reduction in insider lending is a reaction to the increase in local bank competition.

D.2 Reliance on Retail Funding

Branching deregulation brought greater competition to raise local retail deposits (Favara and Imbs, 2015). Clearly, incumbent banks that relied more on local retail deposits had a greater part of funding at stake: in the absence of any action on their part, the greater competition could have led to a lower ability to fund profitable investments and, possibly, to a consequent reduction in profitability. Conversely, banks that primarily funded themselves on the wholesale and bond markets were most likely unaffected, as the availability of such liabilities does not depend on local shocks.

Following this argument, our hypothesis is that if the increase in bank competition underpins our results, banks funded through retail deposits should especially react to deregulation and reduce their lending to insiders to make wiser use of the funds collected and offset the possible loss in profitability. We divide the sample of commercial banks based on the retail-deposit-to-total-asset ratio (measured the quarter before their home state deregulates) between banks below and banks above the sample median. We bring Equation (1) to each subsample and use our baseline measure of insider lending as the dependent variable.

The estimation results are reported in columns (5) and (6) of Table V. They confirm our hypothesis: the coefficient on the competition index is statistically significant only in the case of banks that rely more on retail deposit funding.

D.3 Lending Specialization

The entry of out-of-state banks was accompanied by a reduction in corporate loan rates (Dick, 2006; Rice and Strahan, 2010). However, it is likely that not all lenders suffered from the

same increase in competition in the loan market. Some lenders may have been insulated in light of their greater knowledge of their borrowers. Indeed, when a lender owns private information on its borrowers, the latter are less contestable and less likely to switch banks (Sharpe, 1990).

As emphasized in the literature, one case in which banks hold considerable private information on their borrowers is when they are specialized (Berger et al., 2017b). This provides us with an additional way to test whether bank competition is the reason that banks reduce insider lending. If that were the case, the effect of deregulation on insider lending should be stronger in less specialized banks, as these banks suffer more from the increase in competition in the loan market.

We consider as a measure of lending specialization the normalized HHI of a bank's loan portfolio. This index is derived from the sum of the squared shares of each loan category (for example, real estate loans) in the loan portfolio of a bank.¹³ An HHI equal to one means that the bank focuses on just one segment of the lending market, making it a very specialized lender. Conversely, an HHI close to zero means that the bank operates with equal weight in each segment of the lending market and is thus less specialized. We divide the sample of commercial banks based on this HHI (measured the quarter before their home state deregulates) between banks below and banks above the sample median. We bring Equation (1) to each subsample and use our baseline measure of insider lending as the dependent variable.

The results are displayed in columns (7) and (8) of Table V. We find that only in the case of less specialized banks is the coefficient on the competition index statistically significant. This means that primarily banks facing a greater threat to losing clients and thus experiencing a reduction in their profitability reduce lending to bank insiders.

In summary, the three cross-sectional tests just performed indicate that the impact of deregulation on insider lending hinges on market contestability: when they are challenged by the entry

¹³The loan categories in the loan portfolio are real estate loans, farm loans, commercial and industrial loans, loans to individuals, lease financing receivables, and loans to depository institutions.

of new competitors, banks reduce profit inefficiencies by decreasing insider lending.¹⁴

E Identification Concerns

We conclude our analysis on the impact of deregulation on insider lending by discussing a few identification concerns. In particular, we detail and address different sources of endogeneity (reverse causality and omitted variables), which may pollute our estimations.

E.1 The Effect of the Deregulation on the Lending to Non-Insiders

Our first concern is that the reduction in insider lending could be due to a general reduction in lending rather than to a change in insiders' behavior. This argument cannot explain the results we obtain when our measure of insider lending is the ratio of insider loans to total loans. Nonetheless, Subsection Z.C.1 and Table Z4 of the Online Appendix study the dynamics of the lending to non-insiders. We find no significant effect of the competition index and deregulation dummy. This validates the idea that banks reduce insider lending in response to greater competition because they consciously attempt to reduce wasteful corporate practices.

E.2 Reverse Causality

A plausible source of endogeneity in our context is reverse causality: It could be that states populated with banks that lend more to their insiders deregulate later. This would mean that insider lending causes deregulation, thus calling into question the validity of our findings. Although the absence of a pre-deregulation trend in insider lending (Figures 1 and 2) is reassuring, we develop here a more formal test.

Using a Weibull proportional hazards model, Kroszner and Strahan (1999) show that state-level interest group factors explain the timing of (intrastate) branching deregulation across states. We follow their same specification and study the 'time until interstate branching dereg-

¹⁴For robustness, Table Z3 of the Online Appendix reports the same tests but uses our alternative measure of insider lending as the dependent variable. We obtain very similar results.

ulation’ as a function of the following state-level variables: the fraction of banking assets held by small banks, the capital ratio of small banks relative to large banks, the share of state legislature that is Democratic, a dummy 0/1 indicating whether the governor is a Democrat, the size of the insurance sector relative to banking, and the fraction of small nonfinancial firms in the state. We complement this set of variables by the asset-weighted average level of insider lending and the difference in the insider lending level between small and large banks. By including these two variables, we can assess the extent to which the importance of insider lending activity at local banks actually delays or hastens the removal of branching restrictions by the state.¹⁵

We estimate the model on a dataset that includes one observation for each state in each quarter from 1994Q2 up to and including the quarter the state deregulates (i.e., passes at least one IBBEA provision for the first time).¹⁶ Table VI reports the ‘scaled’ coefficients issued from our estimations: each coefficient represents the percentage change in the time to deregulation for a one-unit change in the related covariate.¹⁷ Standard errors are clustered at the state level. Column (1) is the benchmark estimation, with only the variables proposed by Kroszner and Strahan (1999) being included. In line with Rice and Strahan (2010), we find that in the case of interstate branching deregulation, only the fraction of banking assets held by small banks appears relevant. Its coefficient indicates that the stronger small banks are in the state, the more deregulation is delayed. In columns (2) and (3), we add the two variables measuring local banks’ insider lending activity. Their coefficients are statistically insignificant, suggesting that insider lending does not explain the timing of deregulation across states. This important result dismisses the reverse causality concern and corroborates the causality of our baseline findings.

¹⁵The variables initially proposed by Kroszner and Strahan (1999) and the variables related to insider lending are defined precisely in Table Z1 of the Online Appendix. The table also reports the sources of the data. The summary statistics for all states from 1994Q2 to 2005Q2 are reported in Table I.

¹⁶In the Weibull proportional hazards model, the hazard rate function takes the form:

$$h[t, x(t), b] = h_0(t)\exp[x(t) b] \quad (5)$$

where $x(t)$ is a vector of time-varying covariates, b is a vector of unknown parameters, and the baseline hazard rate, $h_0(t)$, is pt^{p-1} with shape parameter p . The parameters b and p are estimated with maximum likelihood. The dataset we use to estimate these parameters includes all states, even if they have not yet been deregulated in 2005Q2, in which case the duration is right-censored.

¹⁷Precisely, the scaled coefficients are equal to $-b/p$, where b and p are defined in Equation (5).

We then exploit the duration model to set the basis for an instrumental variables strategy, which we detail in the following. The idea is that the timing of a past wave of deregulation could reflect additional persistent elements defining the political economy equilibrium in the state. If that were the case, the speed of deregulation of a state might be similar across subsequent waves. Based on this intuition, we study whether the timing of the deregulation that allowed the formation of multibank holding companies (hereafter named ‘MBHC deregulation’) explains the timing of interstate branching deregulation.

We obtain the years in which states passed MBHC deregulation from Kroszner and Strahan (1999).¹⁸ All states deregulated by the end of 1990: in fact, all states except one had done so by the end of 1985, which is quite well before the passage of the IBBEA. We normalize the years of MBHC deregulation to lie between zero and one, with zero being associated with the states that first deregulated and one being associated with the state that deregulated last.¹⁹ We include this variable as a determinant of the time to interstate branching deregulation in the duration model and present the estimation results in column (4) of Table VI. The coefficient on the normalized year of MBHC deregulation is positive and statistically significant. This means that the more a state delays MBHC deregulation, the more it delays interstate branching deregulation, thus providing support for our conjecture.²⁰

E.3 Omitted Variables

A second source of endogeneity is omitted variables. The triple-difference-in-differences results in Table IV are reassuring, as the state-time fixed effect controls for the average effect

¹⁸We report them in Table Z5 of the Online Appendix.

¹⁹The information on deregulation years is left-censored, as for several states, we only know that they deregulated by the beginning of 1970. We consider 1970 as the year in which states started to deregulate. 1990 is year in which the last state deregulated. The formula to normalize a variable x is $\frac{x-min}{max-min}$, with min and max denoting the minimum and maximum values, respectively, taken by x .

²⁰As a graphical illustration of the relationship between the timing of the two deregulations, Figure Z1 of the Online Appendix relates the quarter in which a state deregulates interstate branching (vertical axis) to the year in which the same state deregulates MBHC formation (horizontal axis). We find a positive relationship, which is also captured by the line of best fit. In particular, we observe that most of the states that were deregulated early on MBHCs deregulated early on interstate branching, while most of the states that had not yet deregulated on interstate branching in 2005Q2 deregulated late on MBHC formation.

on commercial banks and stock thrifts' insider lending dynamics of every state-level factor. However, they are prone to the critique that some unobservable state-level variable may actually affect *mainly* commercial banks: if that were the case, that unobservable would still have the possibility to drive the effect of the competition index even in the presence of the state-time fixed effect. Notably, one may be concerned that the Kroszner and Strahan (1999) factors affect both the process that generates deregulation and commercial banks' insider lending dynamics.²¹

We address this concern by including those determinants of deregulation as explanatory variables in Equation (1). We present the results in column (1) of Table VII. Relative to the baseline results in Table III, the parameter estimate on the competition index is unchanged in both magnitude and statistical significance. The same holds true for the deregulation dummy (column (4)).²²

Subsection *Z.C.2* and Table Z4 of the Online Appendix address the concern of omitted variables more generally by conducting two placebo tests. The idea is to *incorrectly* assign the deregulation events to the states. If our results were driven by unobservable shocks that are correlated with deregulation decisions, we should still observe that insider lending decreases after those placebo events. In contrast, if the effect disappears, we may be confident in our baseline results. We find that the two placebo indices have statistically insignificant effects on insider lending, thus corroborating our baseline findings.

