Federal Deposit Insurance Corporation • Center for Financial Research

WORKING PAPER SERIES

Does Banking Competition Really Increase Credit for All? The Effect of Bank Branching Deregulation on Small Business Credit

John Lynch
The Ohio State University

June 2022

FDIC CFR WP 2022-07

fdic.gov/cfr

Does Banking Competition Really Increase Credit for All? The Effect of Bank Branching Deregulation on Small Business Credit

John Lynch, The Ohio State University*

April 14, 2022

Abstract

In this paper, I quantify the extent to which financial constraints limit the scope of activity of small firms, influence their labor decisions, and impact their ultimate survival. Using the U.S. branching deregulation from the 1990s, I document that local markets within deregulated states experienced an increase in their number of branches, driven by the entry of larger out-of-state banks and a decrease in the number of branches of existing local banks. As a result, small businesses were affected disproportionally. On average, in the treated markets, the overall lending to small businesses initially declined by 5.4% and remained lower for several years. The decline in credit supply eventually led to a decrease in the number of small businesses; however, many firms were able to stay in operation by decreasing their demand for labor. Specifically, there was an immediate decline in the employment and hours worked at small firms in newly deregulated markets, and even as small business lending recovered, these levels remained depressed for many years after that. Overall, the results demonstrate the critical dependence of small businesses on relationship lending by local banks and show how temporary negative credit supply shocks can have persistent adverse effects on labor.

Keywords: Banking, Deregulation, Small Business Credit, Firm Bankruptcy, Labor Demand
JEL Classification: G21, G28, G33, J23

*I would like to thank Zahi Ben-David, Isil Erel, Jack Liebersohn, Victor Lyonnet, René Stulz, Mike Wittry, and the Ph.D. students in the OSU 8290 Seminar for their helpful comments. I also thank the FDIC's Center for Financial Research and the Journal of Financial Services Research (JFSR) for including the paper in their 2021 20th Annual Bank Research Conference. The first draft of the paper was created on May 1, 2020.
Email: lynch.643@osu.edu

1 Introduction

The overwhelming consensus from the banking deregulation literature is that deregulation, whether it be intrastate or interstate, leads to positive economic outcomes. Deregulation, which fosters increased competition among banking organizations, has been shown to increase the market share of better performing banks leading to higher efficiency, decreases in the rents of banks in previously regulated local markets, and lower interest rates (e.g., Jayaratne and Strahan, 1998; Black and Strahan, 2001; Stiroh and Strahan, 2003). These first-order effects have been shown to increase the access of credit to firms, especially small firms, and lead to more significant innovation and productivity (e.g., Black and Strahan, 2002; Amore, Schneider, and Žaldokas, 2013; Chava, Oettl, Subramanian, and Subramanian, 2013; Krishnan, Nandy, and Puri, 2015; Bai, Carvalho, and Phillips, 2018). Additionally, "creative destruction" or churn among small firms has been shown to increase in deregulated areas (e.g., Guiso, Sapienza, and Zingales, 2004; Bertrand, Schoar, and Thesmar, 2007; Kerr and Nanda, 2009). These firm effects, ultimately, lead to greater state per-capita income and income growth rates as well as decreases in state growth volatility (Jayaratne and Strahan, 1996; Morgan, Rime, and Strahan, 2004). However, the changes in bank market structure do not necessarily have the same impact for all sectors in the local economy. For example, in a different context, Chakraborty, Goldstein, and MacKinlay (2018) show that when mortgage lending increases due to rising real estate prices, the amount of local commercial lending declines.

In this paper, I document that increases in local banking competition do not always unambiguously lead to positive credit supply shocks to all firms. The exact mechanics of the deregulation are important. Specifically, I find that in the lesser studied, "second wave" of interstate banking deregulation commencing with the passage of the Riegle-Neal Act in 1994, small businesses in deregulated states saw a decline in their credit supply. This credit rationing led to adverse real effects on the number of small businesses operating in these states as well as persistent declines in employment levels and total hours worked.

In the United States, 99.7% of firms with paid employees are small businesses.[1] These firms employ nearly half of the private workforce and account for approximately 40% of U.S. nonfarm output.[2] Given their size, however, small businesses tend to be more financially constrained than larger firms due to their relative lack of hard information such as audited financial statements (Petersen and Rajan, 1994; Hubbard, 2001; Carpenter and Petersen, 2002). Banks that incur the costs of developing lending relationships with informationally opaque firms can gain economic rents later on in the life cycle of the relationship. This relationship lending is the primary way that small businesses can ease their financial constraints (Sharpe, 1990; Rajan, 1992; Boot and Thakor, 2000). Soft information is hard to credibly transmit, however, and as such, small banks, which tend to be more decentralized, are better at relationship lending than larger firms, which tend to be more hierarchical (Berger and Udell, 2002; Stein, 2002; Berger, Miller, Petersen, Rajan, and Stein, 2005; Liberti and Mian, 2008; Canales and Nanda, 2012; Kysucky and Norden, 2016; Berger, Bouwman, and Kim, 2017).

The core of the paper uses the plausibly exogenous shock to bank competition that occurred after the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) in 1994. The passage of the Act allowed large, out-of-state banks to expand into unrestricted local markets. I use this shock to study the impact of bank competition on small business lending. Identification is based on a banking restrictiveness index (BRI) developed by Johnson and Rice (2008), which quantifies regulatory barriers that states could enact to limit the effects of the IBBEA. As expected, states that had fewer barriers to interstate branching saw an increase in the number of branches of larger, out-of-state banks. This led to permanent increases in the total number of branches in deregulated areas and decreases in the amount of deposits of smaller local banks.

The literature offers mixed theoretical predictions as well as mixed empirical results about the effects of such a competition shock on small business lending. While small banks

[1] Small businesses are defined as having fewer than 500 employees

[2] Williams (2018)

are better at relationship lending, it does not necessarily follow that an increase in local competition resulting in more total branches, a shift in market composition, and fewer small bank deposits should impact the amount of small business lending. Theories by Petersen and Rajan (1995) and Boot and Thakor (2000) yield opposite predictions with the former predicting that increased competition should decrease relationship lending while the latter predicts it should increase it.[3] In empirical work, Black and Strahan (2002) study the early period of U.S. interstate deregulation from 1978 to 1993 and find that, despite an increase in competition from larger banks, the diversification benefits of size outweigh the comparative advantage in relationship lending by smaller banks, thus increasing the amount of credit to small firms.

In this paper I explore the static and dynamic effects of deregulation on banking competition and small businesses with the main results of the static analysis broken down into four parts. First, I explore the extent of the shock to banking competition caused by the deregulation: this is the first stage of my econometric specifications. I extend the work of Johnson and Rice (2008), studying the first-order effects of bank branching deregulation on the actual strategic branching choices of banking organizations.[4] I also document how the composition of deposits across branches in counties changed post-deregulation.

In order to understand the results, it is useful to quickly provide some context into both waves of deregulation. By the time that the IBBEA was passed in 1994, local banking markets across the U.S. had already been exposed to increased banking competition, primarily brought about by BHCs taking advantage of the first wave of interstate banking deregulation occurring from 1978 to 1993. By 1994, 73.9% of all branches in the U.S. were affiliated

[3]Both papers define bank competition in terms of market power, which can be proxied by the number of banks operating in a region. Petersen and Rajan mention that competition is influenced by the spatial distribution of banks with physical closeness being an important determinant of competition. Additionally, Boot and Thakor clarify that their notion of bank competition depends on the degree to which banks can make both transaction and relationship loans. Cost of bank entry is also a characteristic of their model. The first-order effects documented in this paper are not incongruent with these authors' definitions of bank competition.

[4]As is common in this literature, I use the term banking organization to refer to bank holding companies (BHC), their subsidiaries, or non-BHC owned financial institutions such as independent banks, credit unions, thrifts, etc. When necessary, I will be more specific.

with subsidiaries of BHCs, whose ownership of financial companies across different regions yielded diversification benefits, which along with the dispersion of technology and better management practices, allowed for their subsidiaries to offer lower rates. I mention this for two reasons. 1) This period has yielded the majority of the papers on deregulation, yet it is important to understand that the mechanics of how it yielded increased competition in local markets are quite different than those of the IBBEA. 2) It is difficult to understand how the IBBEA and the state-imposed restrictions on interstate branching expansion should have impacted competition without understanding the complex banking landscape that existed just before the passing of the IBBEA.

The IBBEA was a federal act that allowed for nationwide interstate banking and branching deregulation. In theory, after this act would go into effect in 1997, any banking organization in the U.S. would be allowed to expand unfettered across state borders. However, states were allowed to pass specific legislation that would serve as tools to restrict banking organizations from entering their states. The degree to which states enacted restrictions serves as the basis of the BRI, which ranges from 0 to 4, with 4 indicating a completely restricted state and 0, an unrestricted state.

Given the fact that BHCs had many subsidiaries across the U.S. by 1994, a completely restricted state could still not totally prevent interstate branching. Therefore, it is necessary to first check if the BRI is valid as an instrument for banking competition. In order for this to be true, it should have clear first-order effects on observable outcomes across states. Some primary outcomes related to banking competition are the total number of branches and births of branches across more or less restricted states. Using a weighted generalized difference-in-differences identification strategy with varying levels of treatments, I estimate that a one-unit decrease in the BRI caused a permanent increase in the number of branches of about 2% in the local market with the initial shock leading to a 14.9% increase in branch births of banks headquartered outside of the state along with a 4.1% decrease in the number of existing branches of banks headquartered in same county, an indicator of very small, local banks. This indicates that the growth of new branches in relatively less restricted states came primarily from outside of the state at the expense of existing local branches.

Additionally, the branch births came disproportionately from larger banks, which I consider to be banks with total assets above the threshold for Community Reinvestment Act (CRA) disclosure set by the Federal Financial Institutions Examination Council (FFIEC).[5] Using the same methodology, I estimate that a one-unit decrease in the BRI caused an 8.3% increase in branch births of CRA banks with no statistically significant change in branch births of non-CRA banks. Lastly, branches numbers and composition do not tell the whole story of local market competition. Another critical element is the competition for local deposits. Not only did deregulation decrease the amount of deposits in each branch, but by using interaction WLS regressions, I find that a one-unit decrease in the BRI caused branch deposits to be 11.0% higher in out-of-state bank branches compared to in-state ones.

In the second part, I study whether the cross-sectional differences in local market competition impacted the amount of available small business credit. I do this using the same methodology as the previous section, making sure to control for time-varying local market factors. Controlling for lagged population, home prices, aggregate deposits, number of small business, and economic conditions, I find that small business lending[6] decreased by 2.2% for every unit decrease in the BRI. Similar tests on the amount of small business lending per-capita and per number of small businesses produce similar results.

Using subsample analyses and interaction regressions, I investigate the channel that led to the decreases in small business lending in less restricted states. Regarding the former, I split the amount of lending per-capita and per small business into lending done by CRA banks versus non-CRA banks. I find no statistical change in the lending of CRA banks but find a

[5] Throughout the paper, I refer to larger banks as "CRA banks" and smaller banks as "non-CRA banks" interchangeably.

[6] Small business lending is defined and reported in Schedule RC-C, Part II of June Call Reports. If not reported directly within this section, the bank is indicating that "all or substantially all of the bank's "Loans Secured By Nonfarm Nonresidential Properties (1480)" in domestic offices and "Commercial and Industrial Loans to U.S. Addressees (1763)" in domestic offices (reported in Schedule RC-C for the FFIEC 031-034 reports) have original amounts of $100,000 or less." If this is the case, small business lending is taken directly from Schedule RC-C, Part I - Loans and Leases.

decrease of about \$1,300 per small business and \$35 per person in small business lending per one-unit decrease in the BRI for non-CRA banks. This indicates that, on average, smaller local banks tended to decrease their small business lending in response to the initial shock to competition, which is consistent with the facts that their deposits are particularly hurt by competition with larger banks and that they tend to specialize in relationship lending.

Local economic conditions such as the aggregate amount of county-level banking deposits and housing price growth impacted how branching deregulation affected small business lending, providing evidence of possible channels that led to the decrease in small business lending. When interacting the BRI with the log of the total amount of deposits in a county, the results show that a one standard deviation increase in log deposits led to a further decrease in small business lending of 1.9% per unit decrease in the BRI. This is almost the same as the baseline effect of 2.2% highlighting the very large role that local wealth had in decreasing small business lending in deregulated markets and points to how, for larger banks, chasing cheap funding in the form of deposits could have been a higher priority when entering local markets than the opportunity for small business lending. Additionally, in similar interaction regressions, a one standard deviation increase in the log median house price in a county led to a further decrease in small business lending of 1.7% per unit decrease in the BRI. Again, this effect is large compared to the baseline effect indicating how lending decreased to a much greater extent in areas with high home prices as banks entering hot local real estate markets prioritized mortgage originations as opposed to small business lending. This is in line with Chakraborty et al. (2018) and Favara and Imbs (2015). The latter shows that the IBBEA led to a positive credit supply shock in the mortgage market using a similar methodology as the one I use in this paper.

In the third and fourth sections, I see if the increased financial constraints led to any real firm effects. I start by looking at the most drastic potential impact on a small firm – its closure. Owners or managers of small firms have many options when faced with a shock to their financing. For instance, they can decrease investment, downsize their labor force, or cut working hours or benefits. Ultimately, if they cannot continue their operations under the increased constraints, they may be forced to declare bankruptcy or voluntarily close their business. In static regressions, however, I do not find any statistically significant results that indicate that a larger number of small firms closed in more competitive markets the year after deregulation. However, when looking at the dynamic effects of the temporary negative credit shock over a period of eight years, I find that the number of small firms did decrease, peaking around five years after deregulation. This holds when looking at all small businesses, but the effects are magnified for smaller firms indicating that they were less able to stay in operation by utilizing options such as downsizing or cutting hours. The timing of the dynamic effects seems to indicate that small businesses can weather a local credit shock for several years, but in the long run, some are unable to survive.

In the last section of my main results, I investigate the real effects of financial constraints and credit shocks on labor: in particular, I see if banking competition has real effects on overall employment levels, the number of typical hours worked, and wages. One path to doing this would be to aggregate county-level employment using the County Business Patterns (CBP) data set published by the U.S. Census Bureau as in Adelino, Schoar, and Severino (2015). In their paper, they multiply the midpoint of firm size bins by the number of firms in each bin to approximate county-level employment for different sizes of firms. I use the CBP to find my results in the third part, so there will be a mechanical relationship between the BRI and county-level employment calculated this way, which would not give meaningful results. Therefore, I use labor data from the March supplement of the Current Population Survey (CPS), which includes bins for the size of firm employed at as well as detailed demographic and industry data. A state-level versus county-level analysis loses statistical power, and it is further removed from the causal chain I establish in the previous parts (i.e. county-level branch competition leading to county-level decreases in small business lending leading to less county-level small firms). However, it does allow me to see if there are any observable relationships between the BRI and labor outcomes and if they are consistent with the narrative established in the previous parts.

Using empirical specifications that allow for the BRI to have differential effects on workers at different sizes of firms, I study whether firms tended to cut employment or hours as a means of dealing with increased financial constraints. This identification allows for state-year fixed effects to deal with contemporaneous regulatory changes as well as any other omitted variables that could lead to endogeneity concerns. I use large firms, those with a thousand or more employees, as a control. The combination of static and dynamic results show that compared to large firms, the smallest firms with fewer than 51 employees reduced their full-time worker employment levels by 4.5% and full-time workers' hours by 5.0% per unit of the BRI directly after deregulation. Contemporaneously, there was no statistically significant change in full-time employment or hours worked at large firms; although, there was a 2.4% increase in all hours worked, which combines part- and full-time work, indicating a potential shift from full-time work at small firms to part-time work at large. Despite the temporary nature of the credit supply shock, full-time employment and hours remained about 3% lower in the smallest firms eight years after deregulation showing the long-run impact that a shock to small businesses can have.

Firms with 51 to 100 employees did not immediately cut hours or downsize, but starting about five years after deregulation, they did both. The decrease occurred at the same time that the number of small businesses was statistically lower in deregulated markets. However, while there was a recovery in the number of small businesses, there was a monotonic decrease in employment of all workers (full- and part-time) in these firms such that eight years after deregulation, employment and hours were over 4% lower per unit of the BRI in deregulated markets. These results are consistent with those presented earlier. When a firm becomes more financially constrained, managers have several options if they cannot fund operations internally. One of the options is to downsize or cut hours. Given the magnitudes of the effect of the BRI on these values along with the number of small firms, I provide some evidence that financial constraints were first dealt with by cutting hours, then downsizing, and, ultimately, closing.

Lastly, I investigate if increased banking competition also impacts wages. Ex-ante, there are two potential outcomes of a negative credit shock on wages. First, small firms, instead of or in combination with cutting hours and downsizing, may decrease wages to deal with financial constraints. Second, the negative labor demand shock at small firms could lead to a positive labor supply shock at all firms since workers generally do not restrict themselves to employment at firms of specific sizes. While these two outcomes are not mutually exclusive, I only find evidence of the latter occurring. Although firms with 500 to 999 employees do not see a change in employment levels and an increase in hours employed of all workers of about 2.5% per unit of BRI, wages for all workers at these firms decreases by about 0.5% per unit of BRI. This change occurs the year after deregulation and is contemporaneous with the 4.5% decrease in relative hours worked at the smallest firms. Unfortunately, given the nature of the wage data, dynamic estimates are difficult to make, but it may be the case that this initial shock to wages is a conservative estimate relative to potential long-run effects based on the dynamics of employment and hours worked shown previously. Overall, these results suggest that shocks to small firm credit may impact wages outside of small firms.

This paper contributes to three strands of literature. First, by documenting the negative supply shock to small business credit caused by the passage of the IBBEA, I offer a counterexample to the prevailing literature cited throughout the introduction that focuses on the positive economic effects of deregulation. Rather than disagreeing with the prior literature, this paper complements it by demonstrating that the specific mechanics of deregulation are important and may sometimes lead to adverse outcomes for certain local business sectors. Second, this paper contributes to the vast literature on relationship lending and addresses the specific question of how banking competition affects the quantity of relationship loans. Petersen and Rajan (1995) and Boot and Thakor (2000) present theories that yield opposite predictions regarding competition and relationship lending. This paper serves as another empirical test of these theories.

Third, this paper contributes to the growing literature on financial constraints and labor (e.g., Del Boca and Lusardi, 2003; Garmaise, 2008; Caggese and Cuñat, 2008; Pagano and Pica, 2012; Brown and Matsa, 2016; Baghai, Silva, Thell, and Vig, 2020; Caggese, Cuñat, and Metzger, 2019). I do this by first showing that the IBBEA increased financial constraints for small businesses through a decrease in aggregate small business lending in deregulated local markets and then showing that in deregulated states, there were negative labor effects for workers at small firms. The degree to which these effects can be interpreted causally depends on the exogeneity of the banking competition shock captured by the BRI and whether it impacts employment, hours worked, and wages at small firms solely through the channel of small business lending. Previous literature has shown that this banking shock increased mortgage originations and house prices in land constrained markets, which could theoretically impact labor. However, given the collateral lending channel (Cvijanović, 2014; Adelino et al., 2015; Schmalz, Sraer, and Thesmar, 2017), it is likely that the labor results would be impacted in the opposite direction as mine, biasing them downward, which gives some credibility to the assumed link between the financial constraints and labor outcomes that I demonstrate.

