

ORIGINAL ARTICLE

Bank geographic deregulation, new credit accounts, and consumer credit

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Abstract

The bank deregulation literature documents positive effects of intrastate branching—allowing expansion of bank-branch network within a state—on real economic outcomes such as income growth, income insurance, income inequality, and homeownership. The suggested mechanism is the availability of secured bank loans to small businesses and to underserved populations such as self-employed minorities (women and persons of color). This article demonstrates the effect of the Riegle-Neal IBBEA of 1994 (interstate branching) on unsecured consumer credit. Based on the county-level credit bureau data, the analysis shows that credit amounts and the number of new bank cards increased primarily in counties with highly concentrated bank deposits. The effect is stronger in counties that are rural or experience high income growth. These findings help solidify the earlier demonstrated effects of intrastate branching.

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1 | INTRODUCTION

During the period 1976–1992, 35 U.S. states gradually allowed an in-state bank to open branches anywhere in the state (intrastate branching). There is extensive research demonstrating the positive effects of intrastate branching on the real economic outcomes. Jayaratne and Strahan (1996) show that deregulated states enjoyed increased gross domestic product (GDP) and income growth, with a suggested mechanism that increased bank lending is at play. Beck et al. (2010) find tightened distribution of wages in deregulated states as a result of boosting wages of the unskilled workers. Demyanyk et al. (2007) show that risk sharing in the economy went up after intrastate branching, which benefitted disproportionately more to small businesses, because they rely mostly on bank credit. They also show that the increase in risk sharing contributed to higher personal income insurance, especially for the self-employed individuals. Demyanyk (2008) finds that, after intrastate branching, the growth rate of self-employment income increased, especially for women and non-White minorities at the lower end of the income distribution. Tewari (2014) finds an increase in mortgage access to the lower-middle income group, young, and Black households.

In a similar spirit to the above-mentioned articles, this study demonstrates the effect of the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994 on consumer credit.¹ Based on the county-level credit bureau data, the analysis shows that credit amounts and the number of new bank cards increased primarily in counties with highly concentrated bank deposits. The effect is stronger in counties that are rural or experience high income growth. These findings help solidify the earlier demonstrated effects of intrastate branching.

At the same time, this article fills a gap in the bank deregulation literature that the intrastate branching research was unable to fill. With respect to collateralized (secured) loans, the documented real outcomes of intrastate branching suggest that banks either lent more, lent better, lent in previously underserved areas, or extended credit to individuals who had previously lacked access to credit. A similar conclusion for unsecured consumer credit cannot be reached due to the following two reasons.

First, uncollateralized consumer credit is risky. Consumer lenders, mainly large banks, recover money only when the borrower does not default, and the recovery rate is close to zero (Adler et al., 2000). The rising and less volatile income after intrastate branching helps to some extent. However, lenders still face credit risk due to fluctuations in the local economy. They can reduce the risk by holding a portfolio of consumer loans. The less-than-perfect correlation between the returns of individual loans helps eliminate borrower-specific idiosyncratic risk (Desai et al., 2014; Musto & Souleles, 2006).² The state-specific intrastate branching legislation helps a consumer lender to spread credit risk across local economies of that particular state, but not across the entire U.S. For that, we need federal legislation on bank branching. Second, the data on consumer credit for the period of intrastate branching (1976–1992) are not available to a researcher. To circumvent this data limitation, they use personal bankruptcy filings under Chapter 7 as a proxy of consumer credit.³ Dick and Lehnert (2010) and Desai and Downs (2022) find no intrastate branching effect on Chapter 7 bankruptcy filings using state-level and county-level data, respectively.⁴

¹Consumer credit consists of all types of debt incurred by individuals for consumption purposes that are not collateralized. It excludes mortgages and student loans. Consumer credit may take the form of open-ended revolving credit, such as bank and retail credit card debt, or close-ended installment loans. For a detailed discussion on consumer credit in the U.S. economy, see Durkin et al. (2014).

²Demyanyk et al. (2007) suggest an indirect (banking) channel through which a self-employed individual's income is insured after intrastate branching. Bank financing for their small business allows them to share risks with the bank in the event of economic downturn. In the economic growth period, they can invest in a new project located in a different geographic area of the deregulated state, using additional bank financing. In this manner, the proprietor's personal income becomes less volatile to the fluctuations in the aggregate output of their state.

³The availability of unsecured consumer credit provides intertemporal consumption smoothing, whereas default on such loans provides intratemporal consumption insurance (Eaton & Gersovitz, 1981). The default on a loan is a sign of financial distress, and the bankruptcy filing is its remedy. Therefore, an increase in consumer credit leads to an increase in personal bankruptcy filings. In Chapter 7 bankruptcy, a borrower's non-exempted personal assets are used to repay the outstanding unsecured loan.