E.4 Instrumental Variables Approach

As a final step towards addressing residual endogeneity concerns, we consider an instrumental variables approach. We derive a state-specific time-varying predicted probability of deregulation based on when the state passed MBHC deregulation and use it as an instrument for the competition index.

²¹For example, since it is a measure of the strength of small banks in the state, the fraction of banking assets held by small banks describes the structure of the state's banking market and may alter the ability of bank insiders to extract private benefits.

²²We do not report the coefficients on the added explanatory variables to save space and because they are all statistically insignificant.

We define the predicted probability of interstate branching deregulation as:

$$Pr(Deregulation_{st}) = [1 - norm(MBHC_s)] \times norm(t) \quad (6)$$

where $norm(MBHC_s)$ is the normalized year in which state s passed MBHC deregulation and $norm(t)$ is the normalized quarter t . With normalization, we rescale a variable to lie between zero and one. Hence, $Pr(Deregulation)$ also lies between zero and one.

The intuition behind $Pr(Deregulation)$ is the following. We assign a state a higher probability of interstate branching deregulation the earlier it passed MBHC deregulation. Moreover, we set this probability to increase linearly with the time elapsed since the passage of IBBEA. Therefore, states that deregulated earlier on MBHC formation are associated with an increasingly higher probability of interstate branching deregulation the more time has elapsed since the passage of IBBEA.

To be a valid instrument, $Pr(Deregulation)$ must correlate with the competition index but should not directly affect banks' insider lending dynamics in our sample period. We expect the relevance condition to be satisfied: On the one hand, the cross-sectional pattern of $Pr(Deregulation)$ reflects the results in Table VI, which indicate that the earlier a state deregulates MBHC formation, the earlier this state deregulates interstate branching. As we argue in Subsection V.E.2, this is because the timing of a past wave of deregulation reflects persistent elements that define the political economy equilibrium in the state. On the other hand, the time-series behavior of $Pr(Deregulation)$ mimics the empirical fact that most states progressively deregulate and relax restrictions in our sample period. Given these two characteristics, we expect $Pr(Deregulation)$ to correlate positively with the competition index.

Regarding the exclusion restriction, we find it plausible for three reasons. First, all states deregulated MBHC formation well before the beginning of our sample period, and as Kroszner and Strahan (1999) argue, MBHC deregulation had minor economic effects. It is therefore

unlikely that after 1994Q2, the insider lending dynamics of a bank directly depends on when the bank's home state passed MBHC deregulation. Second, our regressions include the bank fixed effect and control for every time-invariant characteristic of the bank's home state. We are hence partialling out the effect that the timing of MBHC deregulation might have on the bank's average level of insider lending in our sample period. Third, even if the dynamics of the bank's home state depended on the persistent elements that define the political economy equilibrium in the state and that correlate with the timing of MBHC deregulation, one should expect that mainly the dynamics of the state characteristics that we include as control variables would be directly affected: in particular, the state's personal income and political dynamics. By controlling for all those variables, we partial out the potential indirect effect on insider lending dynamics.

The first stage of the two-stage least squares (2SLS) approach appears in column (2) of Table VII. In line with our predictions, $P(Deregulation)$ is positively associated with the competition index, and its effect is strongly statistically significant. The second stage (column (3)) confirms our main finding: a greater degree of competition (as measured by the competition index) significantly reduces insider lending. The only difference relative to the OLS estimates in column (1) is that the magnitude of the effect is several times larger, suggesting that OLS results may be understated. However, such a difference between OLS and 2SLS estimates is not uncommon in the empirical literature.²³

We test for underidentification and report the Kleibergen-Paap rk LM statistic. This rejects the null hypothesis at the 1% level, suggesting that the instrument is relevant. We also conduct an F-test of the excluded instrument. The F-statistic rejects the null at the 1% level and indicates that the instrument is not weak. As a final robustness check, we replace the competition index with the deregulation dummy (columns (5) and (6)). Previous results are confirmed.

²³See, e.g., Levitt (1996).

VI Further Validation

This section investigates whether our findings are robust to using alternative measures of agency conflict within banks. The first measure we consider is the level of bank executives' compensation. Agency problems may lead to higher executive pay as a result of managerial rent extraction: according to the *rent extraction view*, managers have substantial power in the design of their compensation arrangement and use this power to extract rents from their firm in the form of higher compensation (Edmans et al., 2017). Hence, our prediction is that when competition intensifies, the level of bank executives' pay should decrease.

We collect top executives' compensation data from Compustat ExecuComp. Since ExecuComp only covers large, publicly traded US firms, our analysis is based on top executives in bank holding companies. The final sample includes 1,097 managers associated with 124 BHCs from 1994 to 2005.²⁴ We obtain a measure of total executive compensation by taking the sum of salary, bonus, equity-based compensation, perks and other compensation.²⁵ We then explicitly focus on the part of pay more vulnerable to rent capture. We define the aggregate 'perks and other compensation' as the sum of perks, contributions to the retirement plan, change-in-control payments, debt forgiveness, and other personal benefits.²⁶ According to prior studies, those forms of pay are indeed particularly susceptible to managerial power, more discretionary, and unrelated to performance (Grinstein and Hribar, 2004; Yermack, 2006; Stefanescu et al., 2018).

We study the impact of greater competition on the level of executive pay using the difference-in-differences approach (Equation (1)). The analysis is performed at the manager level, and the dependent variable is the log of one plus the amount of either total compensation or perks and other compensation. Since the constituent banks of a BHC could be located in different

²⁴Subsection Z.D of the Online Appendix provides details on the construction of our sample.

²⁵Table I reports the summary statistics of this sample, while Table Z1 of the Online Appendix provides variable definitions based on ExecuComp's item codes.

²⁶In our sample period, the disclosure of perks is required unless its aggregate value is less than \$50,000.

states before the passage of the IBBEA, we derive a BHC-specific competition index as the deposit-weighted average of the competition index of the states in which the constituent banks were located in 1994.²⁷ As control variables, we consider the HHI of the local deposit market in which the BHC operates, the log of the BHC’s local deposit market share, the return on assets (lagged), the log of the BHC value (lagged), the log of total assets (lagged), a dummy identifying whether the executive is CEO, a dummy identifying whether the executive is a member of the board of directors, the age of the executive, and BHC and time fixed effects.

Panel *a*) of Table VIII presents the estimation results.²⁸ Standard errors are clustered at the manager level. The dummy identifying whether the executive is a board member is a proxy for the power that the executive can exert to influence her compensation. Its parameter estimate is therefore a useful indicator of whether the rent extraction view can explain the level of bank executive pay. We find confirmation of this hypothesis, as being a board member is associated with higher compensation (both total pay and perks and other compensation).

For the effect of greater competition, we find that in the case of total compensation, the coefficient on the competition index (column (1)) and that on the deregulation dummy (column (2)) are both negative and statistically significant at 10%. In terms of economic magnitude, the estimation in column (1) implies that full deregulation reduces total compensation by approximately 11%. When we focus on the level of perks and other compensation, we also find that both the competition index and the deregulation dummy load negatively (columns (3) and (4)). However, the statistical significance of their coefficients increases, as does the implied economic magnitude: according to column (3), full deregulation reduces the amount of perks and other compensation by approximately 25%. These results indicate that greater competition reduces the level of bank executive compensation and thus mitigates agency conflict within banks. The

²⁷The weights are time-invariant and reflect the BHC’s branch location in 1994. This is to avoid the case in which the resulting competition index changes in response to the entry of BHC in new markets and not purely in response to the increase in competition in its home market. We repeat the same procedure to obtain a BHC-specific deregulation dummy.

²⁸To save space, we report only the coefficients on the competition index, on the deregulation dummy, and on the dummy identifying whether the executive is a board member.

result that the level of the part of pay more prone to rent extraction also decreases is a clear indication in that sense.²⁹

We then return to the sample of commercial banks from our main analysis and consider as a second alternative measure of agency conflict the average cost of operating a branch office. In fact, an additional way in which the management may not act in the bank's best interest is by enjoying the quiet life: managers may choose to avoid unpleasing operations such as bargaining with suppliers and labor unions or, more generally, tolerate cost inefficiencies (Berger et al., 1997; Giroud and Mueller, 2010). We measure the average cost of operating a branch office ('OPEX per branch') by the sum of salaries and employee benefits and premises and equipment expenses divided by the bank's number of branches. We then test whether greater competition reduces cost inefficiencies by implementing the difference-in-differences in Equation (1) with the log of the OPEX per branch as the dependent variable. The estimation results appear in columns (1) and (2) of Table VIII, panel *b*). In column (1), the coefficient on the competition index is negative and statistically significant at the 1% level. Similar results appear using the deregulation dummy (column (2)). These results suggest that greater competition is associated with greater cost efficiency.

As a last proxy for agency conflict, we use the degree of bank internationalization. Berger et al. (2017a) find that agency problems can explain the choice of bank managers to expand activities into foreign markets. That is, banks' international expansion reflects the managerial preference for empire building. Following the authors, we measure the degree of bank internationalization by the ratio of foreign assets to total assets and repeat our difference-in-differences model using that variable as a regressand. The estimation results appear in columns (3) and (4) of Table VIII, panel *b*). The coefficients on the competition index and deregulation dummy are both negative, but only that on the deregulation dummy is statistically significant (at 5%).

²⁹Our results complement those of Cuñat and Guadalupe (2009), who benchmark bank executive compensation with executive compensation in the rest of the financial sector and show that the IBBEA increased performance-pay sensitivity.

Therefore, we find some support for the idea that greater competition is also associated with a mitigation in bank managers' empire building behavior.

VII Concluding Remarks

This paper investigated whether greater competition can act as a spontaneous market force to reduce the consumption of private benefits by bank insiders and, thereby, the agency problems within banks. We considered the volume of loans lent to insiders as a measure of the agency conflict within banks.