2 Interstate Banking Deregulation

The significant periods of interstate banking deregulation in the U.S. occurred during two waves: the first wave was from 1978 to 1993 with the second wave following from 1994 to 2005. During the earlier period, the expansion of banking organizations across state lines was made possible through state legislation occurring piecemeal during the years mentioned. The details are well described in numerous papers (for example, see Strahan et al. (2003) and Kroszner and Strahan (2014)), but it is important to mention that during the first wave, expansion was limited to out-of-state BHCs acquiring incumbent banking organizations; banking organizations were not allowed to open branches across state lines nor were they allowed to merge an acquisition's assets into their own operations. This allowed for a more measured expansion where the most well-run banking organizations, which were previously geographically constrained, could acquire less well-run or failed banking organizations. The limited number of targets for acquisition controlled the rate of expansion and allowed for banking organizations with the highest expected benefits to outbid other potential acquirers. These banking organizations often had better technology and geographic diversification from previous acquisitions allowing them to put competitive pressure on local banking organizations in the incumbent regions. This first wave of deregulation, which has been the source of most of the banking competition literature, has produced a consensus on the positive effects of increased deregulation,[7] but the measured expansion of this period is not the only way to increase banking competition.

After the end of the first wave of deregulation, in 1994, there was a significant amount of interstate banking[8] yet minimal interstate branching. By this time, 73.9% of all branches in the U.S. were from subsidiaries of BHCs, and 69.8% of all branches were part of BHCs that owned banking organizations in more than one state, the latter of which is the direct consequence of the first wave (the regional variation in the percent of county branches being affiliated with a multi-state BHC is shown in Figure 1). However, given the nature of the first wave of deregulation, out-of-state branches, those whose actual bank headquarters are located in a different state, were very rare: by 1994, only 62 out-of-state branches existed.

The second wave of deregulation commencing with the passage of the IBBEA expanded interstate banking to all states, but its primary consequence was greatly expanding interstate branching. This wave was not as restrained as the first one, and by 2005, the number of out-of-state branches had grown to 24,728. That being said, states could slow the spread of interstate banking and branching by implementing a number of restrictions. There were five

[7]Jayaratne and Strahan (1996, 1998); Black and Strahan (2001); Stiroh and Strahan (2003); Black and Strahan (2002); Morgan et al. (2004); Kerr and Nanda (2009); Amore et al. (2013); Chava et al. (2013); Krishnan et al. (2015); Bai et al. (2018)

[8]Interstate banking refers to a BHC's ability to acquire a banking organization outside the state in which it is headquartered. This is different from interstate branching, which refers to de novo out-of-state branching or the conversion of a previously acquired network of branches to new branches of an out-of-state subsidiary.

main restrictions used: 1) imposing a minimum age of banks or branches for acquisition, 2) not allowing de novo interstate branching, 3) not allowing the acquisition of just a single branch or portion of an institution within the state, 4) enforcing state-wide deposit caps on acquisitions, and 5) requiring reciprocity between states. The first four restrictions serve as the basis for the BRI, which ranges from 0 to 4, with 4 indicating that the state-imposed all 4 restrictions to slow interstate banking/branching. This index was created in Johnson and Rice (2008), and I use their version for all tests in this paper.

The trigger date for the IBBEA was June 1, 1997. At this point, any state that had not opted-out and had not passed any specific statutes related to interstate branching would become completely deregulated with a BRI equal to 0. States that opted-out would continue to completely restrict interstate branching with a BRI equal to 4. Most states, however, either opted-in early by passing statutes that implemented their specific restrictions and allowed for interstate branching prior to the trigger date, or passed statutes including their specific restrictions that would go into effect on the trigger date. As such, the earliest states allowed for some form of interstate branching in 1995, and others followed in 1996 prior to the trigger date.

It was possible for many BHCs to circumvent certain restrictions, however. For example, if a multi-state BHC owned a subsidiary in a state that had existed for longer than the minimum age required, it could convert those branches to an out-of-state subsidiary and then de novo branch within that state even if the state did not allow de novo branching. So in a sense, if a BHC already had a branch in another state, it would be possible to expand into it with an out-of-state subsidiary at some point. Similarly, if an out-of-state banking organization was able to acquire just one branch in a restricted state, it would be possible to de novo branch without restriction after that, which is why many states passed the third restriction requiring the acquiring banking organization to purchase an entire banking organization instead of just one branch. These facts disconnect the BRI from direct first-order effects on banking competition to a certain extent, since the pre-existing local market structures within states, along with the specific state restrictions determine the actual effects on banking competition. However, I mention this for two reasons. One, it makes the BRI less likely to be correlated with local economic conditions and potentially omitted variables. This, along with tests in Rice and Strahan (2010) and Favara and Imbs (2015), supports the idea that the BRI is plausibly exogenous and useful in reduced form regressions as a variable that captures the relative differences in banking competition between states. Two, it should bias the coefficients of reduced form regressions with the BRI towards zero, so when statistically significant ones are estimated, it should, if anything, conservatively understate the actual effects of unrestrained deregulation.

3 Data

The data used in the empirical tests come from a variety of sources including the Federal Deposit Insurance Corporation's (FDIC) Summary of Deposits, June Call Reports (Reports of Condition and Income for commercial banks), CRA Disclosure Reports by Institution, U.S. Census CBP and CPS, Bureau of Economic Analysis (BEA) Economic Profiles by County, Federal Housing Finance Agency (FHFA) House Price Index, and National Association of Realtors (NAR) median housing prices. The period for all regressions is 1996 to 2006. This captures all the years for which states made changes to their BRI value in the previous year and allows for the inclusion of CRA data, which is publicly available starting in 1996.

The FDIC Summary of Deposits data has information about each FDIC insured branch of a banking organization. Information includes the state and county of the branch, a unique identifier for the banking organization and BHC it is a part of, and the amount of deposits held by the branch. The unique identifier can be used to merge data from Call Reports and the CRA Disclosure Reports. The relevant data from these sources include the location of the banking organization's headquarters, loans outstanding from Schedule RC-C, Parts I and II, total assets, and small business lending by county. These variables also allow for the creation of a number of binary identifiers, which are used in the first section of the main results. These include identifying out-of-state, out-of-county , BHC, CRA, and unit branches. Also, by using unique identifiers for specific branches, which stay the same if the branch changes ownership, I can identify branch births and deaths. Tables 1 and 2 show summary statistics for branch and bank-level variables.

The key variable of this study is the county-level amount of small business loans outstanding. In order to examine county-level dynamics in small business lending (which is not produced as a comprehensive data source), I construct a measure of small business loans outstanding using information from the Summary of Deposits, Call Reports, and CRA Disclosure Reports. Using CRA disclosure data, it is possible to see county-level small business loan originations by banking organizations. However, banking organizations are only required to disclose this information if they are above a specific threshold for total assets. This value was $250 million starting in 1996 and remained at that level until 2006 when it was set at $1 billion. For these larger banks, I take the average of small business loan originations from the past 3 years and create a yearly weighting across all counties that sums to one. I multiply each county-year weight by the Call Report balance sheet information on small business loans outstanding to create the approximation of county-level small business loans outstanding. For smaller banks that do not disclose for the CRA, I create weights based on the percentage of total deposits in each county, which is information available in the Summary of Deposits. Just as above, I multiply these weights by Call Report small business loans outstanding. Lastly, I add these two values together to form the county-level aggregate amount.

In most regressions, bank and branch information is aggregated at the county-level. The BRI varies by state-year, but performing analyses at the county-level allow for tighter region-year controls, which can account for heterogeneity in economic and banking conditions across a particular state. Data on county-level economic conditions come from the BEA Economic Profiles by County (CAINC: 30 Series) and includes population; dividends, interest, and rent; total employment; wages and salaries; proprietor's income; among other variables. County-level GDP is not available until 2001, but regressions of GDP on BEA variables show that they capture over 95% of the variation in GDP, so it is reasonable to say that most of the information conveyed in county-level GDP is captured in the available controls. Additionally, information on the number of firms of certain sizes in each county is from the CBP.

An important control is a measure of local house prices since previous research has shown that this can impact the amount of lending, especially to small businesses. For example, Adelino et al. (2015) and Schmalz et al. (2017) both show that entrepreneurship increases as house prices rise since entrepreneurs have more valuable collateral for which to secure loans. Additionally, Favara and Imbs (2015) show that deregulation can cause house prices to increase from increased mortgage originations due to greater diversification benefits for geographically expanded banks. For these reasons, I include county-year median house prices, which I constructed from the data from the FHFA and NAR. Tables 3 and 4 show summary statistics for county-level variables.

4 Empirical Design and Results

4.1 Main Specification

Most of the regressions are structured similarly to generalized difference-in-differences models with varying levels of treatment. The basic form is the following:

$$Y_{c,t} = \beta_1 BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t}$$

$Y_{c,t}$ measures the dependent variable, which is usually the natural log of a level variable. Except for Part 4, which explores effects on state-level employment and wages, the level of observation is a county-year. As such, county fixed effects are included in all county-level regressions to control for time-invariant county unobservables. Likewise, year fixed effects are included to control for time-varying factors common to all counties. This strips out all variation except for county-year variation. Even though Favara and Imbs (2015) and Rice and Strahan (2010) both give supporting evidence of the exogeneity of the BRI, I include a number of county-year controls to make sure that estimates of β_1 are not driven by correlation between the BRI and local time-varying economic and demographic conditions. $X_{s,t}$ includes dummy variables for other prominent state-level regulations that might be related to the presence of interstate restrictions and, at the same time, impact the dependent variables. These regulations include right-to-work, poison pill, and universal demand laws. $X_{c,t}$ includes the following lagged controls, all in logged form: population, total employment, proprietor's income, wages/salaries, total deposits, median house prices, and number of small firms. Lastly, it is worth reiterating that the version of the BRI that I use comes directly from Johnson and Rice (2008). This version differs from Favara and Imbs (2015) who make the BRI binary as well as Rice and Strahan (2010), who designate a less than 30% deposit cap as restricted versus Johnson and Rice, who designate a less than or equal to 30% deposit cap as restricted. Regardless, I have run all regressions with both versions of the BRI, and there are minimal impacts on coefficient estimates. Additionally, all statistically significant results remain so with either version. Finally, the BRI varies not only across states, but within states and across time. However, a large degree of serial correlation still exists in most states' BRI values, so I cluster standard errors by state in accordance with Bertrand, Duflo, and Mullainathan (2004).

4.2 First-Order Impacts on Branching and Deposits

In order for the BRI to be a useful instrument for banking competition, it should have clear first-order effects on the expansion activity of banking organizations as well as the composition of branches within local markets. This is critical since, as I described earlier, the first wave of interstate banking deregulation left a complex system of branches, most of which were owned by BHCs, which along with the "loopholes" in restrictions raises questions of whether the restrictions that form the BRI have any ability to slow interstate banking or branching in the first place. There are many possible first-order effects to bank competition that I could study, but I focus on two that are cleaner to identify and probably the most significant: specifically, I study whether the restrictions that make up the BRI affect, first, the total number of branches in a local market and, second, branch births and the existence of certain types of banks within counties.

In order to motivate the regressions, I have created a number of choropleths or heat maps showing the composition of branches within counties. As a reference, Figure 2 shows the values of the BRI for each state after 2005. Figure 3 includes three maps of the U.S. with the percent of out-of-state branches located in each county during 1996, 2001, and 2006. The map shows some branching into mostly deregulated areas early on but a noisier expansion across the country thereafter. As mentioned earlier in the paper, out-of-state branching could be due to the consolidation of branches within a BHC subsidiary network or de novo branching. This highlights the importance of focusing on total branches and branch births and deaths in regressions. In Figure 4, I also plot cumulative CRA branch births per capita over the same time periods. I show this figure for two reasons: 1) it is possible to see a rough relationship between deregulation and CRA branch expansion, but more importantly 2) there is clearly not a clean expansion since CRA expansion occurs across the whole U.S., and regions of the less populated, regulated Midwest show counties with very low CRA births per-capita next to counties with very high values. The latter reason highlights the value of regressions in determining the true effect of the BRI on branch expansion and motivates weighting by county-year population to limit the impact of sparsely populated regions where there may be no or very few branch births or deaths in a year.

The regressions use the form:

$$Y_{c,t} = \beta_1 BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t}$$

$Y_{c,t}$ is one of following seven variables: log total branches, log total branch births, log out-of-state births, log in-state and in-county number of existing branches, log CRA births, and log non-CRA births. The controls are those mentioned in the "Main Identification" section with the addition of log existing number of branches in a county to control for branching opportunities not related to deregulation. This control is excluded in regressions where the dependent variable is either log in-state or in-county existing branches. As mentioned, weighting is done by population. This allows the model to put extra emphasis on counties with large populations where the most branching activity occurs and discount the branching activity in low populated areas where an additional branch birth or death could cause a spike in percent increase or decrease.

Panel A in Table 5 shows the results of these regressions. The total number of branches and total births increased by 1.5% and 6.7%, respectively, per one-unit drop in the BRI. This seems to have been driven by out-of-state births, which increased by 14.9% per one-unit decrease in the BRI. Did this simply add to an increasing number of branches in deregulated areas or did some bank branches suffer? The results focusing on the existing number of in-state or in-county branches indicate that these local branches are the ones that suffered the most. For instance, both show an average decrease in their number of branches: 2.3% and 4.1% for in-state and in-county branches, respectively, per unit decrease in the BRI. However, the decrease for in-state branches is not statistically significant. Lastly, I look at CRA versus non-CRA births. I find that births of larger, CRA bank branches increased in deregulated markets with no similar expansion in non-CRA branches.

To complete my initial study into the first-order effects of deregulation on banking competition, I run branch-level regressions of the log amount of branch deposits. In order to learn how the type of branch impacts the flow of deposits in deregulated areas, I interact CRA and out-of-state dummies with the BRI. The specification is the following:

$$lnDep_{i,b,c,t} = \beta_1 BRI_{s,t-1} + \beta_2 Dummy_b + \beta_3 BRI_{s,t-1} \times Dummy_b + \beta_4 X_{c,t} + \theta_b + \psi_c + \phi_t + \epsilon_{i,b,c,t}$$

where i indexes branches, and b indexes banking organization. I include all the same state-year and county-year controls as before and add in banking organization fixed effects to control for time invariant bank characteristics such as how deposits may be distributed across branches. I weight the regression by the number of branch deposits. The results are shown in Panel B of Table 5. They show that, in general, deregulation lowered the amount of deposits in a branch, which is congruent with the fact that the total number of branches increased in deregulated areas. More interestingly, after controlling for the average deposit levels of CRA and out-of-state branches, the estimate of β_3 shows that per one-unit decrease in the BRI, branches from a CRA or out-of-state bank increased deposits by 4.8% and 11.0%, respectively. This is evidence that larger, out-of-state banks were, in general, able to win the local battles for funds, decreasing the availability for smaller, local banks – the ones most involved and skilled in relationship lending.

4.3 Impact on Small Business Lending

The impact of deregulation on the expansion of larger, out-of-state banks and the distribution of local deposits serves as motivation for exploring the effects on small business lending. Theories from Petersen and Rajan (1995) and Boot and Thakor (2000) generate opposite predictions on how increased competition should impact small business lending, so even though, empirically, there are first-order effects on competition, it is unclear, a priori, how small business lending should be affected. In this section, I run a number of regressions related to small business lending to try to understand how credit supply was impacted during this particular deregulation period. The regressions, whose results are in Table 6, have the same specification as the previous county-level regressions except the regressions are weighted by the inverse number of counties in each state as in Favara and Imbs (2015). This gives equal weight to all states to best exploit the cross-sectional differences in state BRIs. Likewise, this gives equal weighting to counties within each particular state. The main results are robust to weighting each county by population within each state as well.

The results shown in Table 6 are consistent with Rajan and Petersen who predict that small business lending decreases with increased competition. Statistically, the number of small business loans did not decrease, yet the aggregate amount of small business loans outstanding decreased by 2.2% per one-unit decrease in the BRI. This implies smaller loans were made to small businesses. Other measures such as the amount of small business loans per number of small businesses present in the previous year and per capita show similar results. A one-unit drop in the BRI, in expectation, caused a decrease of about $1,400 per small business and $49 per person. A decomposition of these last two measures into CRA and non-CRA lending shows this drop was due to initial decreases from both CRA and non-CRA branches, with a one-sided t-test indicating a statistically greater decrease in non-CRA lending per small business, which may be due to the decrease in their deposits in deregulated markets.

In order to further investigate the mechanisms behind the decrease in small business lending, I run two regressions with the BRI interacted with either the previous county-year's aggregate deposits or median house prices. The specification is the following:

$$y_{c,t} = \beta_1 BRI_{s,t-1} + \beta_2 BRI_{s,t-1} \times x_{c,t-1} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t}$$

where $y_{c,t}$ is one of four measures of small business lending, and $x_{c,t-1}$ is lagged log deposits or median house prices, both of which are also included in the controls. If β_2 is positive and significant, this could signify that banks entering local markets prioritized the opportunities to secure cheap funding in the form of deposits and originate mortgages over the ability to originate small business loans. For example, if a bank expanded into a wealthier county in order to secure a portion of the deposits in that market to lend out elsewhere or to larger in-county firms, this would drive β_2 to be positive. Likewise, if a bank made it a priority to expand into hot housing markets to originate and sell mortgages, it may have done so without giving full consideration to the market for small business lending, which would also cause β_2 to be positive.

Columns 1 and 2 in Table 7 show that β_2 is, indeed, positive and significant in both cases. The means (standard deviations) of counties' log deposits and median home prices are 19.7 (1.5) and 11.7 (0.5), respectively. This implies that, despite the negative coefficient on the BRI in the first row, the estimated decrease in small business lending in the average county from a one unit decrease in the BRI is 2.2% in Column 1 (house prices) and 1.2% in Column 2 (deposits). These estimates are in line with the unconditional estimated effect of 2.2%. However, the interesting part of these result is how impactful these local economic conditions are in determining the effect of banking competition on small business. A one standard deviation increase in housing prices leads to an additional decrease in small business lending of 1.7% per unit decrease in the BRI, while a one standard deviation decrease in deposits leads to an additional decrease of 1.9%. These magnitudes are very large compared to the baseline effect and support a channel of larger, out-of-state banks entering markets in order to compete for local deposits and originate mortgages at the expense of smaller, incumbent banks who are forced to decrease their small business lending as a result.

The final set of regressions begin to explore the dynamics of deregulation on small business lending. In a later section I use the method in Jordà (2005) to estimate impulse response functions, but for now, I simply include a lagged version of the dependent variable as a control. By including the lagged dependent variable, the coefficient measures the initial effect of a change in the BRI on small business lending. Columns 3 and 4 in Table 7 shows the results of these regressions. The statistical significance of the estimates are the same as in Table 6, but the magnitudes are smaller by about half signifying that the effects of deregulation take some time to fully manifest themselves.