⁴Dick and Lehnert (2010) show interstate banking—allowing a bank holding company to set up a subsidiary bank in the state—increases Chapter 7 filings. Desai and Downs (2022), using county-level data, find no effect of interstate banking on Chapter 7 filings. They also replicate the findings of Dick and Lehnert and find that the interstate banking effect becomes significant only when the empirical specification includes unemployment rate.

The Riegle-Neal IBBEA of 1994 removed all restrictions on interstate banking and paved the way for interstate branching (allowing a bank to open branches outside its home state). Proponents of interstate branching, mainly large banks, argue that it will reduce bank failure by allowing banks to diversify risk across geographic locations. Using the amount of branch deposits aggregated at the county-level, Aguirregabiria et al. (2016) show that, post-IBBEA, the geographic risk diversification possibilities significantly increased for large commercial banks. Although small banks benefit most from geographic diversification, they are unable to expand their operations due to higher reallocation costs in maintaining an additional branch. In the U.S., the total consumer debt increased from \$196 billion to \$405 billion during the period 1995–2005. Within the total consumer debt, the bank credit card debt increased from \$66 billion to \$178 billion (See Table 1 in Section 3.1). The commercial banks played an important role in the surge of consumer credit. The risk-based pricing on an individual loan and the technological innovations such as credit-scoring helped a large bank to expand its customer base, and many of them were the consumers in the lowest credit score quartile (Elliehausen & Hannon, 2018).

The availability of consumer credit data from a credit bureau facilitates this article. TransUnion's TrenData starts from the first quarter of 1992. TrenData is based on a time-series of large random samples of U.S. consumer credit histories. Each quarterly sample contains approximately 30 million anonymous credit reports. From this database, variables related to a borrower's debt and payment behavior are built and aggregated at the county, state, and national levels. Barron et al. (2000) is the first study to use the TrenData.⁵ The Consumer Credit Panel data of New York Federal Reserve–Equifax (NYFED–Equifax) are available only after 1999, whereas the sample period for a study on interstate branching begins in 1994.⁶

The interstate branching effect on consumer credit need not be homogeneous across counties. The large banks had already expanded in the metropolitan areas across states lines through the Bank Holding Company (BHC) structure long before the IBBEA of 1994 (Kane, 1996). In these areas, the large banks competed aggressively among one another, resulting in low deposit concentration. It is unlikely that interstate branching further increases consumer loans in these areas. That may not be the case for the counties which a large bank ignored prior to the IBBEA due to higher overhead costs of operating a subsidiary bank. These counties were served by a few local banks, resulting in high deposit concentration. After the enactment of IBBEA, a large bank is willing to extend consumer loans in these communities due to diversification-related benefits.

The quantitative macro models on consumer credit suggest a potential channel through which interstate branching increases consumer credit.⁷ Livshits et al. (2010) show that changes in the credit market provide a better explanation for the rise in consumer debt in the U.S. from 1980 to 2002. These changes are due to financial innovations such as credit scores, which reduce the cost of lending. In a subsequent study, Livshits et al. (2016) show that financial innovations can reduce two types of market frictions: information asymmetry regarding a borrower's default risk and the fixed costs of designing a consumer credit contract. The resulting outcome is an extensive margin effect. The consumer lenders can introduce new credit contracts targeted at riskier borrowers, which increase the level of consumer debt.⁸

The independent variable-of-interest is the five-point scale deregulation index. On the one hand, IBBEA removed all regulatory constraints on a bank to open branches anywhere in the U.S. On the other hand, it permitted a state to erect entry barriers for an out-of-state bank. These barriers are: (1) the minimum age of a target bank must be between 3 and 5 years old, (2) opening a de novo branch is not allowed, (3) acquisition of an individual branch of an in-state bank is not allowed, and (4) the deposit share after a merger with an in-state bank must be below 30%. The staggered timings in implementation of these barriers by a state provides a natural

⁵Desai et al. (2014) and Desai and Elliehausen (2017) are among other articles that use TrenData.

⁶As per TransUnion, the TrenData platform was retired in 2014.

⁷Athreya (2005), Livshits (2015), and Exler and Tertilt (2020) are survey articles on the quantitative models of consumer debt and defaults.

⁸In a similar line of research, Sanchez (2018) shows that the information technology revolution from 1983 to 2004 reduced the information costs of lending, which in turn, significantly contributed to the rise of unsecured consumer credit during that period.

setting to identify bank deregulation effects. Based on these restrictions, Johnson and Rice (2008) construct a five-point scale restriction index. The deregulation index is equal to 4 minus the restriction index and ranges from 0 (most restricted) to 4 (most deregulated).