By exploiting the staggered relaxation of interstate branching restrictions in the US, we found that greater competition reduces insider lending. This effect is stronger when the threat of new entrants has the potential to more strongly affect the profitability of the bank. The results are robust to different identification approaches and to the use of alternative proxies for agency conflict. Overall, our conclusion is that competitive pressure can reduce agency problems within banks and attenuate incentive misalignments between ownership and control.

Our results have at least two policy implications. The first is that policy efforts to increase local banking competition can be socially beneficial in reducing the misuse of bank resources. The second implication relates to the debate on insider lending regulation. Although the Sarbanes-Oxley Act of 2002 prohibited the extension of executive loans by US public companies, exceptions were made for banks. To the extent that insider loans are a way to drain bank resources, this exception might be called into question.

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VIII Figures

Figure 1

The effect of greater competition on insider lending: DiD approach

The figure shows the effect of greater competition on insider lending, estimated using the difference-in-differences approach. The specification is that of Equation (3). We plot the coefficients on the deregulation dummies, as well their 95% confidence intervals, for t between -8 and +8 (expressed in quarters). Time 0 is the last quarter before the bank's home state passes at least one of the provisions in line with the IBBEA for the first time and is taken as the reference quarter. The regression is estimated on the sample composed of commercial banks only, which runs from 1994Q2 to 2005Q2. Confidence intervals are obtained by clustering standard errors at the bank level.

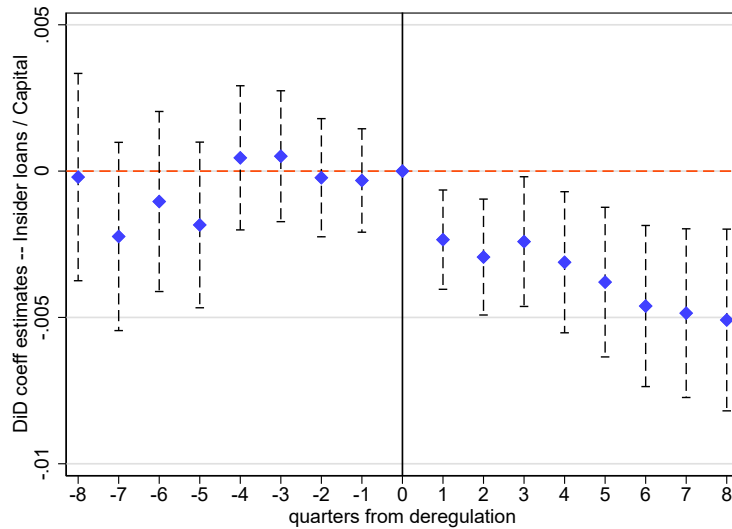
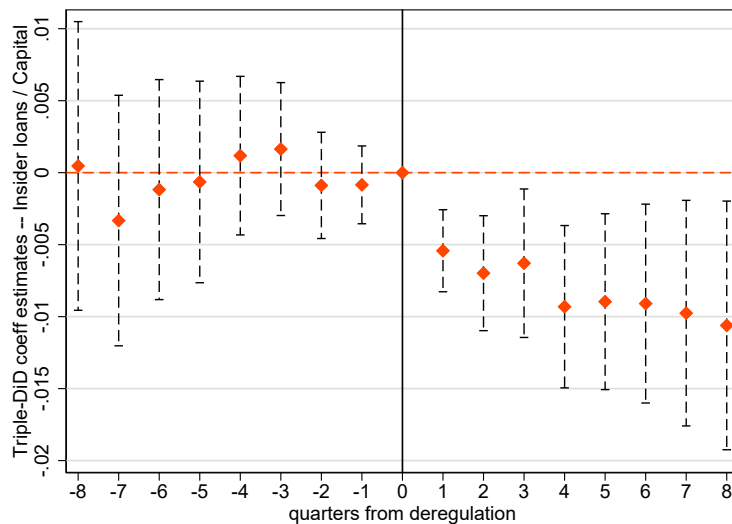


Figure 2

The effect of greater competition on insider lending: Triple-DiD approach

The figure shows the effect of greater competition on insider lending, estimated using the triple-difference-in-differences approach. The specification is that of Equation (4). We plot the coefficients on the deregulation dummies, as well their 95% confidence intervals, for t between -8 and +8 (expressed in quarters). Time 0 is the last quarter before the bank's home state passes at least one of the provisions in line with the IBBEA for the first time and is taken as the reference quarter. The regression is estimated on the sample composed of commercial banks and stock thrifts, which runs from 1994Q2 to 2005Q2. Confidence intervals are obtained by clustering standard errors at the bank level.



IX Tables

Table I
Summary statistics

This table presents the summary statistics of the sample of commercial banks and stock thrifts, of the state-level determinants of deregulation, and of the sample of bank executives. Amounts are in thousands of constant 1994 dollars. Table Z1 of the Online Appendix reports variable definitions.

| <i>Commercial banks</i> (unit of observation: bank-quarter) | | | | | | |
|--|---------|--------|--------|---------|------------|-------------|
| | N | Mean | Median | St.Dev. | 5th pctile | 95th pctile |
| Insider loans / Capital | 384,050 | 0.125 | 0.081 | 0.136 | 0.000 | 0.407 |
| Insider loans / Total loans | 384,050 | 0.021 | 0.014 | 0.022 | 0.000 | 0.068 |
| Other loans / Capital | 382,651 | 5.836 | 5.932 | 2.166 | 2.121 | 9.204 |
| log OPEX per branch | 374,330 | 4.935 | 4.905 | 0.619 | 3.968 | 5.994 |
| Foreign assets / Total assets | 384,049 | 0.002 | 0.000 | 0.024 | 0.000 | 0.000 |
| Retail deposits / Total assets | 384,050 | 0.728 | 0.751 | 0.121 | 0.533 | 0.861 |
| Tier 1 capital / Risk-weighted assets | 382,262 | 0.166 | 0.140 | 0.091 | 0.092 | 0.327 |
| Return on Assets | 377,026 | 0.003 | 0.003 | 0.002 | -0.000 | 0.005 |
| log Total assets | 377,384 | 11.235 | 11.112 | 1.157 | 9.574 | 13.351 |
| log Dep mkt HHI | 382,216 | -2.534 | -2.524 | 0.750 | -3.619 | -1.455 |
| log Dep mkt share | 382,216 | -2.702 | -2.304 | 1.688 | -6.157 | -0.702 |
| loan portfolio HHI | 383,771 | 0.320 | 0.278 | 0.201 | 0.067 | 0.708 |
| N dep managed per emp (thousands) (1994Q2) | 10,213 | 0.242 | 0.233 | 0.094 | 0.099 | 0.412 |
| Cash flows / Total assets (1994Q2) | 10,202 | 0.005 | 0.005 | 0.002 | 0.001 | 0.008 |
| Personal income growth (t+3) (1994Q2) | 10,339 | 0.183 | 0.179 | 0.070 | 0.079 | 0.297 |
| Jensen (high cash flows & low inc growth) (1994Q2) | 10,376 | 0.261 | 0.000 | 0.439 | 0.000 | 1.000 |
| <i>Stock thrifts</i> (unit of observation: bank-quarter) | | | | | | |
| | N | Mean | Median | St.Dev. | 5th pctile | 95th pctile |
| Insider loans / Capital | 39,356 | 0.050 | 0.018 | 0.083 | 0.000 | 0.214 |
| Insider loans / Total loans | 39,356 | 0.007 | 0.003 | 0.011 | 0.000 | 0.028 |
| Other loans / Capital | 36,751 | 7.035 | 7.228 | 2.641 | 2.328 | 11.024 |
| log OPEX per branch | 38,356 | 5.225 | 5.166 | 0.633 | 4.295 | 6.384 |
| Foreign assets / Total assets | 39,356 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Retail deposits / Total assets | 39,356 | 0.625 | 0.648 | 0.156 | 0.346 | 0.832 |
| Tier 1 capital / Risk-weighted assets | 39,068 | 0.179 | 0.143 | 0.110 | 0.092 | 0.396 |
| Return on Assets | 38,256 | 0.002 | 0.002 | 0.002 | -0.001 | 0.005 |
| log Total assets | 38,252 | 12.134 | 12.018 | 1.342 | 10.140 | 14.639 |
| log Dep mkt HHI | 39,134 | -2.474 | -2.484 | 0.506 | -3.303 | -1.654 |
| log Dep mkt share | 39,134 | -3.394 | -2.993 | 1.651 | -6.591 | -1.354 |
| loan portfolio HHI | 39,356 | 0.727 | 0.788 | 0.234 | 0.263 | 0.994 |
| N dep managed per emp (thousands) (1994Q2) | 1,019 | 0.261 | 0.258 | 0.113 | 0.071 | 0.469 |
| Cash flows / Total assets (1994Q2) | 1,000 | 0.003 | 0.003 | 0.002 | -0.001 | 0.007 |
| Personal income growth (t+3) (1994Q2) | 1,034 | 0.185 | 0.181 | 0.053 | 0.107 | 0.275 |
| Jensen (high cash flows & low inc growth) (1994Q2) | 1,042 | 0.114 | 0.000 | 0.318 | 0.000 | 1.000 |
| <i>Determinants of deregulation</i> (unit of observation: state-quarter) | | | | | | |
| | N | Mean | Median | St.Dev. | 5th pctile | 95th pctile |
| Avg insider lending ratio | 2,295 | 0.103 | 0.098 | 0.063 | 0.014 | 0.213 |
| Ins lending ratio of small banks rel to large banks | 2,295 | 0.036 | 0.045 | 0.081 | -0.107 | 0.151 |
| Small bank share of all banking assets | 2,295 | 0.080 | 0.078 | 0.054 | 0.010 | 0.183 |
| Capital ratio of small banks rel to large banks | 2,295 | 0.017 | 0.019 | 0.028 | -0.031 | 0.058 |
| Share of state legislature that is Democrat | 2,295 | 0.474 | 0.333 | 0.359 | 0.000 | 1.000 |
| Governor is Democrat | 2,295 | 0.409 | 0.000 | 0.492 | 0.000 | 1.000 |
| Relative size of insurance to banking plus insurance | 2,265 | 0.452 | 0.455 | 0.128 | 0.207 | 0.653 |
| Small firm share of the number of firms | 2,295 | 0.726 | 0.722 | 0.033 | 0.676 | 0.783 |
| <i>Bank executives</i> (unit of observation: executive-year) | | | | | | |
| | N | Mean | Median | St.Dev. | 5th pctile | 95th pctile |
| Total compensation (\$ millions) | 5,277 | 2.039 | 0.876 | 3.615 | 0.206 | 7.820 |
| Perks & other compensation (\$ millions) | 5,277 | 0.120 | 0.026 | 0.651 | 0.003 | 0.316 |
| Return on Assets | 5,277 | 0.014 | 0.012 | 0.015 | 0.006 | 0.021 |
| log BHC value | 5,277 | 16.671 | 16.462 | 1.437 | 14.601 | 19.337 |
| log Total assets | 5,277 | 16.541 | 16.386 | 1.463 | 14.464 | 19.258 |
| CEO | 5,277 | 0.167 | 0.000 | 0.373 | 0.000 | 1.000 |
| Board member | 5,277 | 0.325 | 0.000 | 0.468 | 0.000 | 1.000 |
| Age (years) | 4,047 | 52.723 | 53.000 | 6.971 | 41.000 | 63.000 |