4.4 Impact on the Number of Small Businesses

Small businesses, in general, are more financially constrained than larger ones, and as such, any decrease in the local credit availability should have real effects on their operations.

Ideally, I would be able to look at accounting variables of firms within local markets and test how specific local credit shocks impact leverage and, consequently, investment and labor decisions. However, reliable and comprehensive data on small, private firms is difficult to acquire. Rice and Strahan (2010) use the best available source of small firm data, the Federal Reserve's Survey of Small Business Finance (SSBF), and study the liabilities of small businesses and find that, in deregulated states, they borrow at lower rates, are more likely to borrow from banks, but seem to not borrow any more or less in terms of amount. In fact, they even find that the use of trade credit by small firms increases in deregulated states, which is consistent with my findings, but ultimately, they are unable to study the investment and labor decisions of these small firms given the nature of the data (pooled and available in 5 year increments). This paper suffers from the same data limitations, and while I cannot observe the intermediate decisions that individual firms make in order to deal with increased financial constraints, I can observe the ultimate decision to close the firm. This is what I do in this section: specifically, I run reduced form regressions to understand how the number of firms is impacted by deregulation.

The reduced form results, found in Table 8, show that the increased competition from the IBBEA did not increase the closures of small firms, at least statistically, in deregulated areas the year after restrictions changed. This is not necessarily surprising given that firms have many options that can enable them to continue their operations before having to close when faced with increased financial constraints. Additionally, even if the credit shock is strong enough to cause the number of firms to be lower in more deregulated regions, it may not necessarily occur the year after restrictions are lifted. This fact serves as further motivation to explore the dynamic effects of deregulation, which I present after the main results.

4.5 Impact on Employment, Hours Worked, and Wages

In the last section of the main results, I investigate the intermediate steps that firms took in aggregate before closing to deal with financial constraints such as reducing their labor force, cutting hours, or decreasing pay. As mentioned previously, reliable data on small businesses is unavailable so I am unable to directly look at individual firm behavior. However, I am able to utilize the U.S. Census Current Population Survey March Supplement to get detailed information from the labor side including demographic and work information. This data is at the state-level, which disconnects it from the county-level chain of causality established in the previous sections, but the nature of the data does allow for specifications that can control for all state-year unobservables. Specifically, I use the following models for the employment and hours worked analysis:

$$\ln y_{f,s,t} = \beta_1 BRI_{s,t-1} + \beta_2 BRI_{s,t-1} \times \alpha_f + \beta_3 X_{s,t} + \alpha_f + \psi_s + \phi_t + \epsilon_{f,s,t} \tag{1}$$

$$\ln y_{f,s,t} = \beta_2 BRI_{s,t-1} \times \alpha_f + \alpha_f + \psi_s \times \phi_t + \epsilon_{f,s,t} \tag{2}$$

$y_{f,s,t}$ represents either total employees or total hours worked aggregated into bins created by state, year, and firm size. Firm sizes are split into 5 categories: S1, S2, M1, M2, and L. These represent firms with 1 to 49, 50 to 99, 100 to 499, 500 to 999 and 1,000 or more employees, respectively. As an example, when forming $employees_{S1,Wisconsin,2000}$, I add up all workers in Wisconsin in 2000 that worked at firms with between 1 and 49 employees: this forms one observation.

The two specifications both contain fixed effects for firm size, α_f, interacted with the BRI, which allows deregulation to have different effects on workers at firms of different sizes. Specification (2) is the most credible, given its inclusion of state-year fixed effects, but it does not allow for a baseline estimation of the BRI's effect on employment or hours worked since the BRI is collinear with the state-year fixed effect. It does, however, allow for estimates of whether banking competition impacts certain sets of workers differently. Specification (1) has separate state and year fixed effects with additional state-year controls and allows for an estimation of the baseline effect of the BRI. In these regressions large firms serve as the base level for comparison. Panel A in Table 9 shows the results on employment of all workers (both part- and full-time) and only full-time workers.

The estimated coefficients are very similar between the two specifications indicating that the BRI is essentially orthogonal to any state-year omitted variables in the first specification. Therefore, the estimates in the first specification, including the overall impact of changes to the BRI, are unlikely to be biased. These results show that there does not appear to have been a direct effect to employment levels of all workers the year after deregulation for any firms. However, full-time employment did drop by 4.5% for firms with fewer than 50 employees. The hours worked by all workers at these firms dropped by 4.5% per unit of BRI relative to the largest firms, which saw an increase of 2.4%. The decrease for only full-time workers at the smallest firms was larger at 5.0% with no statistically significant change for largest firm hours. These numbers are consistent with the narrative that small firms both fired and cut hours of full-time workers, who then found part-time work at larger firms. However, it is impossible to say that this is the case without tracking individual workers.

Despite the existence of adverse effects on employment and hours worked at small firms, an important question of whether, in aggregate, deregulation was positive or negative for labor remains. In either the short-term or long-term, it is possible that, although small firm workers were hurt, aggregate employment and hours worked increased across all firms due to increased banking competition. I explore the long-term effects in the next section, but the initial effects on aggregate employment and hours worked are shown in Table 10. The results show that there were not any statistically or economically significant effects on overall state-wide employment or hours worked due to deregulation. Therefore, it appears that local deregulation contributed to a transformation in the labor market, shifting labor from smaller firms to larger ones.

Lastly, I explore whether or not banking competition ultimately had an impact on wages. This impact could come from the direct lowering of wages by small firms to deal with financial constraints or it could come from an increased labor supply shock to all firms from the workers who previously lost their jobs. For this analysis, I use the pooled CPS data and do not aggregate it in order to maintain detailed demographic and health information. The specifications are different than the previous ones for employment and hours worked, but they follow the same logic, especially with respect to potentially different effects for workers at firms of different sizes. The specifications are:

$$\ln wage_{i,d,f,s,t} = \beta_1 BRI_{s,t-1} + \beta_2 BRI_{s,t-1} \times \alpha_f + \beta_3 X_{i,t} + \beta_4 X_{s,t} + \alpha_f + \psi_{d,s} + \phi_{d,t} + \epsilon_{i,d,f,s,t} \quad (3)$$

$$\ln wage_{i,d,f,s,t} = \beta_2 BRI_{s,t-1} \times \alpha_f + \beta_3 X_{i,t} + \alpha_f + \psi_{d,s,t} + \epsilon_{i,d,f,s,t} \quad (4)$$

where i indexes person and d indexes demographic cluster, which are formed as the cartesian product of relationship to head of household, age, sex, race, marital status, veteran status, nativity, and education. In total there are over 100,000 demographic clusters, which help control for the numerous unobservables that can impact a person's wage. $X_{i,t}$ includes disability status, years of schooling, health status, age, and whether or not the individual gets a pension through work. As is common in the labor literature, I limit the sample to full-time workers between the ages of 25 and 54, inclusive.

The results in Table 11 show that wages did not change at the largest firms right after deregulation but did decrease for workers at firms with 100 to 999 employees by about 0.65% per unit of BRI. While the estimates for the relative effects at smaller firms showed lower wages compared to large firms, they were not statistically significant, indicating that small firms did not cut wages in addition to the workers and hours they cut. It is possible that the decrease in wages at larger firms, specifically those with 500 to 999 employees, came from a positive labor supply shock caused by the cut in hours at small firms, but I cannot rule out other effects from deregulation that may have caused this increase such as a positive credit supply shock to these firms. However, these larger firms are unlikely to be as financially constrained as smaller ones, and as such, should not be impacted as greatly by changes to the local banking market, which provides some support to the idea that changes to the labor at larger firms comes through the small business credit channel.

5 Dynamic Effects of Deregulation

5.1 Impulse Response Function

Up to this point in the paper, the results have focused almost entirely on the static effects of how a change in state-wide restrictions to interstate banking and branching impact branching, lending, small firm existence, and labor outcomes before and after they were enacted. These static results are important, but they mask the interesting dynamics that occur after deregulation including some results that may take several years to manifest themselves. As a brief motivation to this section, the results in Panel B of Table 7 included a regression of log total amount of small business lending with a lag of itself. This specification provides the immediate impact of deregulation on small business lending and shows that the pre-post change is larger than the impact effect. This is evidence that the effects of deregulation take time to manifest themselves fully. In this section, I explore dynamic effects of deregulation on a number of the dependent variables from the previous sections.

In order to create impulse response functions, I use the method provided in Jordà (2005) instead of trying to estimate the true multivariate dynamic process. Jordà's method allows for a direct estimate of the impulse response function using local projections, which makes it easy to implement and does not force an assumption of the underlying data-generation process such as VAR or VARMA. Additionally, it can handle nonlinearities that would be intractable in VARs. The process involves estimating $\{\beta_1^{(i)}\}_{i=0,1,...T}$ from the general model:

$$Y_{c,t+i} = \beta_1^{(i)} BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t+i}$$

where $\beta_1^{(i)}$ estimates the effect of deregulation at horizon i. For each result in this section, I use the exact model specified in the previous sections and adjust it to fit this format, setting $T = 7$, which allows for the study of the dynamics for 8 years following deregulation. I also change the sign of the estimates to make the graphs more intuitive so that a positive value means an increase and a negative one, a decrease.

5.2 Dynamics of Branch Births and Total Branches

While it appears that deregulation had a permanent effect on the number of branches in deregulated areas, it seems to have just delayed the expansion of CRA and out-of-state banks into more restricted areas. Figure 5 shows the dynamics of branch births, overall, as well as births by out-of-state and CRA banks. This shows that branch births were higher, on average, in deregulated areas for approximately 5 years with most estimates being statistically different than 0 for the first 4 years. This changes in years 6 through 8 when the estimates show greater births in regulated areas with some statistically significant years towards the end of the full horizon. This indicates that after about 5 years, 1) banks were finished with or slowing down their expansion into deregulated states and 2) banks were able to still expand into restricted states with the "loopholes" I described in previous sections.

However, even with later expansion into regulated states, the total number of branches remained higher in deregulated states. Figure 6 shows that throughout the 8-year horizon, the number of branches were approximately 2-2.5% higher per unit of the BRI. This is important because it shows that in this case, the new competition that was brought about by the IBBEA was not just from a change in the composition of banks in local markets such as more large banks than small banks, but also from a raw increase in the number of branches in the markets, which is more in line with the competition that Petersen and Rajan (1995) and Boot and Thakor (2000) include in their models.

5.3 Dynamics of Small Business Lending

The dynamics of deregulation on small business lending indicate very clearly that the negative credit shock is temporary. Figure 7 shows that, in expectation, the level of small business lending remains lower in deregulated areas up through year 8, however, the difference is only statistically significant for about the first 3 years, and the trend indicates a slow recovery until the end of the horizon.

Figure 7 also shows a breakdown of small business lending by CRA and non-CRA banking organizations giving some additional evidence on what drives the overall decline in small business lending. The results from the early static regressions seem to indicate that the drop in small business lending comes almost entirely from declines in lending from non-CRA banks. However, the graphs indicate that, while the early negative shock may be mostly attributable to non-CRA banks, they actually seem to eventually increase their small business lending relative to their peers in regulated states. Although, it should be made clear that this graph does not show statistical significance. However, lending by CRA banks does seem to remain lower by about 3% per unit of BRI in deregulated states for the entire horizon with the estimates being statistically significant for the majority of years 2 through 6. This provides some additional evidence in favor of the hypothesis that larger banks were moving into deregulated markets for reasons other than commercial lending opportunities since, relative to other CRA banks, the ones in deregulated markets where expansion was greater in earlier years had less small business lending.

5.4 Dynamics of Small Firm Prevalence

Earlier results seem to indicate that there was no effect of deregulation on the prevalence of small firms: however, if you look over the entire horizon, it appears that a statistically significant decrease in the number of small businesses does occur, peaking around 5 years after deregulation. By this point in time, dynamic results on small business lending show that there had been some recovery in the amount of small business lending so it is very interesting that the initial temporary negative shock had longer run effects – that some small business were able to initially weather the shock and the increased financial constraints that came with it, but ultimately succumbed to bankruptcy or voluntary closure. These results are shown in Figure 8, which includes impulse responses for firms of three different sizes: all small businesses, firms with fewer than 5 employees, and firms with fewer than 100 employees. The smallest firms saw the largest decrease in numbers as well as the longest period of statistical significance. Overall, as mentioned previously, these magnitudes are small but hint at the fact that other dynamic effects on firms' labor decisions may be present.

5.5 Dynamics of Employment and Hours Worked

The dynamics of labor outcomes provides evidence that corroborates the findings in the previous section, specifically that deregulation led to increased financial constraints among small firms which had real effects on firms and their labor. Figure 9 shows the impulse response functions for employment of all, full-time, and part-time workers in firms with fewer than 51 employees. While there was no statistically significant change in employment of all workers over the horizon, full-time employment was about 3-4% less during the entire post-deregulation period. Figure 10 focuses on workers at firms with 51 to 100 employees. At these slightly larger firms, it appears that the credit supply shock took several years to manifest itself with a statistically significant decrease in both full-time and all employment starting 6 years after deregulation. Interestingly, the estimates decrease monotonically between years 4 to 8 indicating that negative effects to labor at these firms only got worse over time. At first glance, the results seem odd since one might imagine that the smallest firms, who the literature has shown to be the most constrained, would have seen the biggest drop in aggregate employment by the end of the horizon, but this is not the case. This could be the natural result of two phenomena. First, it may be the case that smaller firms simply could not downsize as much and stay open. They may have been running leaner operations on average and, given their financial constraints in the past, been unable to invest in fixed capital that would have enabled them to reduce their labor force and keep their operations running. Second, firms with 51-100 employees might downsize to the point where the firm now has fewer than 51 employees, thus mechanically replenishing the employment in the smallest firm subgroup. If no such replenishment occurs within the 51-100 employee group then aggregate employment would decrease as in the graph.

Results for the number of hours worked by all, full-time, and part-time employees at smaller firms, which are shown in Figures 11 and 12, show the same patterns as the employment levels at these firms. The only difference is that the hours worked of all employees at firms with fewer than 51 employees fell by about 4% right after deregulation and remained near this level during the entire horizon. This is in contrast with the no statistical change found in the employment level of all employees at firms of this size throughout the horizon.

Finally, Figures 13 and 14 explore the dynamics of the state-wide effects on employment and hours worked, ignoring firm size. These figures complement Table 10 and help answer the question of whether or not deregulation had an overall positive effect on labor, despite the harm to small firms. Throughout the horizon, there is not one statistically significant estimate. However, near the end of the horizon there is a clear upward trend in full-time employment as well as all and full-time hours worked. Without speculating too much on these results, it may be the case that, ultimately, the IBBEA did lead to improvements in employment and hours worked. However, this improvement, if it exists, would have come from a shift in labor from smaller firms to larger ones. Without knowing anything on the dynamics of wages or the relative quality of work and benefits at larger firms, it is impossible to say anything about any potential welfare loss or improvement coming from this potential shift.

6 Conclusion

The prevailing literature on banking deregulation has focused on the largely positive outcomes fostered by increased banking competition. Taken as a whole, the literature may lead to the conclusion that deregulation is always positive for every sector of the economy. However, in this paper, I show that externalities may arise as a consequence of how deregulation is specifically implemented. In the case of the IBBEA, small businesses were hurt as a consequence of the increased ability of large, out-of-state banks to branch with few limitations into the most unrestricted markets. I provide evidence that when these large banks prioritized entering markets with greater wealth, in the form of aggregate deposits, and higher house prices, it came at the expense of small business lending. Additionally, small banks were generally the losers in the competition for local deposits and, as such, small businesses were further hurt since the very banks most specialized in making relationship loans had less funds to do so.

In this paper, I also explore the dynamic effects of deregulation, providing insight into the nature of the negative credit supply shock and how it had long-run effects on small business existence and labor. Specifically, I show that the negative credit supply shock to small businesses was temporary – that it was driven at first by a decrease in loans from small banks, perpetuated by persistently lower large bank lending, but, ultimately, balanced out by a recovery in small bank lending. This temporary shock initially caused the smallest firms to downsize and cut the hours of their workers, which was contemporaneous with an increase in hours worked at larger firms along with a decrease in average wages at medium-sized firms. However, even as the amount of small business lending recovered, the employment levels and number of hours worked at smaller firms remained persistently lower for the entire eight-year, post-deregulation horizon that I focus on. Closures of small firms were not initially impacted by the negative credit supply shock. However, over time, the increased financial constraints from the initial shock manifested into statistically significant adverse effects on small firm prevalence. In particular, the number of small firms in less regulated markets decreased after several years relative to more regulated markets, and while the number eventually recovered, the total number of workers and hours worked continued to decrease monotonically, thereafter, up until the end of the eight-year horizon.

References

Adelino, Manuel, Antoinette Schoar, and Felipe Severino, 2015, House prices, collateral, and self-employment, *Journal of Financial Economics* 117, 288–306.

Amore, Mario Daniele, Cedric Schneider, and Alminas Žaldokas, 2013, Credit supply and corporate innovation, *Journal of Financial Economics* 109, 835–855.

Baghai, Ramin, Rui Silva, Viktor Thell, and Vikrant Vig, 2020, Talent in distressed firms: Investigating the labor costs of financial distress, *Available at SSRN 2854858* .

Bai, John, Daniel Carvalho, and Gordon M Phillips, 2018, The impact of bank credit on labor reallocation and aggregate industry productivity, *The Journal of Finance* 73, 2787–2836.

Berger, Allen N, Christa HS Bouwman, and Dasol Kim, 2017, Small bank comparative advantages in alleviating financial constraints and providing liquidity insurance over time, *The Review of Financial Studies* 30, 3416–3454.

Berger, Allen N, Nathan H Miller, Mitchell A Petersen, Raghuram G Rajan, and Jeremy C Stein, 2005, Does function follow organizational form? evidence from the lending practices of large and small banks, *Journal of Financial economics* 76, 237–269.

Berger, Allen N, and Gregory F Udell, 2002, Small business credit availability and relationship lending: The importance of bank organisational structure, *The economic journal* 112, F32–F53.

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan, 2004, How much should we trust differences-in-differences estimates?, *The Quarterly journal of economics* 119, 249–275.

Bertrand, Marianne, Antoinette Schoar, and David Thesmar, 2007, Banking deregulation and industry structure: Evidence from the french banking reforms of 1985, *The Journal of Finance* 62, 597–628.

Black, Sandra E, and Philip E Strahan, 2001, The division of spoils: rent-sharing and discrimination in a regulated industry, *American Economic Review* 91, 814–831.

Black, Sandra E, and Philip E Strahan, 2002, Entrepreneurship and bank credit availability, *The Journal of Finance* 57, 2807–2833.

Boot, Arnoud WA, and Anjan V Thakor, 2000, Can relationship banking survive competition?, *The journal of Finance* 55, 679–713.

Brown, Jennifer, and David A Matsa, 2016, Boarding a sinking ship? an investigation of job applications to distressed firms, *The Journal of Finance* 71, 507–550.

Caggese, Andrea, and Vicente Cuñat, 2008, Financing constraints and fixed-term employment contracts, *The Economic Journal* 118, 2013–2046.

Caggese, Andrea, Vicente Cuñat, and Daniel Metzger, 2019, Firing the wrong workers: Financing constraints and labor misallocation, *Journal of Financial Economics* 133, 589–607.