Table II
Insider loans as private benefits for bank insiders

In this table, we test whether insider loans are private benefits for bank insiders. In columns (1) to (5), the dependent variable is the ratio of insider loans to the sum of Tier 1 and Tier 2 capital, which is the ratio used by regulators to impose limits on insider lending (and our baseline measure of this activity). In column (6), we consider instead the ratio of insider loans to total loans. Depending on the column, a measure of insider lending is regressed on bank profitability ('Return on assets'), employees' productivity ('Number of deposits managed per employee'), bank size ('log Total assets'), cash flows ('Cash flows / Total assets', indicating the sum of pretax net operating income and loan loss provisions, scaled by total assets), growth opportunities (measured by the growth of personal income in the subsequent three years of the counties in which the bank is located in 1994Q2), and on the combination of high cash flows and low growth opportunities ('Jensen', indicating a bank with cash flows above the sample median and personal income growth below the sample median). The sample is the cross-section of commercial banks as of 1994Q2, i.e., before the passage of the IBBEA. Standard errors are clustered at the state level, and t-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|------------------------|------------------------|------------------------|------------------------|------------------------|--------------------------|
| | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Tot loans |
| Return on Assets | -5.393*** (-6.53) | -2.724*** (-3.11) | -3.298*** (-4.30) | -5.186*** (-4.26) | -4.521*** (-5.68) | -0.281* (-1.95) |
| N dep managed per employee | | -0.268*** (-10.50) | -0.262*** (-10.93) | -0.263*** (-11.08) | -0.264*** (-10.95) | -0.030*** (-8.09) |
| log Total assets | | | 0.007* (1.77) | 0.007* (1.76) | 0.006* (1.73) | -0.001 (-1.15) |
| Cash flows / Total assets | | | | 1.791* (1.78) | | |
| Personal income growth (t+3) | | | | -0.081** (-2.10) | | |
| Jensen (high cash flows & low inc growth) | | | | | 0.014*** (3.48) | 0.001** (2.08) |
| Regulator FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 10,091 | 10,091 | 10,091 | 10,091 | 10,091 | 9,996 |
| R ² | 0.05 | 0.07 | 0.08 | 0.08 | 0.08 | 0.07 |

Table III

The effect of greater competition on insider lending: DiD approach

In this table, we estimate the effect of greater competition on insider lending using the difference-in-differences approach (Equation (1)). We identify the effect of greater competition by comparing commercial banks headquartered in different states, which thus experience branching deregulation at different points in time and with different intensity. In columns (1) to (4), the dependent variable is the ratio of insider loans to the sum of Tier 1 and Tier 2 capital, which is the ratio used by regulators to impose limits on insider lending (and our baseline measure of this activity). The key explanatory variable is the competition index of the bank's home state, which ranges from 0 (full regulation) to 4 (full deregulation). In column (5), the dependent variable is the ratio of insider loans to total loans. In column (6), the competition index is replaced by 'Deregulation', which is a dummy 0/1 denoting whether the bank's home state has passed at least one IBBEA provision. In column (7), we divide the dummy 'Deregulation' into 4 subperiods: more than 2 years before the bank's home state deregulates, the 2 years preceding such event, the 2 years following such event, and more than 2 years following such event. The regressions are estimated on the sample composed of commercial banks only, which runs from 1994Q2 to 2005Q2. 'State controls' include the level and first difference of the log of the quarterly personal income of the bank's home state. 'Other bank controls' include the level and first difference of the bank's return on assets, ratio of retail deposits to total assets, ratio of Tier 1 capital to risk-weighted assets, and log of total assets. Standard errors are clustered at the bank level, and t-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|-----------------------------------|------------------------|------------------------|------------------------|------------------------|--------------------------|------------------------|------------------------|
| | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Tot loans | Ins loans / Capital | Ins loans / Capital |
| Competition index | -0.0019*** (-3.20) | -0.0018*** (-3.10) | -0.0011** (-2.24) | -0.0010** (-2.11) | -0.0002*** (-2.77) | | |
| Deregulation | | | | | | -0.0035*** (-2.60) | |
| Deregulation ($\leq t - 2$ yrs) | | | | | | | -0.0016 (-0.78) |
| Deregulation ($t - 2$ yrs; t) | | | | | | | -0.0007 (-0.63) |
| Deregulation (t ; $t + 2$ yrs) | | | | | | | -0.0035*** (-3.25) |
| Deregulation ($\geq t + 2$ yrs) | | | | | | | -0.0082*** (-4.52) |
| log Dep mkt HHI | | | | -0.0003 (-0.26) | -0.0002 (-1.09) | -0.0003 (-0.22) | |
| log Dep mkt share | | | | 0.0042* (1.76) | 0.0001 (0.17) | 0.0042* (1.76) | |
| State controls | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Other bank controls | | | | ✓ | ✓ | ✓ | |
| State FE | ✓ | ✓ | | | | | |
| Bank FE | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Time FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 384,043 | 384,043 | 384,043 | 356,075 | 356,075 | 356,075 | 384,043 |
| R ² | 0.04 | 0.04 | 0.72 | 0.74 | 0.72 | 0.74 | 0.72 |

Table IV

The effect of greater competition on insider lending: Triple-DiD approach

In this table, we estimate the effect of greater competition on insider lending using the triple-difference-in-differences approach (Equation (2)). The main difference relative to Table III is that we exploit the fact that thrifts were legally unaffected by the IBBEA. We then measure the effect of the deregulation by benchmarking the trajectory of commercial banks to that of stock thrifts headquartered in the same state. This permits us to include the state-time fixed effect (columns (5) to (8)). In columns (1) to (5), the dependent variable is the ratio of insider loans to the sum of Tier 1 and Tier 2 capital. The key explanatory variable is the competition index of the bank's home state interacted with the dummy 'Comm bank', which identifies whether the credit institution is a commercial bank. In column (6), the dependent variable is the ratio of insider loans to total loans. In column (7), the competition index is replaced by 'Deregulation', which is a dummy 0/1 denoting whether the bank's home state has passed at least one IBBEA provision. In column (8), we divide the dummy 'Deregulation' into 4 subperiods: more than 2 years before the bank's home state deregulates, the 2 years preceding such event, the 2 years following such event, and more than 2 years following such event. The regressions are estimated on the sample of commercial banks and stock thrifts, which runs from 1994Q2 to 2005Q2. 'Bank market power controls' include the log of the normalized HHI of the local deposit market in which the bank operates and the log of the bank's local deposit market share. 'State controls' and 'Other bank controls' are those considered in Table III. When the interaction with 'Comm bank' is included, the uninteracted term is also added, unless it is absorbed by fixed effects. Standard errors are clustered at the bank level, and t-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|--|------------------------|------------------------|------------------------|------------------------|------------------------|--------------------------|------------------------|------------------------|
| | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Tot loans | Ins loans / Capital | Ins loans / Capital |
| Competition index | 0.0006 (0.64) | 0.0004 (0.34) | 0.0012 (1.51) | 0.0013 (1.58) | | | | |
| Competition index x Comm bank | -0.0025** (-2.14) | -0.0022* (-1.79) | -0.0022** (-2.32) | -0.0022** (-2.30) | -0.0020** (-2.04) | -0.0003** (-2.27) | | |
| Deregulation x Comm bank | | | | | | | -0.0066** (-2.05) | |
| Dereg ($\leq t - 2$ yrs) x Comm bank | | | | | | | | -0.0002 (-0.04) |
| Dereg ($t - 2$ yrs; t) x Comm bank | | | | | | | | -0.0017 (-0.75) |
| Dereg (t ; $t + 2$ yrs) x Comm bank | | | | | | | | -0.0075*** (-3.17) |
| Dereg ($\geq t + 2$ yrs) x Comm bank | | | | | | | | -0.0102** (-2.03) |
| State controls x Comm bank | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Bank market power controls x Comm bank | | | | ✓ | ✓ | ✓ | ✓ | |
| Other bank controls x Comm bank | | | | ✓ | ✓ | ✓ | ✓ | |
| Comm bank x State FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank FE | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Comm bank x Time FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State x Time FE | | | | | ✓ | ✓ | ✓ | ✓ |
| Observations | 423,406 | 423,406 | 423,406 | 390,517 | 390,517 | 390,517 | 390,517 | 423,406 |
| R^2 | 0.07 | 0.07 | 0.72 | 0.74 | 0.75 | 0.73 | 0.75 | 0.73 |

Table V
Cross-sectional heterogeneity:
Market power, reliance on retail funding, and lending specialization

In this table, we estimate the effect of greater competition on insider lending depending on the bank's market power, reliance on retail funding, and lending specialization (all evaluated at the quarter immediately before deregulation). In columns (1) and (2), we consider as an indicator of market power the HHI of the bank's home local deposit market. In columns (3) and (4), the indicator of market power is the bank's home local deposit market share. In columns (5) and (6), we focus on the reliance on retail funding, which we measure by the bank's retail-deposit-to-total-asset ratio. Finally, in columns (7) and (8), we focus on the bank's lending specialization, which we measure by the normalized HHI of its loan portfolio: our hypothesis is that a bank with a higher loan portfolio HHI is more specialized. We divide the sample of commercial banks between banks below and banks above the sample median for a given characteristic, for example the HHI of the home local deposit market. We estimate Equation 1 on each subsample, with the dependent variable being the ratio of insider loans to the sum of Tier 1 and Tier 2 capital. By estimating Equation (1) separately on each subsample, we allow for the effect of the competition index, as well as that of state and bank controls and the time fixed effect, to differ between the subsamples. Standard errors are clustered at the bank level, and t-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| | Home local dep mkt HHI | | Home local dep mkt share | | Retail funding (rtl dep / assets) | | Lending spec (loan portfolio HHI) | |
|----------------------------|------------------------|------------------------|--------------------------|------------------------|-----------------------------------|------------------------|-----------------------------------|------------------------|
| | below median | above median | below median | above median | below median | above median | below median | above median |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital | Ins loans / Capital |
| Competition index | -0.0007 (-0.94) | -0.0013** (-1.97) | -0.0003 (-0.34) | -0.0014** (-2.14) | 0.0003 (0.38) | -0.0022*** (-3.25) | -0.0015** (-2.04) | -0.0005 (-0.80) |
| State controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank market power controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Other bank controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Time FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 167,792 | 161,395 | 146,355 | 182,832 | 155,984 | 174,209 | 188,848 | 140,988 |
| R^2 | 0.71 | 0.74 | 0.70 | 0.74 | 0.73 | 0.71 | 0.72 | 0.73 |

Table VI
Determinants of interstate branching deregulation

In this table, we study the determinants of interstate branching deregulation using a Weibull proportional hazards model. The hazard rate function is defined in Equation (5). There is one observation for each state in each quarter up to and including the quarter the state passed at least one IBBEA provision for the first time. As a benchmark, column (1) considers the factors proposed by Kroszner and Strahan (1999). In column (2), we add the asset-weighted average of the ratio of insider loans to the sum of Tier 1 and Tier 2 capital of the commercial banks in the state ('Avg insider lending ratio'). In column (3), we add the difference in the insider lending ratio between small and large banks in the state ('Ins lending ratio of small banks rel to large banks'). Finally, in column (4) we include the normalized year of MBHC deregulation. This variable ranges between 0 and 1: 0 identifies the first states that allowed the formation of MBHCs, while 1 indicates the state that last allowed it. Each coefficient represents the percentage change in the time to deregulation for a one-unit change in the related covariate. Standard errors are clustered at the state level, and t-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| | (1) Deregulation | (2) Deregulation | (3) Deregulation | (4) Deregulation |
|--|---------------------|---------------------|---------------------|---------------------|
| Avg insider lending ratio | | 1.091 (0.53) | 3.939 (1.14) | 3.649 (1.25) |
| Ins lending ratio of small banks rel to large banks | | | 2.855 (0.98) | 2.731 (1.05) |
| Small bank share of all banking assets | 12.835** (2.39) | 11.908** (2.05) | 11.509** (2.28) | 7.924* (1.87) |
| Capital ratio of small banks rel to large banks | -0.699 (-0.12) | -1.406 (-0.22) | 1.611 (0.25) | 0.798 (0.15) |
| Share of state legislature that is Democratic | -0.211 (-0.67) | -0.247 (-0.80) | -0.372 (-1.16) | -0.399 (-1.42) |
| Governor is Democrat | 0.346 (1.40) | 0.343 (1.42) | 0.367 (1.58) | 0.302 (1.32) |
| Relative size of insurance to banking plus insurance | 0.554 (0.57) | 0.488 (0.49) | 0.285 (0.29) | 0.090 (0.10) |
| Small firm share of the number of firms | -1.156 (-0.25) | -0.977 (-0.21) | -1.498 (-0.35) | -0.069 (-0.02) |
| Normalized year of MBHC deregulation | | | | 0.954** (2.18) |
| Observations | 818 | 818 | 818 | 818 |
| p-value of χ^2 | 0.001 | 0.004 | 0.023 | 0.075 |

Table VII
Endogeneity of interstate branching deregulation

In this table, we address potential endogeneity concerns. In columns (1) and (4), we address the concern of omitted variables by adding the factors of interstate branching deregulation initially identified by Kroszner and Strahan (1999) as explanatory variables in Equation (1). In the rest of the columns, we address residual endogeneity concerns by considering an instrumental variables approach. Equation (6) defines a state-specific time-varying predicted probability of interstate branching deregulation ($P(Deregulation)$): building on the results in column (4) of Table VI, we associate the states that deregulated earlier on MBHC formation with an increasingly higher probability of interstate branching deregulation the more time has elapsed since the passage of the IBBEA. We use this predicted probability as an instrumental variable for the competition index and the dummy ‘Deregulation’. ‘Bank market power controls’ include the log of the normalized HHI of the local deposit market in which the bank operates, and the log of the bank’s local deposit market share. ‘State controls’ and ‘Other bank controls’ are those considered in Table III. Standard errors are clustered at the bank level, and t-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| | OLS (1) Ins loans / Capital | 2SLS First stage (2) Competition index | 2SLS Second stage (3) Ins loans / Capital | OLS (4) Ins loans / Capital | 2SLS First stage (5) Deregulation | 2SLS Second stage (6) Ins loans / Capital |
|------------------------------------|--------------------------------------|--|---|--------------------------------------|--|---|
| Competition index | -0.0010** (-2.10) | | -0.0085** (-1.96) | | | |
| Deregulation | | | | -0.0034** (-2.51) | | -0.0241** (-1.96) |
| $P(Deregulation)$ | | 1.2745*** (22.49) | | | 0.4488*** (21.96) | |
| F statistic on excluded instrument | | 505.60 | | | 482.18 | |
| p -value | | 0.0000 | | | 0.0000 | |
| Kleibergen-Paap rk LM statistic | | | 434.52 | | | 400.54 |
| p -value | | | 0.0000 | | | 0.0000 |
| Kroszner-Strahan controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank market power controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Other bank controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Time FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 355,952 | 355,952 | 355,952 | 355,952 | 355,952 | 355,952 |
| R^2 | 0.74 | 0.75 | | 0.74 | 0.77 | |

Table VIII
Further validation

In this table, we consider alternative proxies for the agency conflict within banks. In both panels, the impact of greater competition is estimated using the difference-in-differences approach (Equation (1)). In panel *a*), we focus on the level of executive compensation. In columns (1) and (2), the dependent variable is the log of one plus the amount of total compensation. In columns (3) and (4), the dependent variable is the log of one plus the amount of the part of compensation that we hypothesize to be more prone to rent extraction: this includes perks, contributions to the retirement plan, change-in-control payments, debt forgiveness, and other personal benefits. The competition index we associate with a bank holding company is the deposit-weighted average of the competition index of the states in which the BHC was located in 1994Q2 (i.e., immediately before the passage of the IBBEA). The dummy ‘Deregulation’ follows the same construction. ‘Board member’ is a dummy 0/1 identifying whether the executive is a member of the board of directors. ‘BHC market power controls’ include the HHI of the local deposit market in which the BHC operates and the log of the BHC’s local deposit market share. ‘Other BHC controls’ include the return on assets (lagged), the log of the BHC value (lagged), and the log of total assets (lagged). ‘Other executive controls’ include a dummy 0/1 identifying whether the executive is the CEO, the age of the executive (in years), and a dummy 0/1 identifying whether the manager’s age is missing. The regressions are estimated on the sample of bank executives, which runs from 1994 to 2005. In panel *b*), we focus on the average cost of operating a branch (‘OPEX per branch’) and the degree of bank internationalization. In columns (1) and (2), the dependent variable is the log of the sum of salaries and employee benefits and premises and equipment expenses divided by the bank’s number of branches. In columns (3) and (4), the dependent variable is the ratio of assets held in foreign offices to total assets (in %). The regressions are estimated on the sample composed of commercial banks only, which runs from 1994Q2 to 2005Q2. ‘Bank market power controls’ include the log of the normalized HHI of the local deposit market in which the bank operates, and the log of the bank’s local deposit market share. ‘State controls’ and ‘Other bank controls’ are those considered in Table III. In panel *a*), standard errors are clustered at the manager level, while in panel *b*), they are clustered at the bank level. *t*-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| <i>Panel a</i>): Executive compensation | | | | |
|--|---------------------|---------------------|---------------------|----------------------|
| | (1) | (2) | (3) | (4) |
| | Total comp | Total comp | Perks & other comp | Perks & other comp |
| Competition index | -0.025* (-1.69) | | -0.056** (-1.98) | |
| Deregulation | | -0.095* (-1.88) | | -0.271*** (-2.83) |
| Board member | 0.526*** (13.81) | 0.527*** (13.82) | 0.512*** (7.61) | 0.514*** (7.65) |
| BHC market power controls | ✓ | ✓ | ✓ | ✓ |
| Other BHC controls | ✓ | ✓ | ✓ | ✓ |
| Other executive controls | ✓ | ✓ | ✓ | ✓ |
| Bank Holding Company FE | ✓ | ✓ | ✓ | ✓ |
| Time FE | ✓ | ✓ | ✓ | ✓ |
| Observations | 5,277 | 5,277 | 5,277 | 5,277 |
| <i>R</i> ² | 0.78 | 0.78 | 0.46 | 0.46 |

| <i>Panel b</i>): Operating costs and degree of internationalization | | | | |
|--|----------------------|---------------------|-------------------------|-------------------------|
| | (1) | (2) | (3) | (4) |
| | log OPEX per branch | log OPEX per branch | For assets / Tot assets | For assets / Tot assets |
| Competition index | -0.006*** (-3.74) | | -0.005 (-0.76) | |
| Deregulation | | -0.008** (-2.07) | | -0.024** (-2.02) |
| State controls | ✓ | ✓ | ✓ | ✓ |
| Bank market power controls | ✓ | ✓ | ✓ | ✓ |
| Other bank controls | ✓ | ✓ | ✓ | ✓ |
| Bank FE | ✓ | ✓ | ✓ | ✓ |
| Time FE | ✓ | ✓ | ✓ | ✓ |
| Observations | 355,184 | 355,184 | 361,295 | 361,295 |
| <i>R</i> ² | 0.89 | 0.89 | 0.88 | 0.88 |

Z Online Appendix

A Regulation Regarding Insider Loans: Details

Regulation O establishes four main prescriptions:

1) Terms of the extension of credit. Insider loans must be made on substantially the same terms (including interest rate and collateral) as those prevailing at the time for comparable transactions with other persons and should not involve more than the normal risk of repayment or present other unfavorable terms.