Canales, Rodrigo, and Ramana Nanda, 2012, A darker side to decentralized banks: Market power and credit rationing in sme lending, *Journal of Financial Economics* 105, 353–366.

Carpenter, Robert E, and Bruce C Petersen, 2002, Is the growth of small firms constrained by internal finance?, *Review of Economics and statistics* 84, 298–309.

Chakraborty, Indraneel, Itay Goldstein, and Andrew MacKinlay, 2018, Housing price booms and crowding-out effects in bank lending, *The Review of Financial Studies* 31, 2806–2853.

Chava, Sudheer, Alexander Oettl, Ajay Subramanian, and Krishnamurthy V Subramanian, 2013, Banking deregulation and innovation, *Journal of Financial economics* 109, 759–774.

Cvijanović, Dragana, 2014, Real estate prices and firm capital structure, *The Review of Financial Studies* 27, 2690–2735.

Del Boca, Daniela, and Annamaria Lusardi, 2003, Credit market constraints and labor market decisions, *Labour Economics* 10, 681–703.

Favara, Giovanni, and Jean Imbs, 2015, Credit supply and the price of housing, *American Economic Review* 105, 958–92.

Garmaise, Mark J, 2008, Production in entrepreneurial firms: The effects of financial constraints on labor and capital, *The Review of Financial Studies* 21, 543–577.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales, 2004, Does local financial development matter?, *The Quarterly Journal of Economics* 119, 929–969.

Hubbard, R Glenn, 2001, Capital-market imperfections, investment, and the monetary transmission mechanism, in *Investing today for the world of tomorrow*, 165–194 (Springer).

Jayaratne, Jith, and Philip E Strahan, 1996, The finance-growth nexus: Evidence from bank branch deregulation, *The Quarterly Journal of Economics* 111, 639–670.

Jayaratne, Jith, and Philip E Strahan, 1998, Entry restrictions, industry evolution, and dynamic efficiency: Evidence from commercial banking, *The Journal of Law and Economics* 41, 239–274.

Johnson, Christian A, and Tara Rice, 2008, Assessing a decade of interstate bank branching, *Wash. & Lee L. Rev.* 65, 73.

Jordà, Òscar, 2005, Estimation and inference of impulse responses by local projections, *American economic review* 95, 161–182.

Kerr, William R, and Ramana Nanda, 2009, Democratizing entry: Banking deregulations, financing constraints, and entrepreneurship, *Journal of Financial Economics* 94, 124–149.

Krishnan, Karthik, Debarshi K Nandy, and Manju Puri, 2015, Does financing spur small business productivity? evidence from a natural experiment, *The Review of Financial Studies* 28, 1768–1809.

Kroszner, Randall S, and Philip E Strahan, 2014, Regulation and deregulation of the us banking industry: causes, consequences, and implications for the future, in *Economic regulation and its reform: what have we learned?*, 485–543 (University of Chicago Press).

Kysucky, Vlado, and Lars Norden, 2016, The benefits of relationship lending in a cross-country context: A meta-analysis, *Management Science* 62, 90–110.

Liberti, Jose M, and Atif R Mian, 2008, Estimating the effect of hierarchies on information use, *The Review of Financial Studies* 22, 4057–4090.

Morgan, Donald P, Bertrand Rime, and Philip E Strahan, 2004, Bank integration and state business cycles, *The Quarterly Journal of Economics* 119, 1555–1584.

Pagano, Marco, and Giovanni Pica, 2012, Finance and employment, *Economic Policy* 27, 5–55.

Petersen, Mitchell A, and Raghuram G Rajan, 1994, The benefits of lending relationships: Evidence from small business data, *The journal of finance* 49, 3–37.

Petersen, Mitchell A, and Raghuram G Rajan, 1995, The effect of credit market competition on lending relationships, *The Quarterly Journal of Economics* 110, 407–443.

Rajan, Raghuram G, 1992, Insiders and outsiders: The choice between informed and arm's-length debt, *The Journal of finance* 47, 1367–1400.

Rice, Tara, and Philip E Strahan, 2010, Does credit competition affect small-firm finance?, *The Journal of Finance* 65, 861–889.

Schmalz, Martin C, David A Sraer, and David Thesmar, 2017, Housing collateral and entrepreneurship, *The Journal of Finance* 72, 99–132.

Sharpe, Steven A, 1990, Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships, *The journal of finance* 45, 1069–1087.

Stein, Jeremy C, 2002, Information production and capital allocation: Decentralized versus hierarchical firms, *The journal of finance* 57, 1891–1921.

Stiroh, Kevin J, and Philip E Strahan, 2003, Competitive dynamics of deregulation: Evidence from us banking, *Journal of money, credit and Banking* 801–828.

Strahan, Philip E, et al., 2003, The real effects of us banking deregulation, *Review-Federal Reserve Bank Of Saint Louis* 85, 111–128.

Williams, Victoria, 2018, 2016, small business lending in the united states .

Figures

Figure 1. Percent of county branches affiliated with a multi-state bank holding company in 1994

FDIC Summary of Deposits data includes unique identifiers for both the deposit taking institution and its holding company if it has one. I sum up all branches in a county that have a holding company and divide it by the total number of county branches to create this measure.

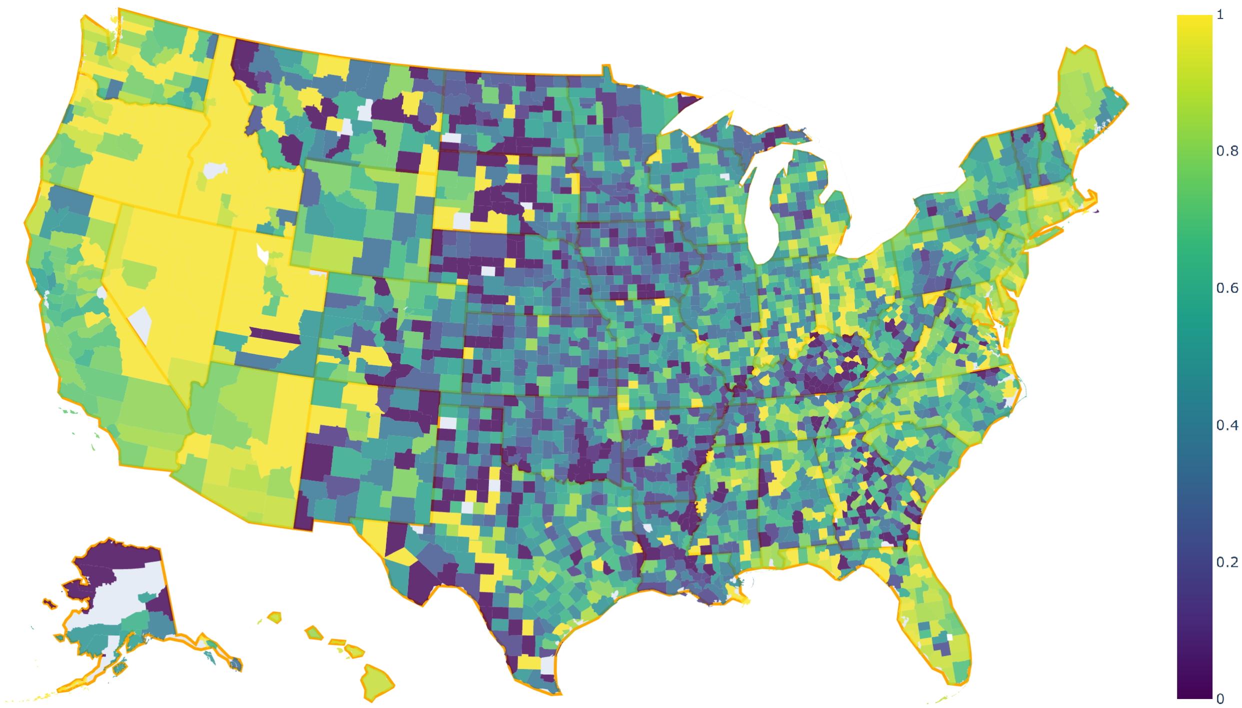


Figure 2. Branching Restrictiveness Index by State at the End of 2005

This figure shows the final value of the BRI for each state at the end of my sample period. States enacted restrictions between 1995 and 2005 so my sample period of 1996 to 2006 captures all previous year changes to the BRI. Most of the states enacted their restrictions between 1995 and 1998, but several of them changed their restrictions even after these years.

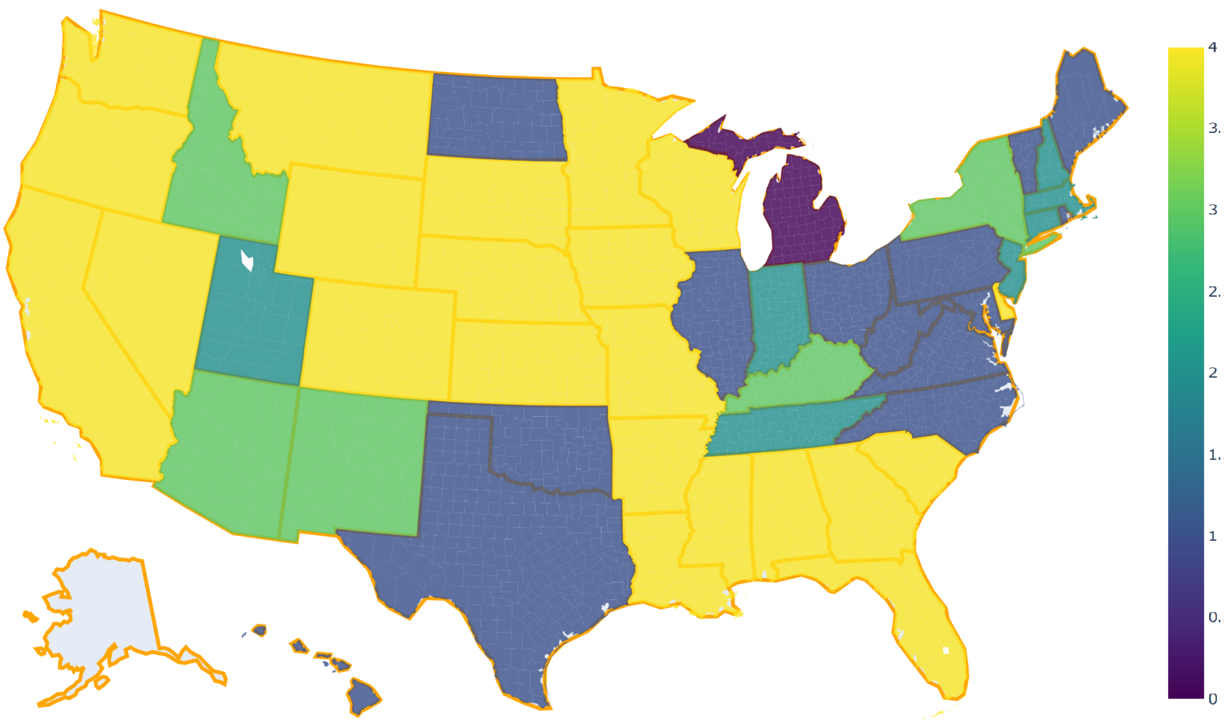


Figure 3. Percent of Out-of-State Branches Within Each County (1996, 2001, and 2006)

This figure shows the percent of branches whose main office branch is located outside of the branch's state. In the FDIC Summary of Deposits data, each branch is labeled as a regular branch or main office branch. For each uniquely identified deposit taking institution, I find the state of the main office, and for every branch I label an out-of-state indicator as 1 if its state is different than the main office state, and 0 otherwise. The county-level measure is the average of all branch indicators at each point in time.

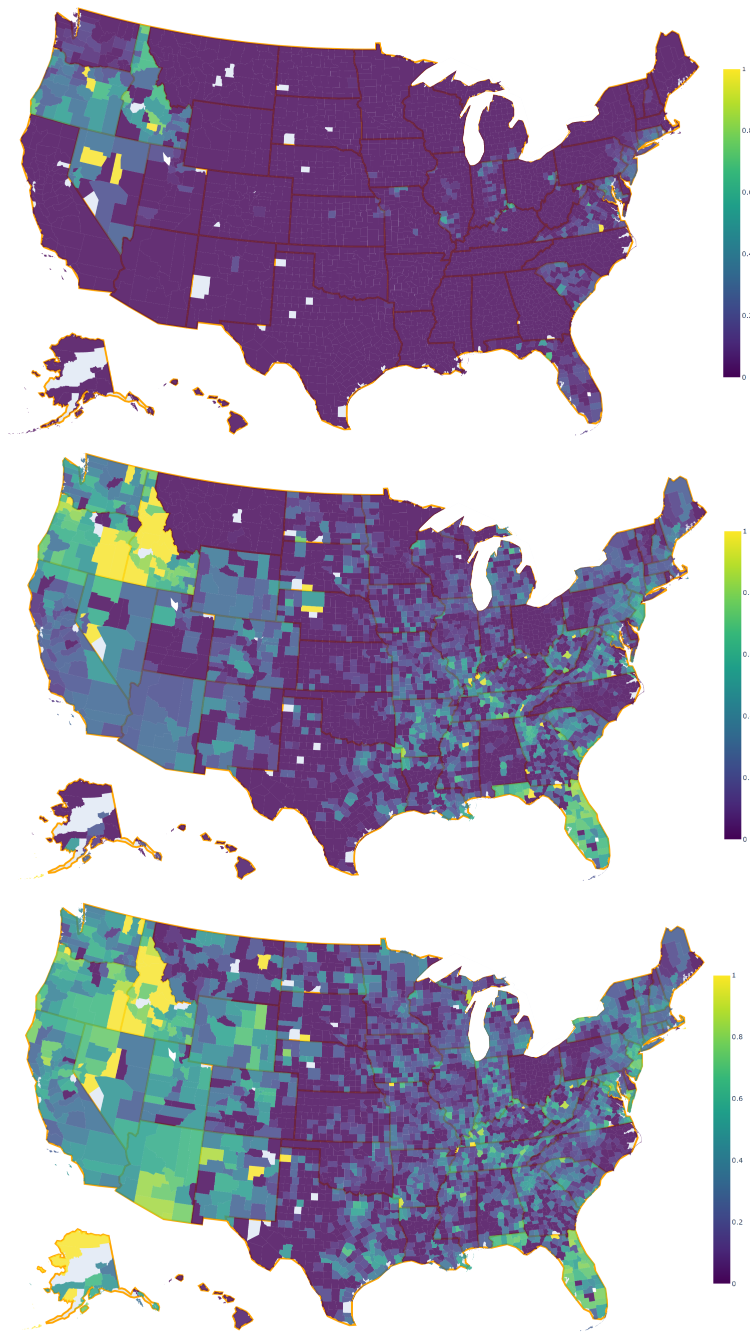


Figure 4. Cumulative CRA Branch Births Per-Capita (1996, 2001, 2006)

This figure shows the cumulative number of CRA branch births normalized by county-level population at three points in time. I use 1996 as a starting year and calculate new branch births using FDIC Summary of Deposits data. Births can be identified because each branch has a unique branch identifier, so even if a bank is sold and a branch is converted, it will not count as a branch birth since its branch ID remains the same. CRA reporting data includes one of four different unique identifiers depending on the reporting agency. Each CRA reporting institution is merged with the appropriate identifier in the Summary of Deposits data to indicate it as a CRA branch or not.

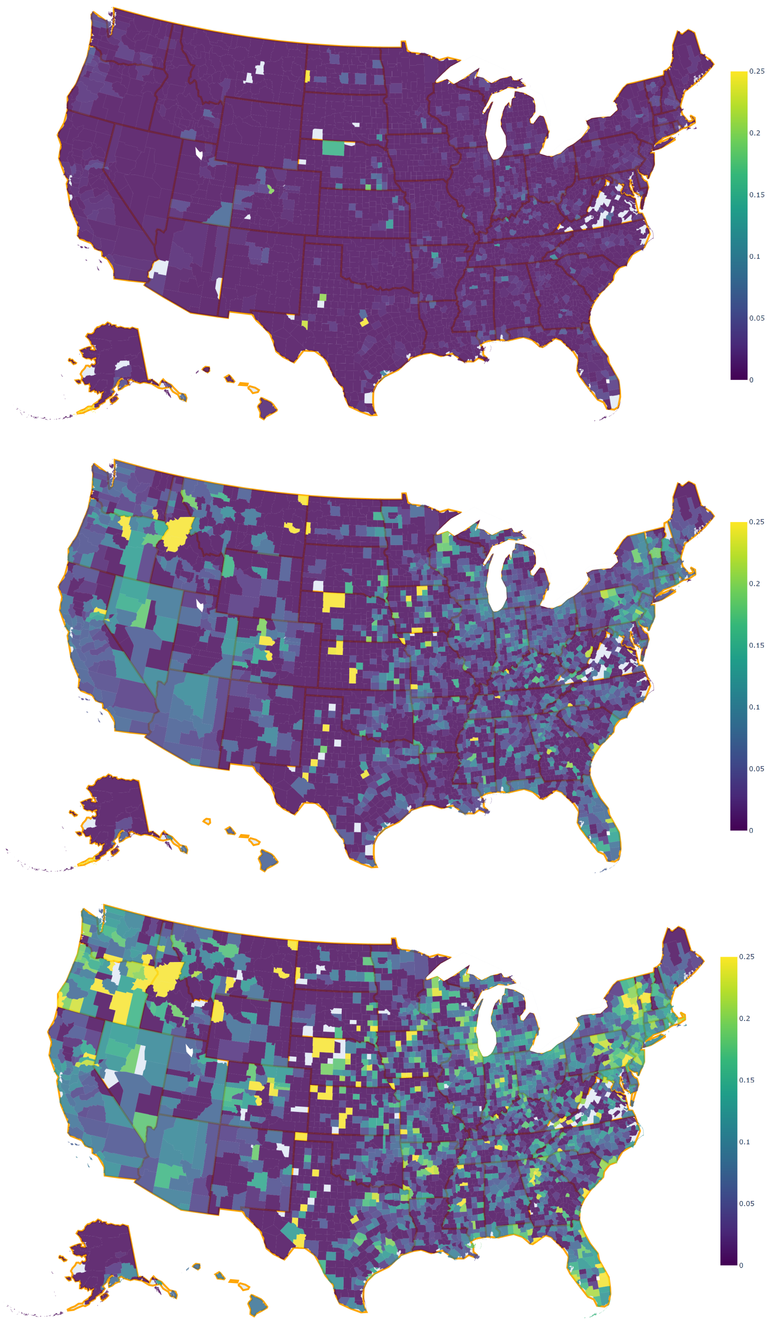


Figure 5. Bank Branch Birth Dynamics (Years Post-Deregulation)

This figure shows the estimates with 90% confidence intervals of $\{\beta_1^{(i)}\}_{i=0,1,...7}$ for $Y_{c,t+i} = \beta_1^{(i)} BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t+i}$. i=0 represents "Year 1" or one year after a change in restrictions. $Y_{c,t+i}$ represents log branch births in total and broken down by CRA and out-of-state banking organizations at different horizons. $X_{s,t}$ includes other state regulations and $X_{c,t}$ includes county-year controls. ψ_c and ϕ_t are county and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