2) Approval by the bank's board of directors. Every extension of credit by a bank to an insider of the bank that would exceed the higher of \$25,000 or 5% of the bank's unimpaired capital and unimpaired surplus, when aggregated with every other extension of credit to that person and her related interest, must be approved in advance by a majority of the entire board of directors of the bank, with the interested party not participating in the voting.

3) Individual lending limit. Any insider cannot borrow from the bank more than 15% of the bank's unimpaired capital and unimpaired surplus in the case of loans that are not fully secured. This limit is increased by 10% of the bank's unimpaired capital and unimpaired surplus in the case of loans that are fully secured by readily marketable collateral having a market value at least equal to the amount of the loan.

4) Aggregate Lending Limit. The total amount of insider loans must not exceed the bank's unimpaired capital and unimpaired surplus.¹

The lending limits imposed by Regulation O depend on the amount of unimpaired capital and unimpaired surplus. This amount corresponds to the sum of the bank's Tier 1 and Tier 2 capital and the balance of the bank's allowance for loan and lease losses not included in the bank's Tier 2 capital. Therefore, to the extent that Tier 2 capital already includes most of the

¹Under some conditions, banks with deposits of less than \$100 million may by an annual resolution of their board of directors increase this general limit to a level not to exceed two times the bank's unimpaired capital and unimpaired surplus.

allowance for loan and lease losses, point 4) fixes a bank-level lending limit equal to the sum of the bank's Tier 1 and Tier 2 capital.

For comparison, Basel I capital regulation, to which US banks are also subject in the period we consider (see, e.g., Kling (2016)), defines a minimum ratio of total capital (i.e., the sum of Tier 1 and Tier 2 capital) to risk-weighted assets of 8%.² To obtain risk-weighted assets, every bank asset is assigned to one of four risk buckets: 0%, 20%, 50%, and 100%. Insider loans belong to the group of corporate and household loans and thus have a 100% risk weight.³ This implies that to comply with Basel I regulation, a bank may lend up to $(1/0.08=)$ 12.5 units of capital to insiders: this limit is significantly less restrictive than that imposed by Regulation O of only one unit.

B Relationship Between Insider Lending and Bank Risk

According to Murphy (1980), in 1978, the FDIC presented several reports to the Congress stating that excessive insider lending represents a major cause of bank failure. Specifically, those reports indicate that almost 60% of all bank failures between 1960 and 1975 were principally caused by insider lending abuses. The abuses involved loans to insiders that were not only excessive in amount but were also granted substantially more favorable terms than those available to the public.

Similarly, in a report to the Congress of March 1994, the US General Accounting Office (GAO) notes that 61% of the 286 bank failures that occurred in 1990 and 1991 had insider problems, such as fraud or loan losses (General Accounting Office, 1994). The most common violations were exceeding the lending limits for insiders and granting loans to insiders with preferential terms, which were not available to the general public. Investigators cited insider problems as one of the major causes of failure in 26% of the banks. The GAO stresses that even if insider problems were not the major cause of bank failure, there exists a strong association

²At least half of total capital needs to be Tier 1 capital.

³Loans to households and firms fall in the 100% risk bucket unless they are secured by first liens on one to four family residential properties.

between insider violations and the larger problems of poor administration by bank management and inadequate oversight by bank boards of directors.

More generally, O’Keefe and Yom (2017) show that in 37% of the bank failures occurring between 1989 and 2015, there were insiders activities intended to extract private benefits. Overall, these studies suggest that insider lending is tightly linked with a more general mismanagement of the funds collected by the bank and risk of bank failure.

C Additional Identification Checks

C.1 The Effect of Deregulation on Lending to Non-Insiders

Although Subsection V.D shows that the mechanism underpinning our results relies on greater bank competition, one could argue that the dynamics we find for insider lending are due to an overall reduction in total lending rather than to a change in insiders’ behavior. Although this argument cannot explain the results we obtain when our measure of insider lending is the ratio of insider loans to total loans, it seems interesting to examine the dynamics of lending to non-insiders. Indeed, lending to non-insiders may be used as a benchmark for insider lending: finding a significant effect of the competition index on insider lending and no effect on lending to non-insiders would validate the idea that banks consciously attempt to reduce wasteful corporate practices in response to greater competition.

We exploit Equation (1) but consider as the dependent variable the ratio of loans to non-insiders to the sum of Tier 1 and Tier 2 capital. The results are presented in column (1) of Table Z4. We find no effect of the competition index on lending to non-insiders. The same finding is obtained when we replace the competition index with the deregulation dummy (column (2)). Overall, this result is in line with Rice and Strahan (2010) and Favara and Imbs (2015) and clarifies that the effect on insider lending is not due to a change in the overall lending strategy but rather to a change in insiders’ behavior and management practices.

C.2 Placebo Tests

One concern is that omitted variables that correlate with the competition index could be the actual drivers of our results. If this were the case, our estimations would be plagued by endogeneity, and the effects we find would no longer be valid and causal. We primarily address this concern by considering a triple-difference-in-differences approach (Table IV) and by adding the determinants of deregulation initially identified by Kroszner and Strahan (1999) as explanatory variables in Equation (1) (Table VII). However, to further address this concern of omitted variables, we consider here two placebo tests.

The idea is to *incorrectly* assign the deregulation events to the states. If our results were driven by unobservable shocks that are correlated with deregulation decisions, we should still observe that insider lending decreases after these placebo events. In contrast, if the effect disappears, we may be confident in our results.

In the first placebo test, we randomly assign to all banks headquartered in a given state the competition index of another state. We run Equation (1) by first replacing the competition index with this placebo index and report the results in column (3) of Table Z4. We find that the coefficient on this placebo competition index is statistically insignificant.

In the second test, we follow the approach of Cornaggia et al. (2015). We obtain the empirical distribution of quarters when states deregulate on each of the four provisions: minimum age, deposit cap, de novo branching, and individual branch acquisitions. Following this distribution, we randomly allocate each state into each of these deregulation quarters without replacement. By following this procedure, we maintain the actual empirical distribution of deregulation quarters. We run Equation (1) by first replacing the competition index with this placebo index. The estimation results appear in column (4) of Table Z4. Also in this case, we find a statistically insignificant parameter estimate. Taken together, these results corroborate the idea that omitted variables are not the drivers of the estimated effect of the competition index.

The second placebo test also contributes to the understanding of the mechanism underpinning our findings. One might be concerned that if the competition index of one state correlates with the competition index of other states, banks reduce insider lending in response to the greater ability to expand out of their home state rather than to the entry of competitors into their home state. This explanation is ruled out by the second placebo test (as well as by our cross-sectional tests in Table V). Indeed, since it is derived from the actual distribution of quarters when states deregulate, the second placebo index correlates with the actual competition index of other states. The fact that we find that its effect is statistically insignificant indicates that it is not the greater ability to expand in other states that drives the insider lending dynamics.⁴

D Construction of the Sample of Bank Executives

We merge executive compensation data from Compustat ExecuComp with BHC-level balance sheet information from Compustat based on the *GVKEY* identifier. Then, using correspondence tables linking the *GVKEY* identifier with CRSP's permanent company identifier (*PERMCO*) and with the Federal Reserve's bank identifier (*RSSD ID*), we merge the resulting dataset with the Summary of Deposits information. By doing so, we relate measures of local deposit market power to each BHC in the sample. Importantly, since the SOD data cover only deposit-taking institutions, this second merge excludes BHCs that do not collect deposits.

⁴If our main findings were driven by the correlation of the home state's competition index with those of other states, we should have found a negative and statistically significant effect of this placebo index.

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Figure Z1

Timing of interstate branching deregulation vs. timing of MBHC deregulation

This figure relates the quarter in which a state passed at least one of the provisions in line with the IBBEA for the first time (vertical axis) to the year in which the same state allowed the formation of multibank holding companies (MBHCs) (horizontal axis). The size of the circles is proportional to the number of states that share the same quarter of interstate branching deregulation and the same year of MBHC deregulation. Blue circles represent states that passed at least one of the provisions in line with the IBBEA between 1994Q2 and 2005Q2, while red circles represent states that had not yet passed any of such provisions in 2005Q2. The dashed black line is the line of best fit following a simple linear regression. Information on interstate branching deregulation quarters is from Johnson and Rice (2008): it is right-censored, with 2005Q2 being the upper bound. Information on MBHC deregulation years is from Kroszner and Strahan (1999): it is left-censored, with 1970 being the lower bound.

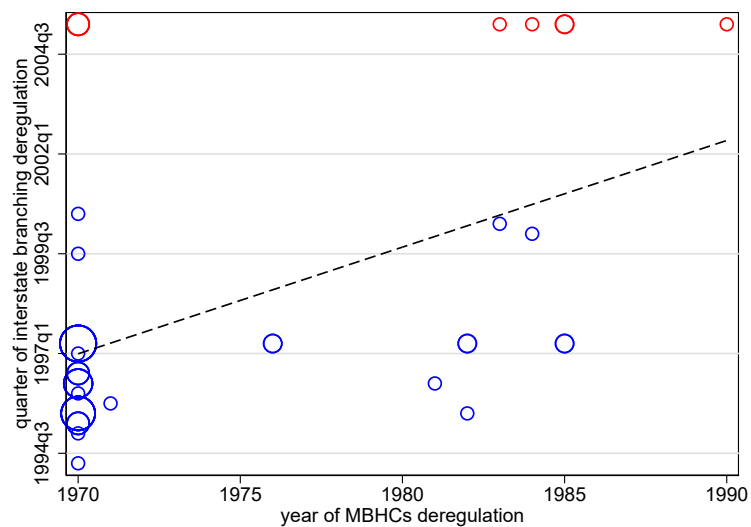


Table Z1
Variable definitions

This table recapitulates the definitions of the variables considered in the analysis and their sources.