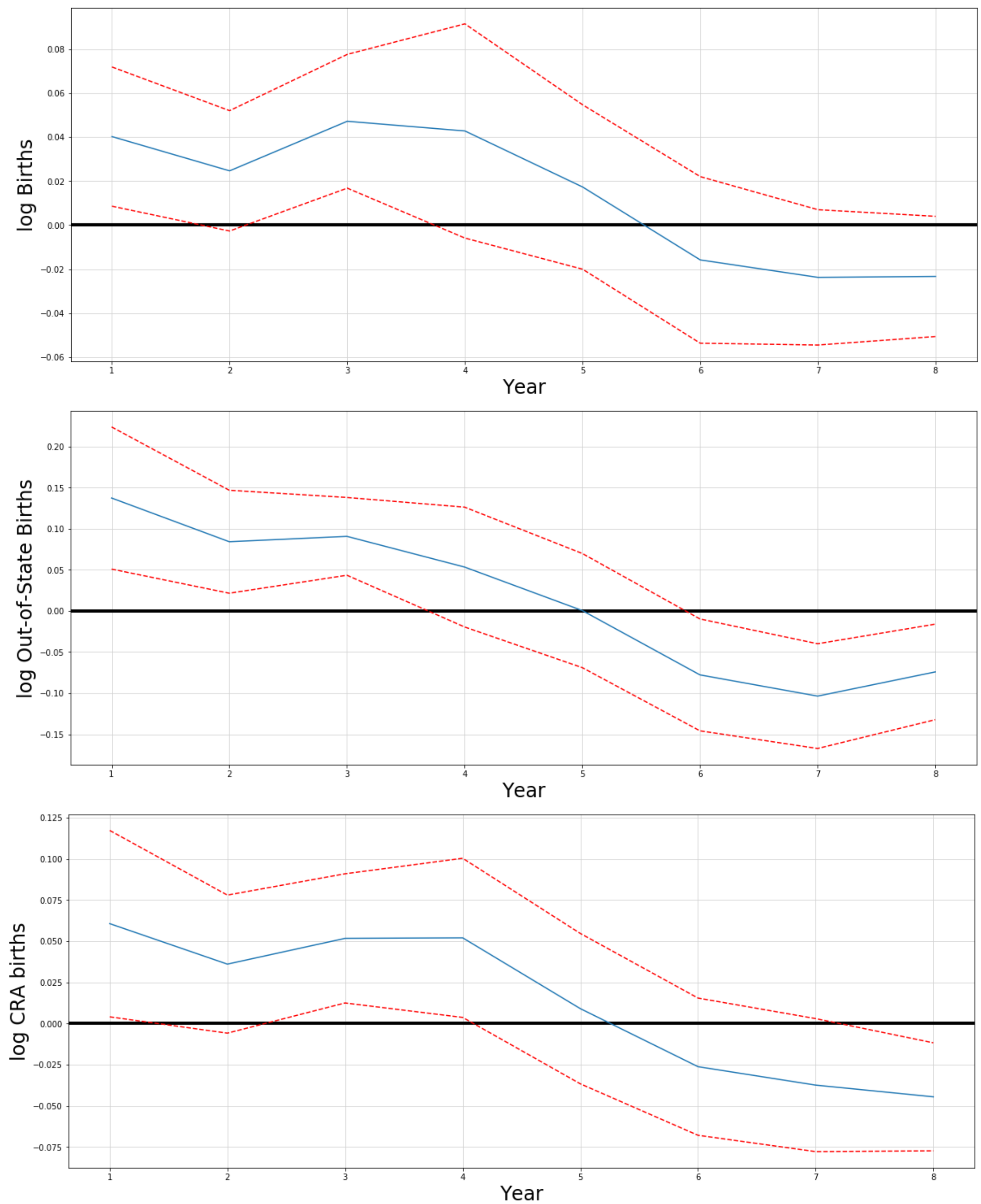


Figure 6. Total Bank Branches Dynamics (Years Post-Deregulation)

This figure shows the estimates with 90% confidence intervals of $\{\beta_1^{(i)}\}_{i=0,1,...7}$ for $Y_{c,t+i} = \beta_1^{(i)} BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t+i}$. i=0 represents "Year 1" or one year after a change in restrictions. $Y_{c,t+i}$ represents log total county branches at different horizons. $X_{s,t}$ includes other state regulations and $X_{c,t}$ includes county-year controls. ψ_c and ϕ_t are county and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

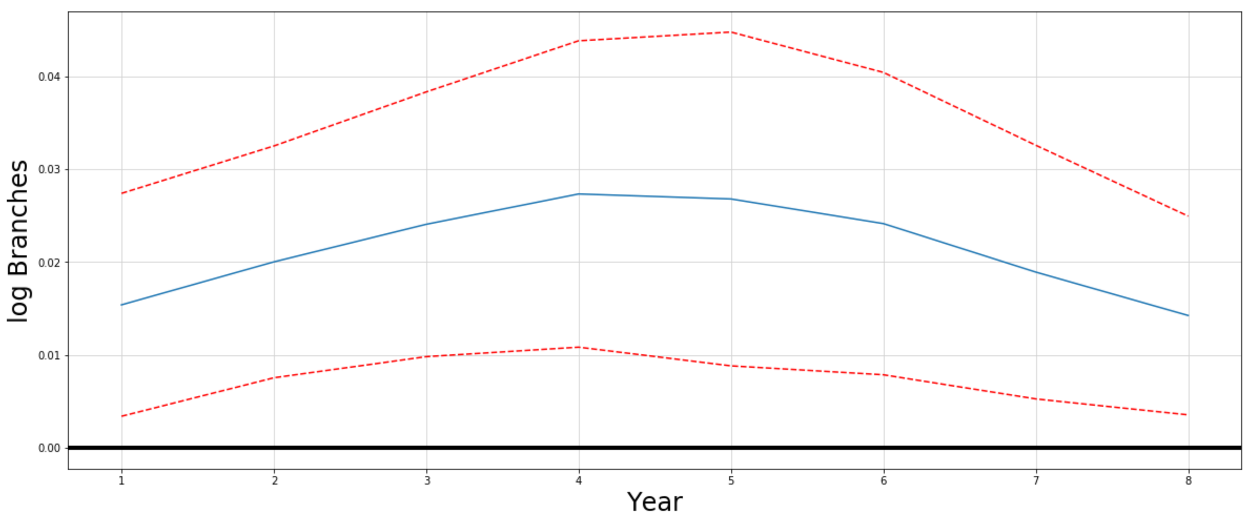


Figure 7. Small Business Lending Dynamics (Years Post-Deregulation)

This figure shows the estimates with 90% confidence intervals of $\{\beta_1^{(i)}\}_{i=0,1,...7}$ for $Y_{c,t+i} = \beta_1^{(i)} BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t+i}$. i=0 represents "Year 1" or one year after a change in restrictions. $Y_{c,t+i}$ represent log small business lending in total as well as broken down into lending coming from CRA and non-CRA institutions at different horizons. $X_{s,t}$ includes other state regulations and $X_{c,t}$ includes county-year controls. ψ_c and ϕ_t are county and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

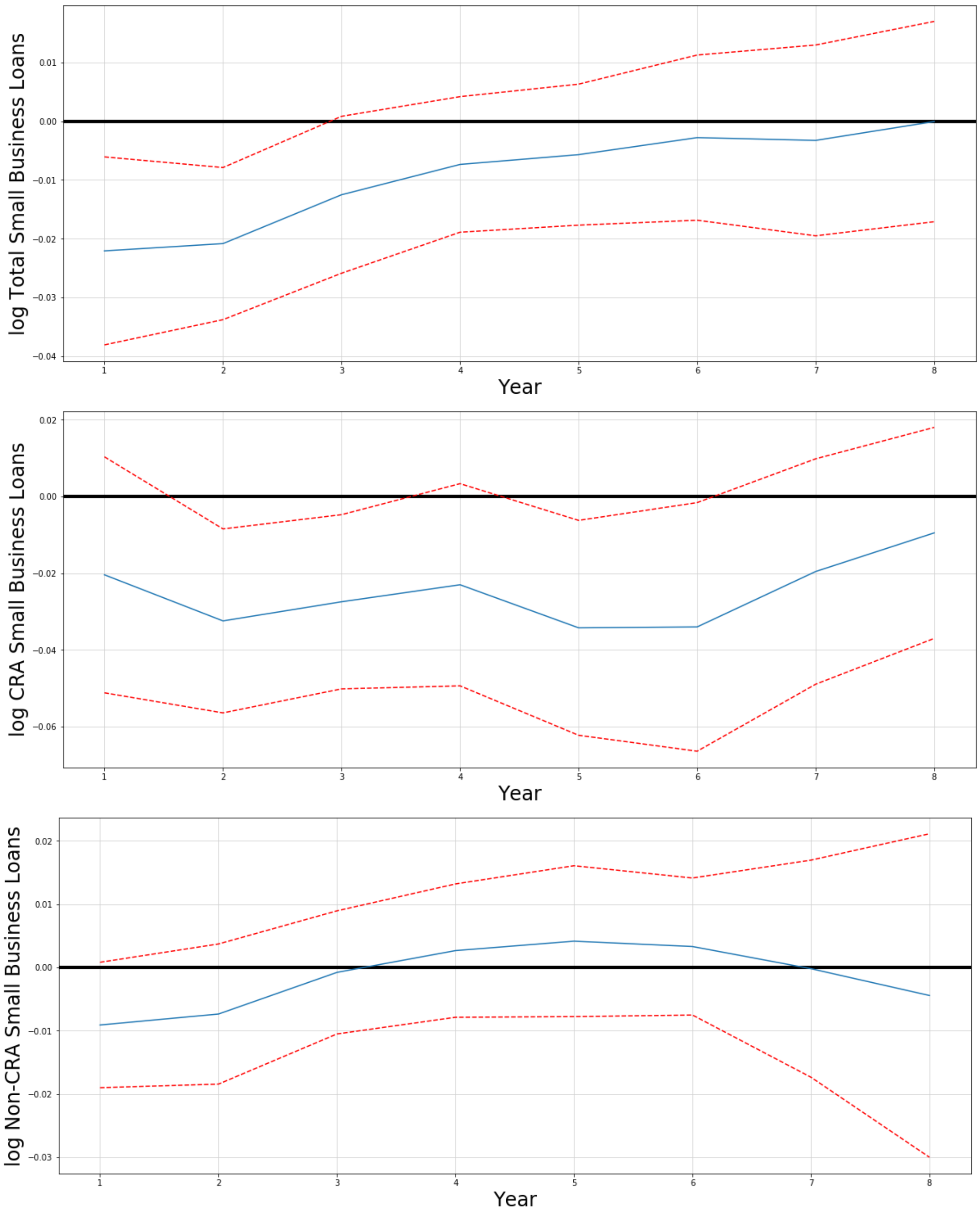


Figure 8. Number of Firms Dynamics (Years Post-Deregulation)

This figure shows the estimates with 90% confidence intervals of $\{\beta_1^{(i)}\}_{i=0,1,...7}$ for $Y_{c,t+i} = \beta_1^{(i)} BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t+i}$. i=0 represents "Year 1" or one year after a change in restrictions. $Y_{c,t+i}$ represents log number of small businesses broken down into 3 different size categories at different horizons. $X_{s,t}$ includes other state regulations and $X_{c,t}$ includes county-year controls. ψ_c and ϕ_t are county and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

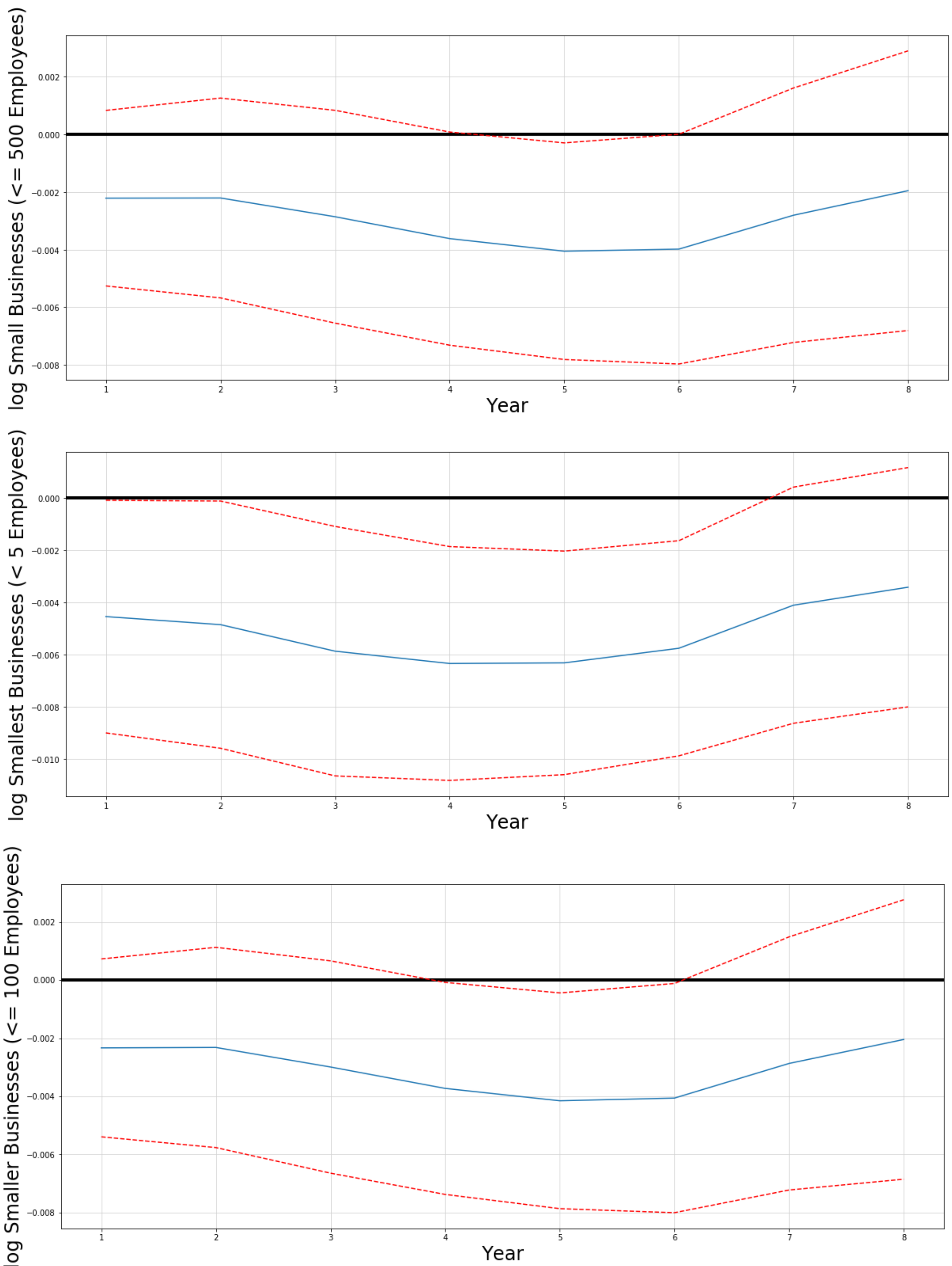


Figure 9. Employment Dynamics at S1 Firms (Years Post-Deregulation)

This figure shows the estimates with 90% confidence intervals of $\{\beta_2^{(i)}\}_{i=0,1,...7}$ for $\ln Y_{f,s,t+i} = \beta_1 BRI_{s,t-1} + \beta_{2,f}^{(i)} BRI_{s,t-1} \times \alpha_f + \beta_3 X_{s,t} + \alpha_f + \psi_s + \phi_t + \epsilon_{f,s,t+i}$ for $f = S1$ where $S1$ represents firms with 50 or fewer employees. i=0 represents "Year 1" or one year after a change in restrictions. $\ln Y_{f,s,t+i}$ represents the log number of total, full-time, and part-time employees working within state "s" during year "t" at firms of size "f" at different horizons. $X_{s,t}$ includes other state regulations and controls. α_f, ψ_s, and ϕ_t represent firm size, state, and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

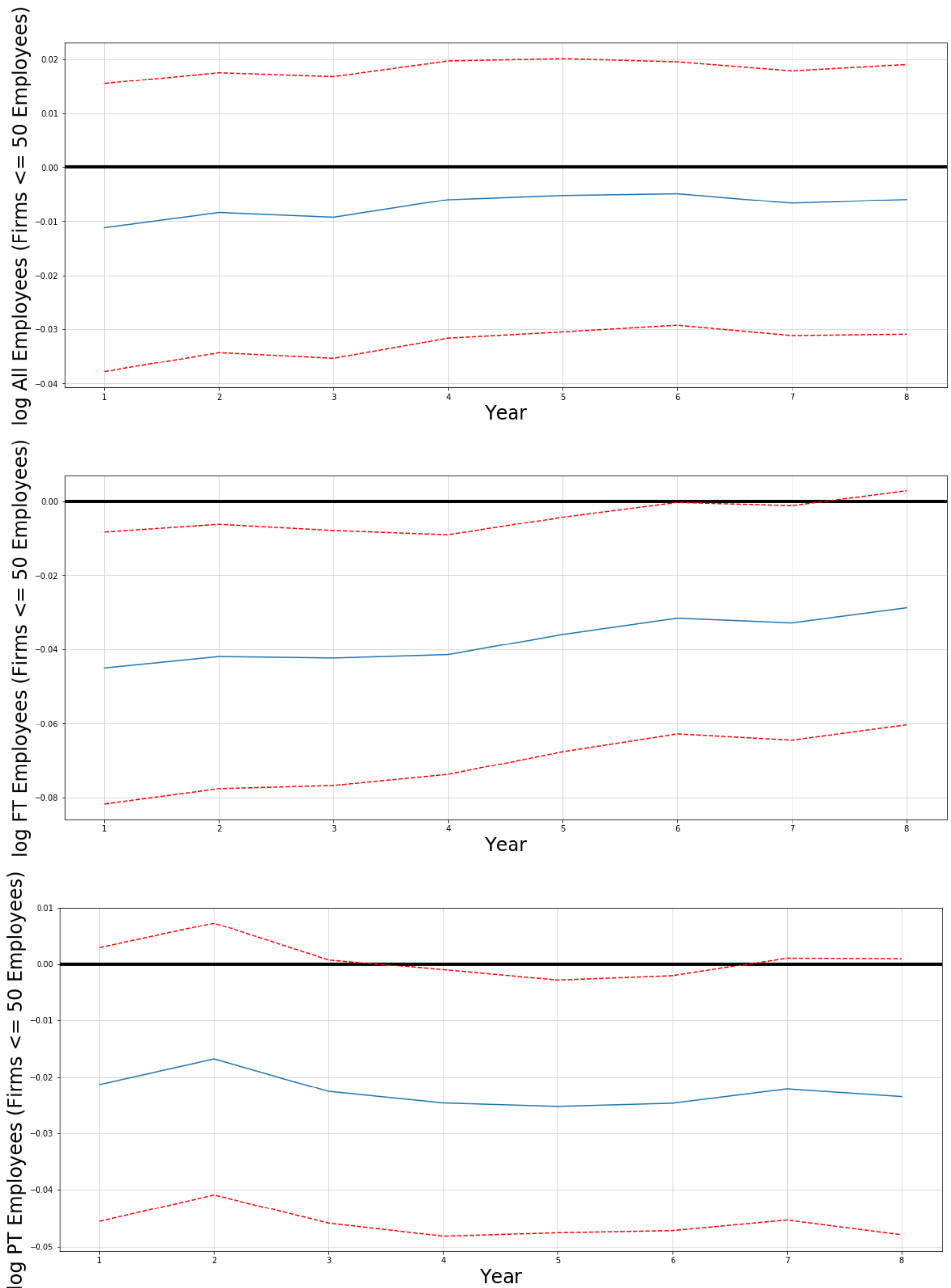


Figure 10. Employment Dynamics at S2 Firms (Years Post-Deregulation)