Bank-level variables

| Variable | Definition | Source |
|---------------------------------------|--|-----------------------------|
| Insider loans / Capital | item <i>lnexamt</i> / (item <i>rbct1j</i> + item <i>rbct2</i>) | FDIC (SDI) |
| Insider loans / Total loans | item <i>lnexamt</i> / item <i>lnlsnet</i> | FDIC (SDI) |
| Other loans / Capital | (item <i>lnlsnet</i> - item <i>lnexamt</i>) / (item <i>rbct1j</i> + item <i>rbct2</i>) | FDIC (SDI) |
| log OPEX per branch | log((item <i>esal</i> + item <i>epremagg</i>) / (item <i>offdom</i> + item <i>offfor</i>)). Both item <i>esal</i> and item <i>epremagg</i> are in thousands of constant 1994 dollars | FDIC (SDI) |
| Foreign assets / Total assets | item <i>assetfor</i> / item <i>asset</i> | FDIC (SDI) |
| Competition index | it indicates how many provisions in line with the IBBEA a given state has passed. See Table Z2 | Johnson and Rice (2008) |
| Deregulation | dummy 0/1 indicating whether the state has passed at least one IBBEA provision at a given point in time in the period from 1994 to 2005 | Johnson and Rice (2008) |
| $P(\text{Deregulation})$ | $[1 - \text{norm}(\text{MBHC}_s)] \times \text{norm}(t)$, with $\text{norm}(\text{MBHC}_s)$ being the normalized year in which state s passed MBHC deregulation and $\text{norm}(t)$ being the normalized quarter t | Kroszner and Strahan (1999) |
| Retail deposits / Total assets | item <i>coredep</i> / item <i>asset</i> | FDIC (SDI) |
| Tier 1 capital / Risk-weighted assets | item <i>rbct1j</i> / item <i>ruajt</i> | FDIC (SDI) |
| Return on Assets | item <i>netinc</i> / item <i>asset</i> | FDIC (SDI) |
| log Total assets | log(item <i>asset</i>). Amount in thousands of constant 1994 dollars | FDIC (SDI) |
| log Dep mkt HHI | log of the normalized HHI of the local deposit market in which the bank operates. We define local deposit markets as counties. When banks operate in more than one county, we compute a weighted average based on the amount of deposits (item <i>depsumbr</i>) collected in each county | FDIC (SOD) |
| log Dep mkt share | log of the bank's local deposit market share. We define local deposit markets as counties. When banks operate in more than one county, we compute a weighted average based on the amount of deposits (item <i>depsumbr</i>) collected in each county | FDIC (SOD) |
| loan portfolio HHI | normalized HHI of the loan categories in the bank's loan portfolio. The loan categories considered are real estate loans (item <i>lnre</i>), farm loans (item <i>lnag</i>), commercial and industrial loans (item <i>lnci</i>), loans to individuals (item <i>lncon</i>), lease financing receivables (item <i>ls</i>), and loans to depository institutions (item <i>lndepac</i>) | FDIC (SDI) |
| N deposits managed per employee | (item <i>depsmb</i> + item <i>deplgb</i>) / item <i>numemp</i> | FDIC (SDI) |
| Cash flows / Total assets | (item <i>idpretx</i> + item <i>elnatr</i>) / item <i>asset</i> | FDIC (SDI) |
| Personal income growth (t+3) | personal income growth from 1994 to 1997 of the counties in which the bank operates (average weighted by the amount of deposits (item <i>depsumbr</i>) collected in each county) | BEA and FDIC (SOD) |
| Jensen | dummy 0/1 indicating whether cash flows are above sample median and growth opportunities are below sample median | BEA and FDIC (SDI, SOD) |

State-level variables

| Variable | Definition | Source |
|--|---|--|
| Avg insider lending ratio | asset-weighted average of the ratio (item <i>lnexamt</i> / (item <i>rbct1j</i> + item <i>rbct2j</i>)) in the state/quarter | FDIC (SDI) |
| Ins lending ratio of small banks rel to large banks | a bank is defined 'small' if its total assets (item <i>asset</i>) are below the sample median in the state/quarter. The insider lending ratio is defined as (item <i>lnexamt</i> / (item <i>rbct1j</i> + item <i>rbct2j</i>)). We calculate the asset-weighted averages for small and large banks in the state/quarter. We then take the difference | FDIC (SDI) |
| Small bank share of all banking assets | share of all banking assets (item <i>asset</i>) held by small banks in the state/quarter | FDIC (SDI) |
| Capital ratio of small banks rel to large banks | the capital ratio is defined as (item <i>eq</i> / item <i>asset</i>). We calculate the asset-weighted averages for small and large banks in the state/quarter. We then take the difference | FDIC (SDI) |
| Share of state legislature that is Democratic | fraction of the three bodies of the state government (the house, senate, and governorship) controlled by Democrats | Book of the States |
| Governor is Democrat | dummy 0/1 denoting whether the governor is a Democrat | Book of the States |
| Relative size of insurance to banking plus insurance | total value added of the insurance sector in the state/year relative to the sum of the banking plus insurance sectors | Bureau of Economic Analysis (Survey of Current Business) |
| Small firm share of the number of firms | proportion of all establishments operating in the state/year with fewer than twenty employees | Bureau of the Census (County Business Patterns) |
| Norm year of MBHC deregulation | $\frac{x-1970}{1990-1970}$, with x being the year in which the state passed MBHC deregulation | Kroszner and Strahan (1999) |

Manager-level variables

| Variable | Definition | Source |
|----------------------------|---|---------------------|
| Total compensation | item <i>TDC1</i> in constant 1994 dollars | Compustat ExecuComp |
| Perks & other compensation | item <i>OTHANN</i> + item <i>ALLOTHTOT</i> in constant 1994 dollars | Compustat ExecuComp |
| Return on Assets | item <i>ni</i> / item <i>at</i> | Compustat |
| log BHC value | $\log((\text{item } csho \times \text{item } prcc.f) + (\text{item } at - \text{item } ceq - \text{item } txd))$. BHC value is in thousands of dollars | Compustat |
| log Total assets | $\log(\text{item } at)$. Amount of total assets is in thousands of dollars | Compustat |
| CEO | dummy 0/1 denoting whether the manager is the CEO of the bank holding company | Compustat ExecuComp |
| Board member | item <i>EXECDIR</i> | Compustat ExecuComp |
| Age | manager's age in years | Compustat ExecuComp |

Table Z2
Competition index

This table presents the competition index based on how many provisions in line with the IBBEA a given state has passed at a given point in time in the period from 1994 to 2005. Source: Johnson and Rice (2008).

| State | Competition Index | Effective Date | NO Min. Age for Target Inst. | De Novo Branch Allowed | Single Br. Acquisition Allowed | Statewide Dep. Cap $\geq 30\%$ |
|---------------|-------------------|----------------|------------------------------|------------------------|--------------------------------|--------------------------------|
| Alabama | 1 | 5/31/1997 | 0 | 0 | 0 | 1 |
| Alaska | 2 | 1/1/1994 | 0 | 0 | 1 | 1 |
| Arizona | 2 | 8/31/2001 | 0 | 0 | 1 | 1 |
| | 1 | 9/1/1996 | 0 | 0 | 0 | 1 |
| Arkansas | 0 | 6/1/1997 | 0 | 0 | 0 | 0 |
| California | 1 | 9/28/1995 | 0 | 0 | 0 | 1 |
| Colorado | 0 | 6/1/1997 | 0 | 0 | 0 | 0 |
| Connecticut | 3 | 6/27/1995 | 0 | 1 | 1 | 1 |
| Delaware | 1 | 9/29/1995 | 0 | 0 | 0 | 1 |
| DC | 4 | 6/13/1996 | 1 | 1 | 1 | 1 |
| Florida | 1 | 6/1/1997 | 0 | 0 | 0 | 1 |
| Georgia | 1 | 5/10/2002 | 0 | 0 | 0 | 1 |
| | 1 | 6/1/1997 | 0 | 0 | 0 | 1 |
| Hawaii | 4 | 1/1/2001 | 1 | 1 | 1 | 1 |
| | 1 | 6/1/1997 | 0 | 0 | 0 | 1 |
| Idaho | 1 | 9/29/1995 | 0 | 0 | 0 | 1 |
| Illinois | 4 | 8/20/2004 | 1 | 1 | 1 | 1 |
| | 1 | 6/1/1997 | 0 | 0 | 0 | 1 |
| Indiana | 3 | 7/1/1998 | 0 | 1 | 1 | 1 |
| | 4 | 6/1/1997 | 1 | 1 | 1 | 1 |
| Iowa | 0 | 4/4/1996 | 0 | 0 | 0 | 0 |
| Kansas | 0 | 9/29/1995 | 0 | 0 | 0 | 0 |
| Kentucky | 1 | 3/22/2004 | 1 | 0 | 0 | 0 |
| | 1 | 3/17/2000 | 1 | 0 | 0 | 0 |
| | 0 | 6/1/1997 | 0 | 0 | 0 | 0 |
| Louisiana | 1 | 6/1/1997 | 0 | 0 | 0 | 1 |
| Maine | 4 | 1/1/1997 | 1 | 1 | 1 | 1 |
| Maryland | 4 | 9/29/1995 | 1 | 1 | 1 | 1 |
| Massachusetts | 3 | 8/2/1996 | 0 | 1 | 1 | 1 |
| Michigan | 4 | 11/29/1995 | 1 | 1 | 1 | 1 |
| Minnesota | 1 | 6/1/1997 | 0 | 0 | 0 | 1 |
| Mississippi | 0 | 6/1/1997 | 0 | 0 | 0 | 0 |
| Missouri | 0 | 9/29/1995 | 0 | 0 | 0 | 0 |
| Montana | 0 | 10/1/2001 | 0 | 0 | 0 | 0 |
| | 0 | 9/29/1995 | | Opt out | | |
| Nebraska | 0 | 5/31/1997 | 0 | 0 | 0 | 0 |
| Nevada | 1 | 9/29/1995 | 0 | 0 | 0 | 1 |
| New Hampshire | 4 | 1/1/2002 | 1 | 1 | 1 | 1 |
| | 3 | 8/1/2000 | 0 | 1 | 1 | 1 |
| | 0 | 6/1/1997 | 0 | 0 | 0 | 0 |