This figure shows the estimates with 90% confidence intervals of $\{\beta_2^{(i)}\}_{i=0,1,...7}$ for $\ln Y_{f,s,t+i} = \beta_1 BRI_{s,t-1} + \beta_{2,f}^{(i)} BRI_{s,t-1} \times \alpha_f + \beta_3 X_{s,t} + \alpha_f + \psi_s + \phi_t + \epsilon_{f,s,t+i}$ for $f = S2$ where $S2$ represents firms with 51 to 100 employees. i=0 represents "Year 1" or one year after a change in restrictions. $\ln Y_{f,s,t+i}$ represents the log number of total, full-time, and part-time employees working within state "s" during year "t" at firms of size "f" at different horizons. $X_{s,t}$ includes other state regulations and controls. α_f, ψ_s, and ϕ_t represent firm size, state, and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

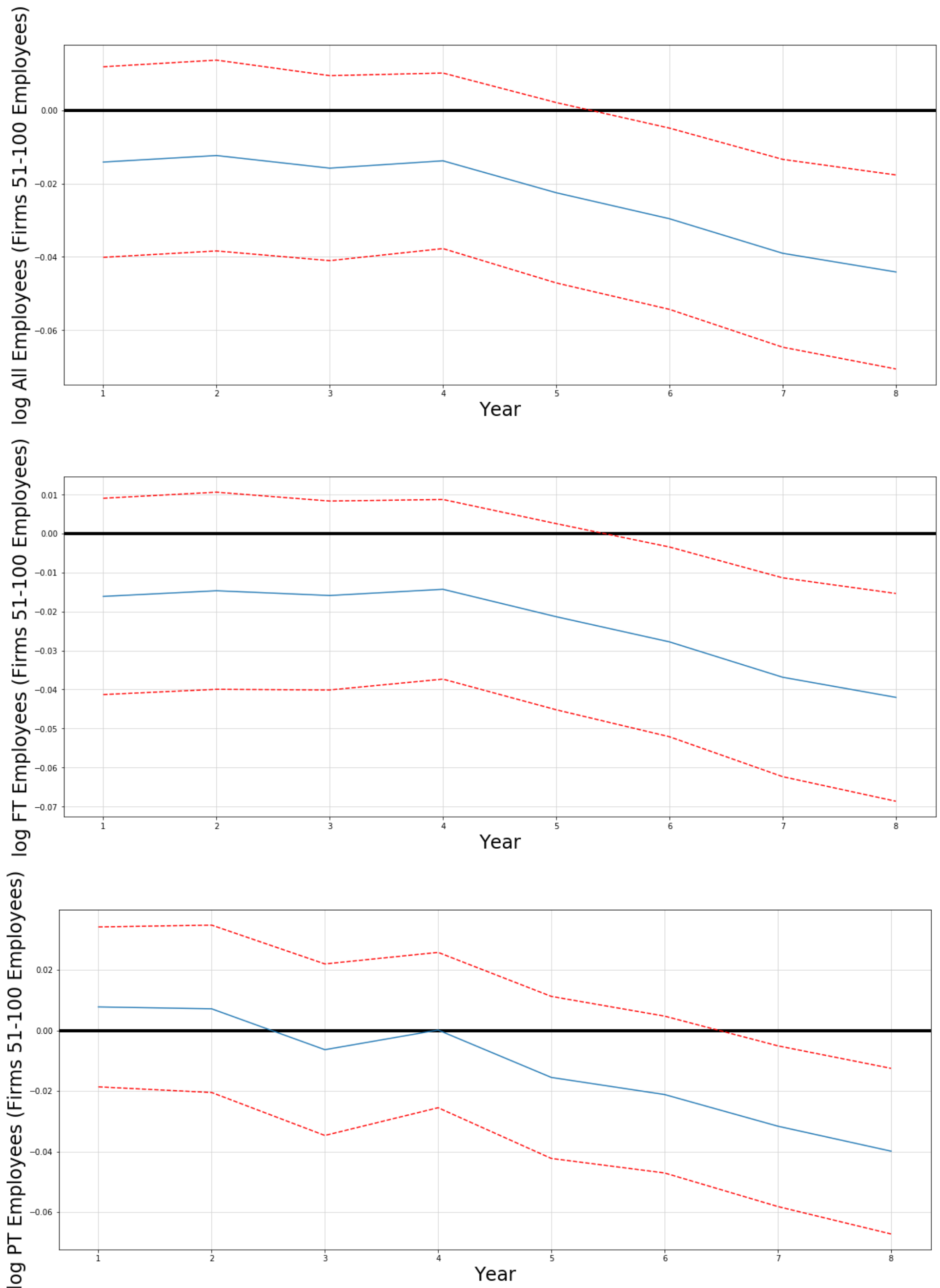


Figure 11. Hours Worked Dynamics at S1 Firms (Years Post-Deregulation)

This figure shows the estimates with 90% confidence intervals of $\{\beta_2^{(i)}\}_{i=0,1,...7}$ for $\ln Y_{f,s,t+i} = \beta_1 BRI_{s,t-1} + \beta_{2,f}^{(i)} BRI_{s,t-1} \times \alpha_f + \beta_3 X_{s,t} + \alpha_f + \psi_s + \phi_t + \epsilon_{f,s,t+i}$ for $f = S1$ where $S1$ represents firms with 50 or fewer employees. i=0 represents "Year 1" or one year after a change in restrictions. $\ln Y_{f,s,t+i}$ represents the log number of aggregate hours worked for all workers, full-time workers, and part-time workers within state "s" during year "t" at firms of size "f" at different horizons. $X_{s,t}$ includes other state regulations and controls. α_f, ψ_s, and ϕ_t represent firm size, state, and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

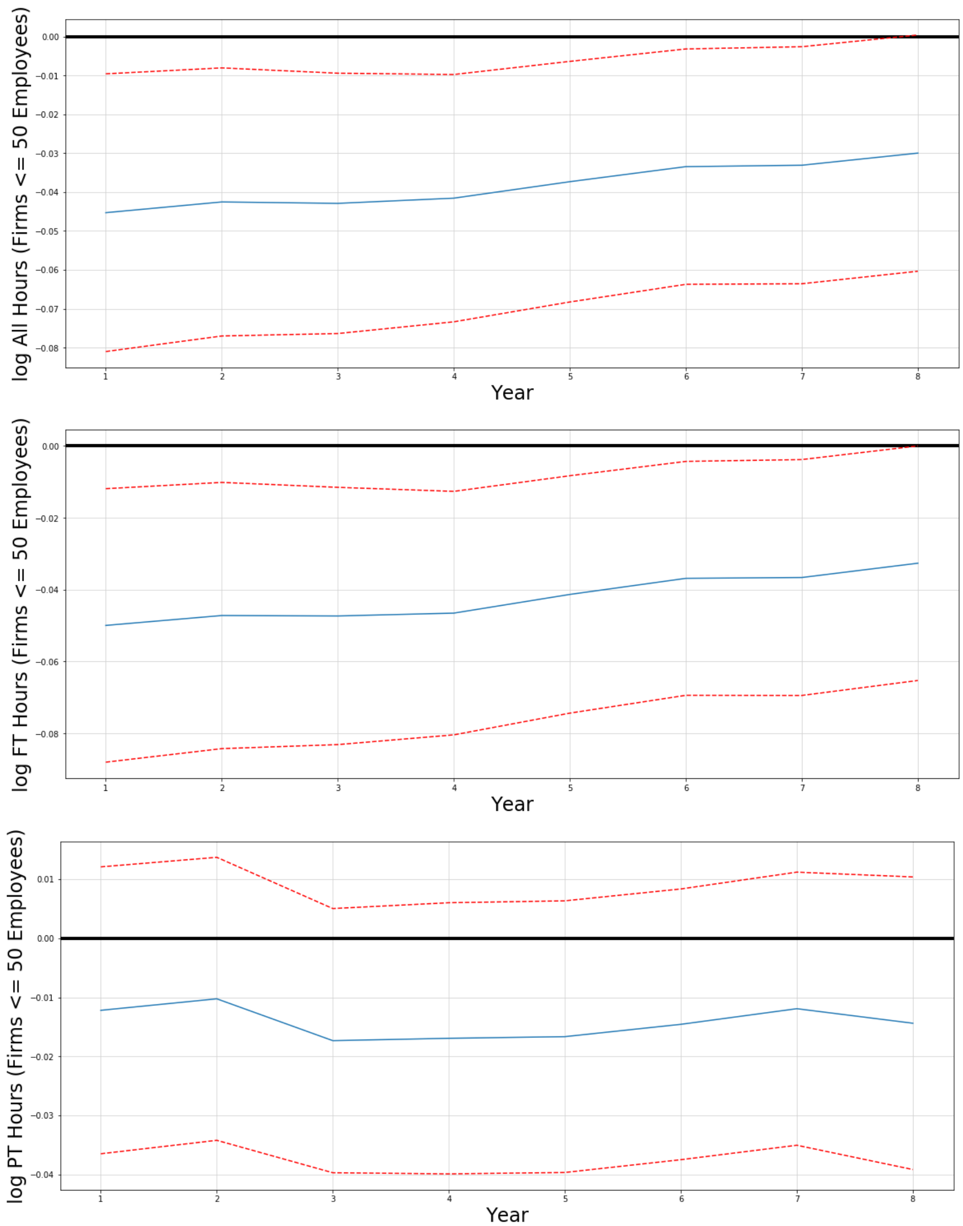


Figure 12. Hours Worked Dynamics at S2 Firms (Years Post-Deregulation)

This figure shows the estimates with 90% confidence intervals of $\{\beta_2^{(i)}\}_{i=0,1,...7}$ for $\ln Y_{f,s,t+i} = \beta_1 BRI_{s,t-1} + \beta_{2,f}^{(i)} BRI_{s,t-1} \times \alpha_f + \beta_3 X_{s,t} + \alpha_f + \psi_s + \phi_t + \epsilon_{f,s,t+i}$ for $f = S2$ where $S2$ represents firms with 51 to 100 employees. i=0 represents "Year 1" or one year after a change in restrictions. $\ln Y_{f,s,t+i}$ represents the log number of aggregate hours worked for all workers, full-time workers, and part-time workers within state "s" during year "t" at firms of size "f" at different horizons. $X_{s,t}$ includes other state regulations and controls. α_f, ψ_s and ϕ_t represent firm size, state, and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

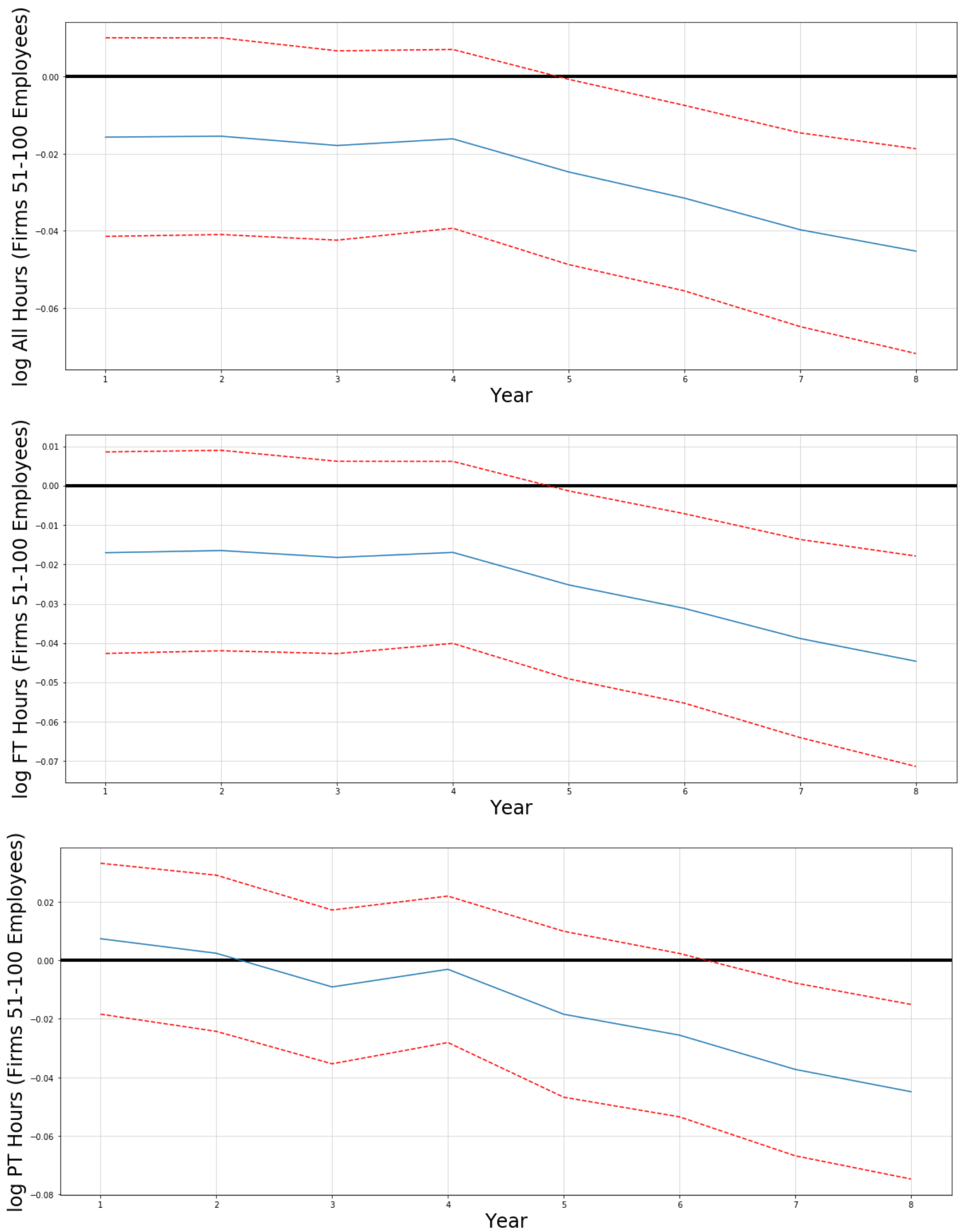


Figure 13. Employment Dynamics at All Firms (Years Post-Deregulation)

$\{\beta_1^{(i)}\}_{i=0,1,...7}$ for $\ln Y_{s,t+i} = \beta_1^{(i)} BRI_{s,t-1} + \beta_2 X_{s,t} + \psi_s + \phi_t + \epsilon_{s,t+i}$. i=0 represents "Year 1" or one year after a change in restrictions. $\ln Y_{s,t+i}$ represents the log number of total, full-time, and part-time employees at all firms within state "s" during year "t" at different horizons. $X_{s,t}$ includes other state regulations and controls. ψ_s and ϕ_t represent state and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.

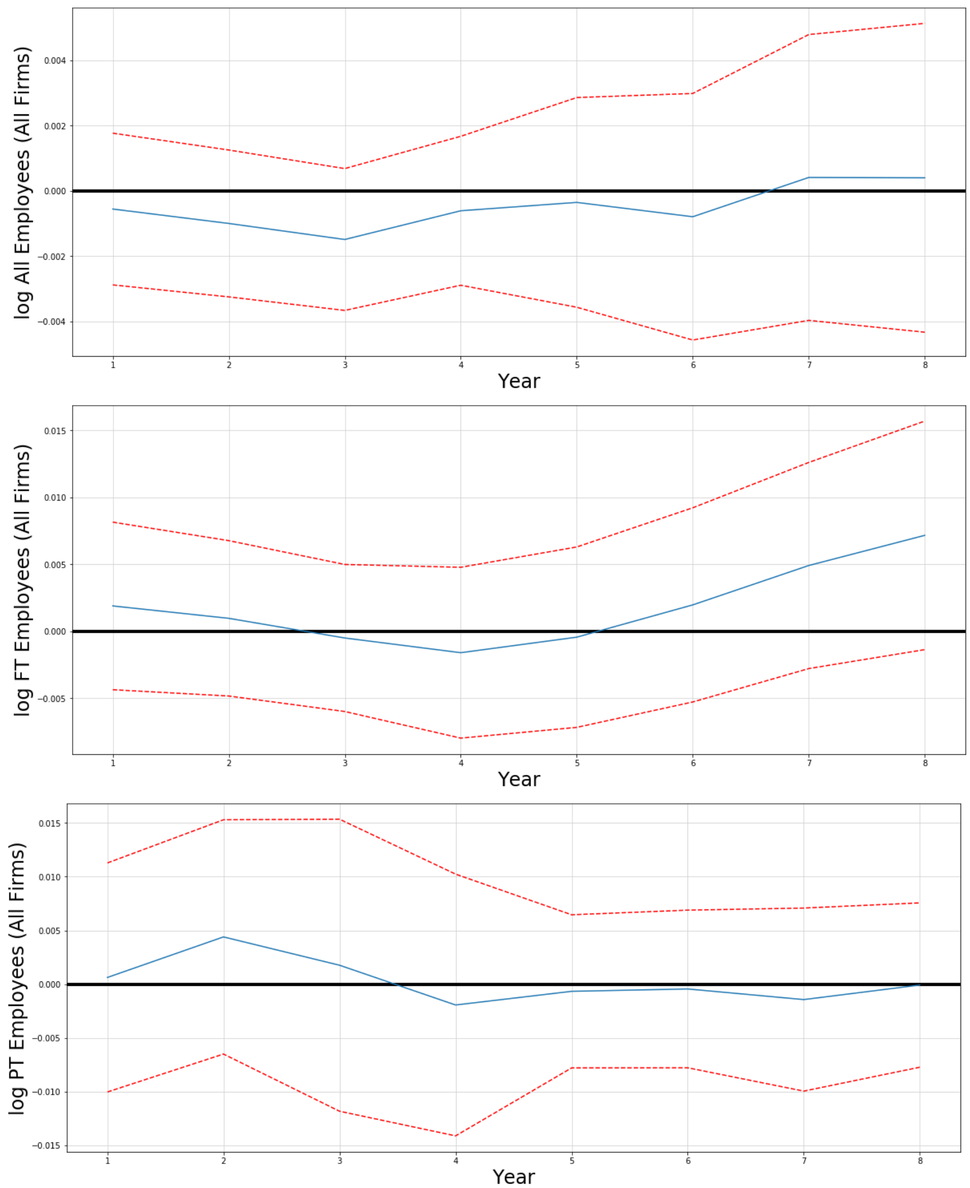
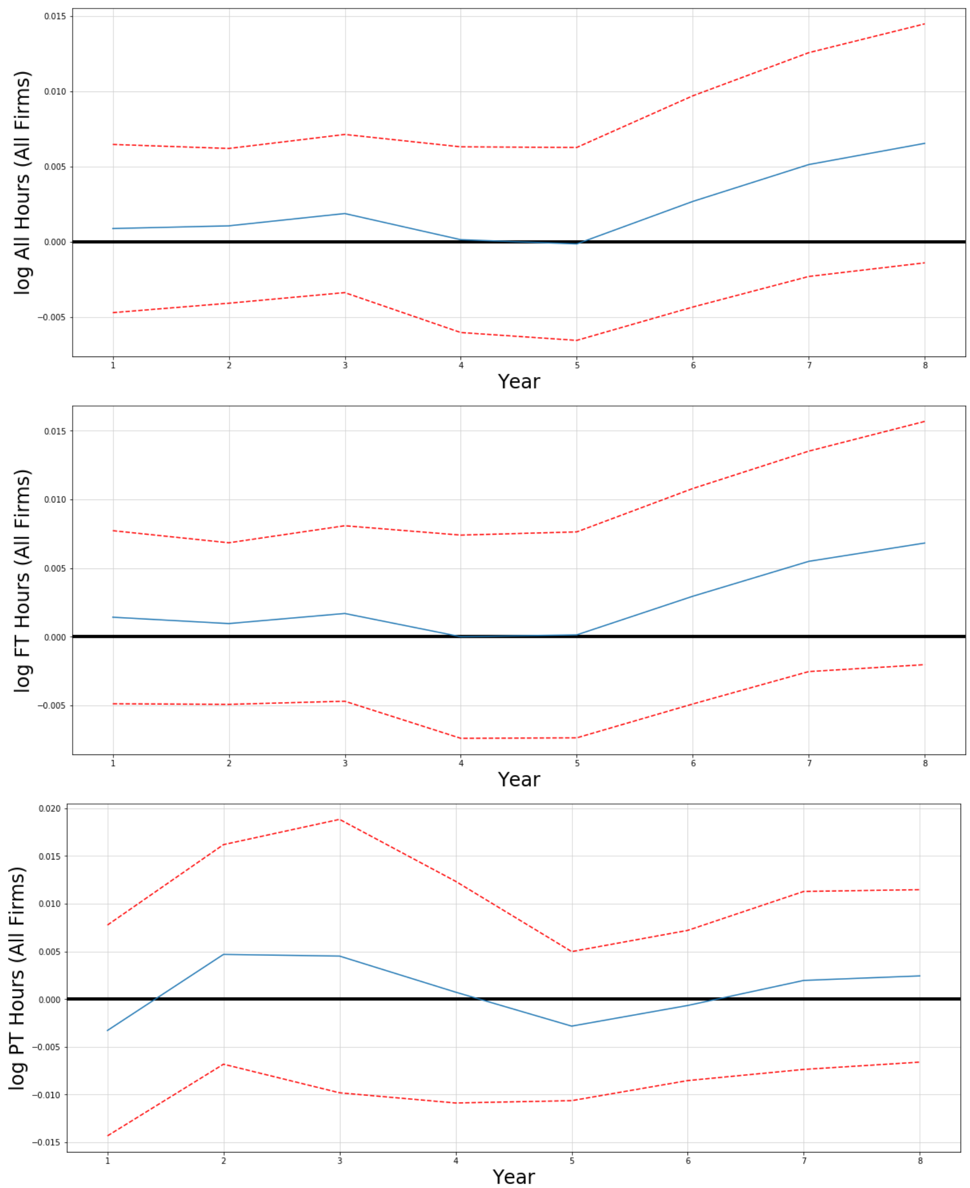