(continued)

| State | Competition Index | Effective Date | NO Min. Age for Target Inst. | De Novo Branch Allowed | Single Br. Acquisition Allowed | Statewide Dep. Cap $\geq 30\%$ |
|----------------|-------------------|----------------|------------------------------|------------------------|--------------------------------|--------------------------------|
| New Jersey | 3 | 4/17/1996 | 1 | 0 | 1 | 1 |
| New Mexico | 1 | 6/1/1996 | 0 | 0 | 0 | 1 |
| New York | 2 | 6/1/1997 | 0 | 0 | 1 | 1 |
| North Carolina | 4 | 7/1/1995 | 1 | 1 | 1 | 1 |
| North Dakota | 3 | 8/1/2003 | 1 | 1 | 1 | 0 |
| | 1 | 5/31/1997 | 1 | 0 | 0 | 0 |
| Ohio | 4 | 5/21/1997 | 1 | 1 | 1 | 1 |
| Oklahoma | 3 | 5/17/2000 | 1 | 1 | 1 | 0 |
| | 0 | 5/31/1997 | 0 | 0 | 0 | 0 |
| Oregon | 1 | 7/1/1997 | 0 | 0 | 0 | 1 |
| | 2 | 2/27/1995 | 0 | 0 | 1 | 1 |
| Pennsylvania | 4 | 7/6/1995 | 1 | 1 | 1 | 1 |
| Rhode Island | 4 | 6/20/1995 | 1 | 1 | 1 | 1 |
| South Carolina | 1 | 7/1/1996 | 0 | 0 | 0 | 1 |
| South Dakota | 1 | 3/9/1996 | 0 | 0 | 0 | 1 |
| Tennessee | 3 | 3/17/2003 | 0 | 1 | 1 | 1 |
| | 3 | 7/1/2001 | 0 | 1 | 1 | 1 |
| | 2 | 5/1/1998 | 0 | 0 | 1 | 1 |
| | 1 | 6/1/1997 | 0 | 0 | 0 | 1 |
| Texas | 3 | 9/1/1999 | 1 | 1 | 1 | 0 |
| | 0 | 8/28/1995 | | | Opt out | |
| Utah | 3 | 4/30/2001 | 0 | 1 | 1 | 1 |
| | 2 | 6/1/1995 | 0 | 0 | 1 | 1 |
| Vermont | 4 | 1/1/2001 | 1 | 1 | 1 | 1 |
| | 2 | 5/30/1996 | 0 | 0 | 1 | 1 |
| Virginia | 4 | 9/29/1995 | 1 | 1 | 1 | 1 |
| Washington | 3 | 5/9/2005 | 0 | 1 | 1 | 1 |
| | 1 | 6/6/1996 | 0 | 0 | 0 | 1 |
| West Virginia | 3 | 5/31/1997 | 1 | 1 | 1 | 0 |
| Wisconsin | 1 | 5/1/1996 | 0 | 0 | 0 | 1 |
| Wyoming | 1 | 5/31/1997 | 0 | 0 | 0 | 1 |

Table Z3
Cross-sectional heterogeneity: Alternative measure of insider lending

In this table, we estimate the effect of greater competition on insider lending depending on the bank's market power, reliance on retail funding, and lending specialization (all evaluated at the quarter immediately before deregulation). The key difference relative to Table V is that the dependent variable is the ratio of insider loans to total loans (and not the ratio of insider loans to the sum of Tier 1 and Tier 2 capital). In columns (1) and (2), we consider as an indicator of market power the HHI of the bank's home local deposit market. In columns (3) and (4), the indicator of market power is the bank's home local deposit market share. In columns (5) and (6), we focus on the reliance on retail funding, which we measure by the bank's retail-deposit-to-total-asset ratio. Finally, in columns (7) and (8), we focus on the bank's lending specialization, which we measure by the normalized HHI of its loan portfolio. Our hypothesis is that a bank with a higher loan portfolio HHI is more specialized. We divide the sample of commercial banks between banks below and banks above the sample median for a given characteristic, for example the HHI of the home local deposit market. We estimate Equation 1 on each subsample, with the dependent variable being the ratio of insider loans to the sum of Tier 1 and Tier 2 capital. By separately estimating Equation (1) on each subsample, we allow for the effect of the competition index, as well as that of state and bank controls and the time fixed effect, to differ between the subsamples. Standard errors are clustered at the bank level, and t-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| | Home local dep mkt HHI | | Home local dep mkt share | | Retail funding (rtl dep / assets) | | Lending spec (loan portfolio HHI) | |
|----------------------------|------------------------|--------------|--------------------------|--------------|-----------------------------------|--------------|-----------------------------------|--------------|
| | below median | above median | below median | above median | below median | above median | below median | above median |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Ins loans | Ins loans | Ins loans | Ins loans | Ins loans | Ins loans | Ins loans | Ins loans |
| | / Tot loans | / Tot loans | / Tot loans | / Tot loans | / Tot loans | / Tot loans | / Tot loans | / Tot loans |
| Competition index | -0.0002* | -0.0003*** | -0.0001 | -0.0004*** | -0.0001 | -0.0004*** | -0.0004*** | -0.0001 |
| | (-1.67) | (-2.64) | (-0.80) | (-3.10) | (-0.78) | (-3.29) | (-3.05) | (-0.97) |
| State controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank market power controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Other bank controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Time FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 167,792 | 161,395 | 146,355 | 182,832 | 155,984 | 174,209 | 188,848 | 140,988 |
| R^2 | 0.70 | 0.72 | 0.69 | 0.73 | 0.71 | 0.70 | 0.71 | 0.71 |

Table Z4
Lending to non-insiders and placebo tests

In columns (1) and (2) of this table, we study the effect of greater competition on the ratio of loans to non-insiders to the sum of Tier 1 and Tier 2 capital using the difference-in-differences approach (Equation (1)). In columns (3) and (4), we present the results of two placebo tests. In the first placebo test (column (3)), we randomly assign to all banks headquartered in a given state the competition index of another state. We label the resulting competition index ‘Placebo comp index (rnd state)’. In the second placebo test (column (4)), we obtain the empirical distribution of quarters when states deregulate on each of the four provisions: minimum age, deposit cap, de novo branching, and individual branch acquisitions. Following this distribution, we randomly allocate each state into each of these deregulation quarters without replacement. We label the resulting competition index ‘Placebo comp index (rnd dereg state)’. We identify the effects of these placebo competition indices on insider lending using the difference-in-differences approach (Equation (1)). All regressions are run on the sample composed of commercial banks only. ‘Bank market power controls’ include the log of the normalized HHI of the local deposit market in which the bank operates and the log of the bank’s local deposit market share. ‘State controls’ and ‘Other bank controls’ are those considered in Table III. Standard errors are clustered at the bank level, and t-statistics are in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

| | (1) Other loans / Capital | (2) Other loans / Capital | (3) Ins loans / Capital | (4) Ins loans / Capital |
|--------------------------------------|---------------------------------|---------------------------------|-------------------------------|-------------------------------|
| Competition index | -0.0037 (-0.70) | | | |
| Deregulation | | 0.0039 (0.27) | | |
| Placebo comp index (rnd state) | | | -0.0003 (-0.74) | |
| Placebo comp index (rnd dereg dates) | | | | -0.0005 (-0.61) |
| State controls | ✓ | ✓ | ✓ | ✓ |
| Bank market power controls | ✓ | ✓ | ✓ | ✓ |
| Other bank controls | ✓ | ✓ | ✓ | ✓ |
| Bank FE | ✓ | ✓ | ✓ | ✓ |
| Time FE | ✓ | ✓ | ✓ | ✓ |
| Observations | 355,152 | 355,152 | 356,075 | 356,075 |
| R^2 | 0.90 | 0.90 | 0.74 | 0.74 |

Table Z5
Year of multibank holding company deregulation

This table presents the year of multibank holding company deregulation by state. Source: Kroszner and Strahan (1999).

| State | Multibank holding companies permitted |
|----------------|---------------------------------------|
| Alabama | < 1970 |
| Alaska | < 1970 |
| Arizona | < 1970 |
| Arkansas | 1985 |
| California | < 1970 |
| Colorado | < 1970 |
| Connecticut | < 1970 |
| Delaware | < 1970 |
| DC | < 1970 |
| Florida | < 1970 |
| Georgia | 1976 |
| Hawaii | < 1970 |
| Idaho | < 1970 |
| Illinois | 1982 |
| Indiana | 1985 |
| Iowa | 1984 |
| Kansas | 1985 |
| Kentucky | 1984 |
| Louisiana | 1985 |
| Maine | < 1970 |
| Maryland | < 1970 |
| Massachusetts | < 1970 |
| Michigan | 1971 |
| Minnesota | < 1970 |
| Mississippi | 1990 |
| Missouri | < 1970 |
| Montana | < 1970 |
| Nebraska | 1983 |
| Nevada | < 1970 |
| New Hampshire | < 1970 |
| New Jersey | < 1970 |
| New Mexico | < 1970 |
| New York | 1976 |
| North Carolina | < 1970 |
| North Dakota | < 1970 |
| Ohio | < 1970 |
| Oklahoma | 1983 |
| Oregon | < 1970 |
| Pennsylvania | 1982 |
| Rhode Island | < 1970 |
| South Carolina | < 1970 |
| South Dakota | < 1970 |
| Tennessee | < 1970 |
| Texas | 1970 |
| Utah | < 1970 |
| Vermont | < 1970 |
| Virginia | < 1970 |
| Washington | 1981 |
| West Virginia | 1982 |
| Wisconsin | < 1970 |
| Wyoming | < 1970 |