Figure 14. Hours Worked Dynamics at All Firms (Years Post-Deregulation)

$\{\beta_1^{(i)}\}_{i=0,1,...7}$ for $\ln Y_{s,t+i} = \beta_1^{(i)} BRI_{s,t-1} + \beta_2 X_{s,t} + \psi_s + \phi_t + \epsilon_{s,t+i}$. i=0 represents "Year 1" or one year after a change in restrictions. $\ln Y_{s,t+i}$ represents the log number of hours worked by all, full-time, and part-time employees at all firms within state "s" during year "t" at different horizons. $X_{s,t}$ includes other state regulations and controls. ψ_s and ϕ_t represent state and year fixed effects, respectively. Years post-deregulation is used as opposed to calendar years since deregulation occurred across states in different years.



Tables

Table 1. Bank and Branch Summary Statistics (1996, 2001, and 2006)

Bank-level data comes from June Call Reports (Reports of Condition and Income for commercial banks). Information on the number of branches, states operating in, and whether the bank operates in multiple states or is a BHC subsidiary comes from merging the Call Report data with Summary of Deposits data using the RSSD ID. Branch-level data comes from the Summary of Deposits. Indicator variables describing if a branch was created in a particular year or closed the following year are based on unique branch identifiers. Out-of-state and out-of-county indicators describe if the deposit taking institution's main office is located in a different state or county as a given branch. BHC branches are those of a subsidiary of a BHC. CRA branches are those whose deposit taking institution is large enough to report to one of four agencies under the Community Reinvestment Act. Unit branches are those whose deposit taking institution has only one branch, the main office.

Panel A	(1) 1996		(2) 2001		(3) 2006	
	Mean	SD	Mean	SD	Mean	SD
Total Assets ($M)	393.9	2,813.00	678.9	7,854.40	1,101.30	16,817.10
Number of Small Business Loans Outstanding	638.1	6,780.60	1,431.70	27,850.70	2,276.10	41,368.60
Small Business Loans Outstanding ($M)	34.2	142.2	55.7	340.5	74.9	494.3
Number of Branches	6.8	33.2	8.8	68	10.7	101.2
State Operating In	1	0.2	1.1	0.6	1.1	0.8
Multi-State	1.0%	9.0%	4.0%	18.0%	6.0%	23.0%
BHC Subsidiary	73.0%	45.0%	76.0%	43.0%	78.0%	41.0%
Total Deposits ($M)	272.5	1,786.30	434	4,763.40	701.7	9,979.20
Observations	10,297		8,711		7,934	

Panel B	(1) 1996		(1) 2001		(1) 2006	
	Mean	SD	Mean	SD	Mean	SD
Deposits ($M)	40.9	165.6	50.3	389.5	68.1	804.1
Branch Birth	5.8%	23.4%	5.1%	22.0%	5.9%	23.5%
Branch Death	6.2%	24.1%	4.2%	20.1%	3.3%	17.8%
Out-of-State Branch	7.0%	25.5%	25.8%	43.7%	35.3%	47.8%
Out-of-County Branch	52.2%	50.0%	63.3%	48.2%	69.1%	46.2%
BHC Branch	77.5%	41.7%	81.9%	38.5%	84.2%	36.5%
CRA Branch	62.6%	48.4%	70.1%	45.8%	66.0%	47.4%
Unit Branch	4.9%	21.5%	3.5%	18.3%	2.5%	15.6%
Observations	81,361		86,064		94,748	

Table 2. Bank and Branch Detailed Summary Statistics

Bank-level data comes from June Call Reports (Reports of Condition and Income for commercial banks). Information on the number of branches, states operating in, and whether the bank operates in multiple states or is a BHC subsidiary comes from merging the Call Report data with Summary of Deposits data using the RSSD ID. Branch-level data comes from the Summary of Deposits. Indicator variables describing if a branch was created in a particular year or closed the following year are based on unique branch identifiers. Out-of-state and out-of-county indicators describe if the deposit taking institution's main office is located in a different state or county as a given branch. BHC branches are those of a subsidiary of a BHC. CRA branches are those whose deposit taking institution is large enough to report to one of four agencies under the Community Reinvestment Act. Unit branches are those whose deposit taking institution has only one branch, the main office.

Panel A									
	Mean	SD	Min	p10	p25	p50	p75	p90	Max
Year	2000.7	3.2	1996	1996	1998	2001	2003	2005	2006
Total Assets ($M)	764.2	9,396.50	0	22.4	41.9	87.8	204.8	540.2	1,039,426.00
Number of Small Business Loans Outstanding	1,380.30	27,677.30	0	28	92	214	442	912	2,198,000.00
Small Business Loans Outstanding ($M)	71	439.9	0	1.7	4.9	14.5	37.6	86.6	22,296.00
Number of Branches	8.6	70	0	1	1	3	5	10	5,909.00
State Operating In	1.1	0.6	0	1	1	1	1	1	30
Multi-State	3.20%	17.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
BHC Subsidiary	75.90%	42.80%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Deposits ($M)	445.7	5,674.00	0	18.5	34.8	71.8	159.3	380.3	576,962.10
Observations	97,676								

Panel B									
	Mean	SD	Min	p10	p25	p50	p75	p90	Max
Year	2,001.1	3.2	1,996.0	1,997.0	1,998.0	2,001.0	2,004.0	2,005.0	2,006.0
Deposits ($M)	52.6	470.4	0.0	3.1	11.3	26.3	51.3	91.0	145,597.8
Branch Birth	5.9%	23.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Branch Death	4.3%	20.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Out-of-State Branch	24.4%	43.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Out-of-County Branch	62.4%	48.4%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%
BHC Branch	81.7%	38.7%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%
CRA Branch	68.4%	46.5%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%
Unit Branch	3.5%	18.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Observations	953,542								

Table 3. County-Level Summary Statistics (1996, 2001, and 2006)

County-level controls demographic and economic data comes from the U.S. Census County Business Patterns (CBP), the Bureau of Economic Analysis (BEA) Economic Profiles by County, and the Federal Housing Finance Agency (FHFA) House Price Index. Bank branch information comes from the FDIC Summary of Deposits. Information on small business lending comes from the aggregation of data from the Federal Financial Institutions Examination Council (FFIEC) CRA dataset, the Summary of Deposits, and Call Reports. Information on specific state restrictions come from Johnson and Rice (2008).

	(1) 1996		(2) 2001		(3) 2006	
	Mean	SD	Mean	SD	Mean	SD
# Branches	23.4	50.9	25.7	53.9	28.6	64.0
Out-of-state branch %	2.2%	7.7%	16.0%	20.5%	20.8%	.2135405
Out-of-county branch %	42.5%	31.0%	55.1%	29.3%	60.7%	.2832975
CRA branch %	36.7%	31.3%	45.0%	31.1%	41.6%	.3007152
# SBL outstanding	2,209.6	5,287.5	4,229.3	13,827.1	6,187.3	54,522.2
SBL outstanding ($M)	117.9	328.2	164.2	470.9	201.5	565.0
# Small firms	2257.0	7363.4	2390.7	7823.2	2580.0	8450.9
# Large firms	7.7	31.0	8.8	36.2	8.5	34.5
Amt. SBL per thousand people	1.6	0.8	2.1	1.0	2.5	1.4
Amt. SBL per lagged # small firm	68.2	30.6	90.6	41.5	106.9	51.5
BHC branches	21.0	46.0	23.6	50.6	26.9	61.9
CRA branches	16.6	48.5	19.9	53.4	21.0	60.9
Unit branches	1.4	2.6	1.1	2.1	0.8	1.8
# Branches per thousand people	0.46	0.26	0.48	0.28	0.49	0.30
Minimum Age Restriction$_{t-1}$	1.00	0.03	0.66	0.47	0.62	0.49
De Novo Restriction$_{t-1}$	1.00	0.06	0.69	0.46	0.59	0.49
Single Acquisition Restriction$_{t-1}$	0.98	0.14	0.62	0.49	0.56	0.50
Deposit Cap Restriction$_{t-1}$	1.00	0.00	0.95	0.22	0.95	0.22
# Branch births	1.6	4.7	1.5	4.4	1.9	6.9
# Branch deaths	1.4	4.6	1.3	4.0	1.0	3.3
# Out-of-state births	0.1	0.9	0.3	1.9	0.8	4.0
# in-state deaths	1.3	4.2	0.8	3.0	0.5	1.8
# CRA births	0.8	3.3	0.9	3.2	1.1	5.0
Observations	2,838		2,810		2,860	

Table 4. County-Level Detailed Summary Statistics

County-level controls demographic and economic data comes from the U.S. Census County Business Patterns (CBP), the Bureau of Economic Analysis (BEA) Economic Profiles by County, and the Federal Housing Finance Agency (FHFA) House Price Index. Bank branch information comes from the FDIC Summary of Deposits. Information on small business lending comes from the aggregation of data from the Federal Financial Institutions Examination Council (FFIEC) CRA dataset, the Summary of Deposits, and Call Reports. Information on specific state restrictions come from Johnson and Rice (2008).

	Count	Mean	SD	Min	p10	p25	p50	p75	p90	Max
Year	35,597	2001.0	3.2	1996	1997	1998	2001	2004	2005	2006
Population (thousands)	33,762	90.2	293.2	0.4	5.4	11.2	24.8	62.4	177.1	9,793.3
Total Employment (thousands)	33,762	51.6	179.4	0.2	2.6	5.0	11.7	30.6	97.0	5,494.9
Aggregate Wages and Salaries ($M)	33,762	1,464.8	6,490.3	1.3	32.8	74.9	208.0	649.2	2,392.5	203,757.8
Aggregate Proprietor's Income ($M)	33,762	240.8	1,207.0	-1,276.7	11.7	23.3	50.6	116.9	354.0	46,765.7
Median House Prices ($T)	23,995	119.8	64.2	25.7	65.1	79.6	105.0	139.0	186.8	964.1
# SBL outstanding	31,676	4,306.3	29,469.9	1.6	286.3	583.7	1,233.1	2,782.8	7,404.2	2,111,291.0
SBL outstanding ($M)	31,676	159.9	453.7	0.0	9.7	21.2	51.1	123.6	332.8	15,200.0
# Small firms	34,377	2,273.0	7,581.7	3.0	119.0	237.0	555.0	1,452.0	4,382.0	249,380.0
# Large firms	34,377	7.80	32.32	0.00	0.00	0.00	1.00	4.00	13.00	832.00
Amt. SBL per capita	31,035	2.06	1.11	0.05	0.94	1.31	1.84	2.55	3.43	22.96
Amt. SBL per lagged # small firm	31,473	88.23	44.03	6.74	45.65	59.70	79.93	106.39	138.72	815.13
# Branches	35,262	23.9	53.0	1.0	2.0	5.0	10.0	20.0	50.0	1,350.0
Out-of-state branch %	35,262	15.3%	21.8%	0.0%	0.0%	0.0%	0.0%	25.0%	49.0%	100.0%
Out-of-county branch %	35,262	57.6%	31.6%	0.0%	12.5%	33.3%	58.3%	85.7%	100.0%	100.0%
CRA branch %	35,262	48.7%	34.4%	0.0%	0.0%	16.7%	50.0%	79.7%	98.4%	100.0%
BHC branches	35,286	22.1	49.8	0.0	2.0	4.0	9.0	19.0	46.0	1,361.0
CRA branches	35,286	18.5	52.6	0.0	0.0	1.0	4.0	13.0	41.0	1,330.0
Unit branches	35,286	0.9	2.0	0.0	0.0	0.0	0.0	1.0	3.0	73.0
# Branches per capita	33,562	0.5	0.3	0.0	0.2	0.3	0.4	0.5	0.8	3.3
# Branch births	35,597	1.6	5.4	0.0	0.0	0.0	0.0	1.0	4.0	183.0
# Branch deaths	35,597	1.2	4.5	0.0	0.0	0.0	0.0	1.0	3.0	233.0
# Out-of-state births	35,597	0.4	2.4	0.0	0.0	0.0	0.0	0.0	1.0	111.0
# in-state deaths	35,597	0.9	3.8	0.0	0.0	0.0	0.0	1.0	2.0	233.0
# CRA births	35,597	1.0	4.1	0.0	0.0	0.0	0.0	0.0	2.0	174.0
# Non-CRA deaths	35,597	0.5	2.2	0.0	0.0	0.0	0.0	0.0	1.0	120.0
Minimum Age Restriction$_{t-1}$	34,553	0.7	0.4	0.0	0.0	0.0	1.0	1.0	1.0	1.0
De Novo Restriction$_{t-1}$	34,553	0.7	0.4	0.0	0.0	0.0	1.0	1.0	1.0	1.0
Single Acquisition Restriction$_{t-1}$	34,257	0.7	0.5	0.0	0.0	0.0	1.0	1.0	1.0	1.0
Deposit Cap Restriction$_{t-1}$	34,257	1.0	0.2	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Branching Restrictiveness Index$_{t-1}$	34,257	3.1	1.3	0.0	1.0	2.0	4.0	4.0	4.0	4.0

Table 5. Effects of Deregulation on Branch Births and Branch-Level Deposits

Panel A shows the results of WLS regressions of $Y_{c,t} = \beta_1 BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t}$ where $Y_{c,t}$ is one of following seven variables: log total county branches, log total branch births, log out-of-state births, log in-state and in-county number of existing branches, log CRA births, and log non-CRA births. Weighting is done by population. This allows the model to put extra weight on counties with large populations where the most branching activity occurs and discount the branching activity in low populated areas where an additional branch birth or death could cause a spike in percent increase or decrease. Panel B shows the results of WLS regressions of $\ln Dep_{i,b,c,t} = \beta_1 BRI_{s,t-1} + \beta_2 Dummy_b + \beta_3 BRI_{s,t-1} \times Dummy_b + \beta_4 X_{c,t} + \theta_b + \psi_c + \phi_t + \epsilon_{i,b,c,t}$ where $Dummy_b$ represents a branch-level dummy indicating if the branch is out-of-state (column 1) or affiliated with a CRA banking institution (column 2). Weighting is done by branch deposit amount. The other state-level regulations controlled for are Poison Pill, Right-to-Work, and Universal Demand Law legislation. Standard errors are clustered by state.

Panel A: County-Level Branches	(1) log Branches	(2) log Births	(3) log OoS Births	(4) log IS Existing	(5) log IC Existing	(6) log CRA births	(7) log non-CRA births
BRI_{t-1}	-0.0154**	-0.0672**	-0.1494**	0.0225	0.0408***	-0.0826*	-0.0085
	(0.007)	(0.03)	(0.057)	(0.014)	(0.01)	(0.045)	(0.027)
log # Existing Branches		-2.1290***	-0.9529**			-1.7252***	-0.9848***
		(0.243)	(0.359)			(0.29)	(0.203)
log $Employment_{t-1}$	0.3581***	2.1669***	1.8248	0.1499	0.2432	2.6884**	0.2037
	(0.072)	(0.75)	(1.443)	(0.217)	(0.321)	(1.095)	(0.330)
log Prop. $Income_{t-1}$	0.0008	-0.0154	-0.0748	-0.0078	0.0143	-0.0254	0.0102
	(0.007)	(0.037)	(0.081)	(0.024)	(0.04)	(0.055)	(0.039)
log_Population	0.2209	0.3413	-1.6811	-0.5206	-0.2838	-0.1072	0.4961*
	(0.133)	(0.901)	(1.527)	(0.339)	(0.342)	(1.301)	(0.262)
log Agg. $Wages/Salaries_{t-1}$	-0.0977**	-0.9658**	-0.771	0.1142	0.226	-1.1687**	-0.3551
	(0.039)	(0.421)	(0.462)	(0.159)	(0.211)	(0.445)	(0.234)
log # Small $Firms_{t-1}$	0.3427***	1.2834**	1.5428	0.7855***	0.6267***	1.2588**	0.6245*
	(0.108)	(0.513)	(1.021)	(0.217)	(0.176)	(0.502)	(0.325)
log Total Deposits	0.0689***	0.2405**	0.3145*	0.0438	0.1852***	0.2242**	0.0847
	(0.025)	(0.094)	(0.157)	(0.05)	(0.055)	(0.098)	(0.095)
log Housing $Price_{t-1}$	-0.0689	-0.1882	1.6576***	-0.5428***	-0.1384	-0.1868	-0.0729
	(0.041)	(0.154)	(0.43)	(0.102)	(0.12)	(0.174)	(0.125)
Other Regulations	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.9983	0.9084	0.7631	0.9861	0.9672	0.8757	0.8059
N	21803	21803	21803	21803	21803	21803	21803

Standard errors in parentheses
* p<0.10 ** p<0.05 *** p<0.010

Panel B: Branch-Level Deposits	(1)	(2) Log Deposits	(3)
BRI_{t-1}	0.0311*	0.0107	0.0027
	(0.017)	(0.022)	(0.02)
CRA	0.1451		
	(0.1)		
BRI_{t-1} × CRA	-0.0479		
	(0.032)		
OoS		-0.2448	
		(0.151)	
BRI_{t-1} × OoS		-0.1104**	
		(0.054)	
CRA OoS			-0.2245
			(0.136)
BRI_{t-1} × CRA OoS			-0.1035**
			(0.049)
log $Population_{t-1}$	1.7526	1.547	1.5655
	(1.06)	(1.04)	(1.029)
log $Employment_{t-1}$	-0.8533***	-0.9594***	-0.9661***
	(0.31)	(0.302)	(0.294)
log Prop. $Income_{t-1}$	0.0002	-0.0057	-0.0042
	(0.05)	(0.048)	(0.048)
log Agg. $Wages/Salaries_{t-1}$	0.3675	0.368	0.3853
	(0.265)	(0.281)	(0.277)
log # Small $Firms_{t-1}$	-0.2315	-0.1955	-0.1881
	(0.591)	(0.589)	(0.593)
log Housing $Price_{t-1}$	0.2215	0.4383**	0.4131*
	(0.176)	(0.212)	(0.208)
Other Regulations	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Adjusted R-squared	0.6421	0.6457	0.6453
N	762770	762770	762770

Table 6. Effects of Deregulation on Small Business Lending

The table shows the results of WLS regressions of $Y_{c,t} = \beta_1 BRI_{s,t-1} + \beta_2 X_{s.t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t}$ where $Y_{c,t}$ is one of following eight variables: log number of small business loans outstanding, log total amount of small business loans outstanding, the amount of small business loans per previous year's number of small businesses (in total, by CRA institutions, and by non-CRA institutions), and the amount of small business loans per-capita (in total, by CRA institutions, and by non-CRA institutions). Weighting is done by the inverse number of counties in a state, which gives equal weighting across all states and equal weighting to counties within states. The other state-level regulations controlled for are Poison Pill, Right-to-Work, and Universal Demand Law legislation. Standard errors are clustered by state.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	log # SBL	log Amt SBL	Amt SBL/SB	CRA Amt SBL/SB	Non-CRA Amt SBL/SB	Amt SBL PC	CRA Amt PC	Non-CRA Amt PC
BRI_{t-1}	0.0065	0.0221**	1.3710*	0.2625	1.2641*	0.0424*	0.0113	0.0346*
	(0.013)	(0.01)	(0.814)	(0.485)	(0.663)	(0.021)	(0.011)	(0.02)
log Population_{t-1}	0.9061***	0.3182	10.4433	35.5024***	-31.8406**	-2.6637***	-0.2565	-2.5845***
	(0.295)	(0.211)	(16.021)	(12.006)	(15.382)	(0.452)	(0.249)	(0.513)
log Employment_{t-1}	0.3677**	0.1067	-5.2633	3.6026	-9.0002	-0.2529	-0.0417	-0.2403
	(0.164)	(0.107)	(8.746)	(5.874)	(9.082)	(0.251)	(0.146)	(0.265)
log Prop. Income_{t-1}	0.085	-0.0216	-1.9103*	-2.1644**	0.0978	-0.0382	-0.0306	-0.0145
	(0.066)	(0.013)	(1.059)	(0.821)	(1.198)	(0.032)	(0.027)	(0.047)
log Agg. $\text{Wages/Salaries}_{t-1}$	-0.2034*	-0.0527	5.7708	-1.458	8.59	0.4627**	0.1254	0.3714**
	(0.114)	(0.095)	(6.746)	(4.056)	(6.436)	(0.173)	(0.104)	(0.168)
log Housing Price_{t-1}	-0.0066	0.0499	-8.3435	12.0312***	-19.0601***	-0.0873	0.3067**	-0.3810**
	(0.097)	(0.069)	(6.101)	(3.894)	(5.745)	(0.193)	(0.123)	(0.167)
log # Small Firms_{t-1}	0.3297**	0.5060***	-43.4043***	-17.1017***	-26.6902***	1.1180***	0.5422***	0.6287**
	(0.129)	(0.081)	(7.681)	(4.206)	(8.127)	(0.207)	(0.123)	(0.24)
log Total Deposits	0.2118**	0.1725**	16.8839**	0.8251	16.6204**	0.5317**	0.0582	0.4849**
	(0.084)	(0.07)	(6.696)	(1.485)	(6.688)	(0.2)	(0.054)	(0.206)
Other Regulations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.9704	0.9838	0.839	0.7728	0.8355	0.8674	0.8153	0.8303
N	21945	21945	21945	23607	21946	21933	23588	21934

Standard errors in parentheses
* p<0.10 ** p<0.05 *** p<0.010

Table 7. Effects of Deregulation on Small Business Lending (Interactions and Impact Effects)

Columns 1 and 2 show the results of WLS regressions of $y_{c,t} = \beta_1 BRI_{s,t-1} + \beta_2 BRI_{s,t-1} \times x_{c,t-1} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t}$ where $x_{c,t-1}$ is lagged log deposits or median house prices. Columns 3 and 4 show the results of WLS regressions of $Y_{c,t} = \beta_1 BRI_{s,t-1} + \beta_2 X_{s,t} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t}$ where $X_{c,t}$ contains a lag of the dependent variable. Weighting is done by the inverse number of counties in a state, which gives equal weighting across all states and equal weighting to counties within states. The other state-level regulations controlled for are Poison Pill, Right-to-Work, and Universal Demand Law legislation. Standard errors are clustered by state.

	(1) log Amt SBL	(2) log Amt SBL	(3) log Num SBL	(4) log Amt SBL
BRI_{t-1}	-0.4117***	-0.2352**	0.0028	0.0103*
	(0.148)	(0.094)	(0.007)	(0.005)
log Housing $\text{Price}_{t-1} \times \text{BRI}_{t-1}$	0.0371***			
	(0.013)			
log total deposits $\times\ \text{BRI}_{t-1}$		0.0126**		
		(0.005)		
log Population_{t-1}	0.3237	0.3109	0.4782**	0.1059
	(0.207)	(0.212)	(0.208)	(0.159)
log Employment_{t-1}	0.1424	0.1239	0.0962	0.0272
	(0.107)	(0.107)	(0.087)	(0.056)
log Prop. Income_{t-1}	-0.0192	-0.0206	0.0758	0.0117
	(0.013)	(0.013)	(0.057)	(0.019)
log Agg. $\text{Wages/Salaries}_{t-1}$	-0.0684	-0.0603	-0.0388	0.0043
	(0.092)	(0.092)	(0.067)	(0.047)
log Housing Price_{t-1}	-0.044	0.0562	-0.1421	0.0374
	(0.084)	(0.067)	(0.085)	(0.054)
log # Small Firms_{t-1}	0.5019***	0.4910***	0.2533**	0.2005***
	(0.083)	(0.081)	(0.097)	(0.068)
log Total Deposits	0.1681**	0.1359*	0.0853	0.1434***
	(0.071)	(0.071)	(0.083)	(0.032)
Lagged Dependent Variable	No	No	Yes	Yes
Other Regulations	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.9839	0.9839	0.978	0.9892
N	21945	21945	19818	19818

Standard errors in parentheses

* p<0.10 ** p<0.05 *** p<0.010

Table 8. Effects of Deregulation on the Prevalence of Small Firms of Different Sizes

The table shows the results of WLS regressions of $y_{c,t} = \beta_1 BRI_{s,t-1} + \beta_2 BRI_{s,t-1} \times x_{c,t-1} + \beta_3 X_{c,t} + \psi_c + \phi_t + \epsilon_{c,t}$, where $y_{c,t}$ is the log number of small businesses for multiple sizes categorized by the number of employees. Weighting is done by the inverse number of counties in a state, which gives equal weighting across all states and equal weighting to counties within states. The other state-level regulations controlled for are Poison Pill, Right-to-Work, and Universal Demand Law legislation. Standard errors are clustered by state.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	≤ 500	≤ 4	≤ 9	≤ 19	≤ 49	≤ 99	≤ 124
	log # Firms						
BRI_{t-1}	0.0021	0.0044	0.0034	0.0026	0.0023	0.0022	0.0021
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
log Population_{t-1}	0.5815***	0.6175***	0.6093***	0.5960***	0.5912***	0.5897***	0.5838***
	(0.033)	(0.069)	(0.046)	(0.039)	(0.035)	(0.034)	(0.033)
log Employment_{t-1}	0.2172***	0.2331***	0.2107***	0.2081***	0.2120***	0.2109***	0.2152***
	(0.035)	(0.046)	(0.042)	(0.039)	(0.036)	(0.035)	(0.035)
log Prop. Income_{t-1}	0.0027	-0.0001	0.0012	0.0027	0.0025	0.003	0.0028
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
log Agg. $\text{Wages/Salaries}_{t-1}$	0.0485**	0.0265	0.0254	0.0367*	0.0406**	0.0451**	0.0473**
	(0.018)	(0.027)	(0.022)	(0.02)	(0.019)	(0.018)	(0.018)
log total deposits	0.0341***	0.0487***	0.0389***	0.0339***	0.0341***	0.0341***	0.0342***
	(0.007)	(0.01)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
log Housing Price_{t-1}	0.0055	0.0108	0.0065	0.0068	0.0062	0.0062	0.0063
	(0.025)	(0.035)	(0.03)	(0.027)	(0.026)	(0.025)	(0.025)
Other Regulations	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.999	0.999	0.999	0.999	0.999	0.999	0.999
N	23621	23621	23621	23621	23621	23621	23621

Standard errors in parentheses
* $p<0.10$ ** $p<0.05$ *** $p<0.010$

Table 9. State-Level Effects of Deregulation on Employment and Hours Worked by Firm Size

This table shows the results of WLS regressions of $\ln y_{f,s,t} = \beta_1 BRI_{s,t-1} + \beta_2 BRI_{s,t-1} \times \alpha_f + \beta_3 X_{s,t} + \alpha_f + \psi_s + \phi_t + \epsilon_{f,s,t}$ (columns 1 and 3) and $\ln y_{f,s,t} = \beta_2 BRI_{s,t-1} \times \alpha_f + \alpha_f + \psi_s \times \phi_t + \epsilon_{f,s,t}$ (columns 2 and 4). In Panel A, $y_{f,s,t}$ represents either total employment (part-time plus full-time) or full-time employment aggregated into bins created by state, year, and firm size. In Panel B, $y_{f,s,t}$ represents either total hours worked (part-time plus full-time) or full-time hours worked aggregated into bins created by state, year, and firm size. Firm sizes are split into 5 categories: S1, S2, M1, M2, and L. These represents firms with 1 to 49, 50 to 99, 100 to 499, 500 to 999 and 1,000 or more employees, respectively. The two specifications both contain fixed effects for firm size, α_f, interacted with the BRI, which allows deregulation to have different effects on workers at firms of different sizes. Weighting is done by the number of workers in a state-year-size bin divided by the number of state-year workers. This gives more weight to more populated bins while giving equal weighting to all states. Standard errors are clustered by state.

	Panel A: Employment				Panel B: Hours Worked			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	log All Employment		log Full-time Employment		log All Hours Worked		log Full-time Hours Worked	
BRI_{t-1}	-0.0058	(Base)	-0.0168	(Base)	-0.0241*	(Base)	-0.018	(Base)
	(0.011)	(.)	(0.011)	(.)	(0.014)	(.)	(0.011)	(.)
L × BRI_{t-1}	(Base)	(Base)	(Base)	(Base)	(Base)	(Base)	(Base)	(Base)
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
S1 × BRI_{t-1}	0.0112	0.0112	0.0451**	0.0451**	0.0452**	0.0453**	0.0500**	0.0500**
	(0.016)	(0.016)	(0.022)	(0.022)	(0.022)	(0.022)	(0.023)	(0.023)
S2 × BRI_{t-1}	0.014	0.0141	0.0161	0.0161	0.0156	0.0157	0.0169	0.017
	(0.016)	(0.016)	(0.015)	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)
M1 × BRI_{t-1}	-0.005	-0.0049	-0.0025	-0.0026	-0.0029	-0.003	-0.002	-0.0021
	(0.02)	(0.02)	(0.019)	(0.019)	(0.02)	(0.02)	(0.02)	(0.02)
M2 × BRI_{t-1}	-0.0041	-0.004	-0.0025	-0.0029	-0.0012	-0.0014	-0.0002	-0.0007
	(0.017)	(0.017)	(0.017)	(0.017)	(0.018)	(0.018)	(0.017)	(0.017)
log $Population_{t-1}$	0.9363***		0.6911***		0.6391***		0.7120***	
	(0.041)		(0.137)		(0.122)		(0.147)	
log $Subsidies_{t-1}$	-0.0225***		-0.0333*		-0.0440**		-0.0372*	
	(0.008)		(0.018)		(0.017)		(0.02)	
log GDP_{t-1}	0.1033		0.4686**		0.3830**		0.5002**	
	(0.092)		(0.223)		(0.188)		(0.237)	
log $Taxes_{t-1}$	-0.0111		-0.0364		0.0268		-0.0396	
	(0.019)		(0.052)		(0.061)		(0.061)	
log Gross Operating $Surplus_{t-1}$	-0.0504		-0.2017		-0.1337		-0.224	
	(0.058)		(0.134)		(0.117)		(0.143)	
Other Regulations	Yes	No	Yes	No	Yes	No	Yes	No
State FE	Yes	No	Yes	No	Yes	No	Yes	No
Year FE	Yes	No	Yes	No	Yes	No	Yes	No
State-Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Firmsize FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.9915	0.9897	0.9841	0.9848	0.9835	0.981	0.9832	0.9839
N	2750	2750	2750	2750	2750	2750	2750	2750

Standard errors in parentheses
* p<0.10 ** p<0.05 *** p<0.010

Table 10. State-Level Effects of Deregulation on Employment and Hours Worked

This table shows the results of OLS regressions of $\ln y_{s,t} = \beta_1 BRI_{s,t-1} + \beta_2 X_{s,t} + \psi_s + \phi_t + \epsilon_{s,t}$ where $y_{s,t}$ represents total employment (full-time plus part-time), full-time employment, total hours worked (full-time plus part-time), or full-time hours worked. The difference between this table and Table 9 is that this table aggregates all employment and hours worked at the state-level instead of within firm size bins within a state. This table makes it clear that deregulation did not have a statistically or economically significant effect on total state employment or hours worked. Instead, this evidence leads to the conclusion that employment or hour losses from small firms were essentially balanced by gains at larger firms. Standard errors are clustered by state.

	(1) log All Employment	(2) log Full-time Employment	(3) log All Hours	(4) log Full-time Hours
BRI_{t-1}	0.0006	-0.0019	-0.0009	-0.0014
	(0.001)	(0.004)	(0.003)	(0.004)
log Population_{t-1}	0.9344***	0.6775***	0.6931***	0.7012***
	(0.042)	(0.134)	(0.127)	(0.143)
log Subsidies_{t-1}	-0.0208**	-0.0331*	-0.0317*	-0.0376*
	(0.008)	(0.018)	(0.018)	(0.02)
log GDP_{t-1}	0.1103	0.4370**	0.4162*	0.4620**
	(0.081)	(0.205)	(0.213)	(0.218)
log Taxes_{t-1}	-0.0058	-0.0298	-0.0234	-0.0316
	(0.018)	(0.052)	(0.056)	(0.06)
log Gross Operating Surplus_{t-1}	-0.0448	-0.175	-0.168	-0.1937
	(0.053)	(0.125)	(0.134)	(0.134)
Other Regulations	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.9998	0.9992	0.9992	0.999
N	550	550	550	550

Standard errors in parentheses
* p<0.10 ** p<0.05 *** p<0.010

Table 11. State-Level Effects of Deregulation on Wages by Firm Size

This table shows the results of WLS regressions of $\ln wage_{i,d,f,s,t} = \beta_1 BRI_{s,t-1} + \beta_2 BRI_{s,t-1} \times \alpha_f + \beta_3 X_{i,t} + \beta_3 X_{s,t} + \alpha_f + \psi_{d,s} + \phi_{d,t} + \epsilon_{i,d,f,s,t}$ (column 1) and $\ln wage_{i,d,f,s,t} = \beta_2 BRI_{s,t-1} \times \alpha_f + \beta_3 X_{i,t} + \alpha_f + \psi_{d,s,t} +_{i,d,f,s,t}$ (column 2) where i indexes person and d indexes demographic cluster, which are formed as the Cartesian product of relationship to head of household, age, sex, race, marital status, veteran status, nativity, and education. Weighting is done by the ASEC weight provided in the CPS to make the data representative of the national population. Standard errors are clustered by state.

	(1) log Wage	(2) log Wage
BRI_{t-1}	-0.0008	Base
	(0.002)	(.)
L × BRI_{t-1}	Base	Base
	(.)	(.)
S1 × BRI_{t-1}	0.0024	0.0015
	(0.004)	(0.005)
S2 × BRI_{t-1}	0.0033	0.0031
	(0.003)	(0.003)
M1 × BRI_{t-1}	0.0084***	0.0081***
	(0.003)	(0.003)
M2 × BRI_{t-1}	0.0048**	0.0049**
	(0.002)	(0.002)
Disability Dummy	-0.1327***	-0.1360***
	(0.010)	(0.008)
Pension Dummy	0.1266***	0.1252***
	(0.003)	(0.004)
Years of Education	0.0759***	0.0771***
	(0.002)	(0.003)
Health Status	-0.0496***	-0.0506***
	(0.001)	(0.001)
Age	0.0077***	0.0075***
	(0.000)	(0.000)
Other Regulations	Yes	No
State-Year Controls	Yes	No
State-Demographic FE	Yes	No
Year FE	Yes	No
Year-Demographic FE	No	Yes
State-Year-Demographic FE	Yes	Yes
Firmsize FE	Yes	Yes
Adjusted R-squared	0.382	0.473
N	2,632,470	2,632,470

Standard errors in parentheses
* p<0.10 ** p<0.05 *** p<0.010