The empirics consist of four parts. In each part, the dependent variable is the annualized log-change in a given consumer credit measure (Favara & Imbs, 2015). The first part focuses on the effects of bank deregulation on changes in the outstanding balances of consumer loans, including bank credit card debt, for a sample of all U.S. counties. The main finding is that consumer debt increases after a state allows an out-of-state bank to open branches anywhere in that state. In the second part, the focus is narrower, concentrating on groups of counties based on deposit concentration. The results show that the effects of interstate branching on consumer credit are only in those counties with higher bank-deposit concentration. In addition, the effect is larger in rural counties or counties with higher income growth. In the third part, the dependent variable is the annual log-change in newly opened credit accounts, including new bank cards. The results suggest that new credit accounts are a potential channel explaining the rise in consumer credit after interstate branching in counties with highly concentrated bank deposits. For completeness, the fourth part contains an analysis of consumer defaults.

The topic of analyzing the effects of either the Riegle-Neal IBBEA (interstate branching) or the gradual deregulation that states experienced for years before 1994 (intrastate branching) is not new. The next section provides a thorough summary and analysis of the literature on interstate branching. By itself, it constitutes a useful contribution to the academic community.

2 | INTERSTATE BRANCHING EFFECTS ON ECONOMIC OUTCOMES

For a bank, liquidity risk and credit risk are important. Liquidity risk refers to uncertainty in deposits, whereas credit risk pertains to non-repayment of loan obligations. The first line of defense against liquidity risk is to increase holdings of liquid assets such as securities. This has two effects: it decreases the loan-to-assets ratio and reduces net interest income because securities earn lower interest. The geographic expansion of a branch network allows a bank to increase its deposit base, which reduces the volatility of deposits. It also helps in lending. If a potential borrower happens to maintain a deposit account, the bank can reduce information costs of credit evaluation at the time of loan application and of monitoring loan performance during the repayment period. In addition, the geographic expansion of branch network allows the bank to reduce the credit risk of its portfolio of loans, because local economies are not perfectly correlated.⁹ The effect of geographic expansion, however, on the overall expected return relative to the bank's risk is ambiguous. Wider deposit and loan bases across regions also increase the loan-to-asset ratio. Some of the new borrowers can be risky, which can negatively impact a bank's expected return and increase the bank risk (Hughes et al., 1996). By accepting deposits from households and disbursing loans to corporations, banks play an important financial-intermediation role for the real economy. A change in bank risk can transmit to the household sector and to the corporate sector, which can impact the economic outcomes of both sectors.

The remainder of this section reviews the extant literature that studies the effects of interstate branching on economic outcomes. Specifically, it focuses on the outcomes concerning three important pillars of an economy—banks, corporations, and households. The independent variable-of-interest in this literature is the deregulation index of Johnson and Rice (2008), with a few exceptions.¹⁰

⁹The case of a unit bank (bank with one building) illustrates how liquidity and credit risks are intertwined. Because a unit bank operates in a single geographic area, local economic conditions can simultaneously impact both its liquidity and credit risks.

¹⁰Akhigbe and Whyte (2003), Dick (2006), and Zarutskie (2006) use 1994, the year when the IBBEA was signed into law, to identify the effects of interstate branching.

2.1 | Interstate branching effects on bank-related outcomes

Theoretically, a bank with market power can extract monopolistic rents. For example, it can exert influence on the profits of a borrowing firm after the projects have started. The quiet-life hypothesis, however, posits that for a bank with market power, enjoying a “quiet life” is the first-order priority, not achieving higher profits. Accordingly, bank managers can create excessive profit inefficiencies, such as lower efforts on credit evaluation, loan monitoring, and collateral requirements. They can also create excessive cost inefficiency, such as spending on private jets and club memberships. Geographical deregulation helps disrupt the quiet life. It generates competition among banks in a local geographical market, which, in turn, increases the efficient allocation of factors (resources) and ultimately improves welfare.

Koetter et al. (2012) evaluate the quiet life hypothesis using U.S. commercial bank data from 1976–2004. Unlike other studies on bank geographic deregulation, they incorporate both waves of geographic deregulations. To capture intrastate branching and interstate banking, they use the deregulation measure of Amel (1993), and to capture interstate branching, they use the deregulation index of Johnson and Rice (2008).¹¹ To account for potential monopolistic rents, which are forgone due to the quiet life, Koetter et al. (2012) propose an adjusted-Lerner Index, which serves as a proxy for market power. From their results (as reported in their Table 9), we infer that prior to interstate branching, during the period 1976–1996, an increase in market power is associated with higher profit inefficiency, which supports the quiet life hypothesis. However, after interstate branching, during the period 1997–2004, the evidence does not support the “quiet life” hypothesis. Therefore, interstate branching seems to have improved the profit efficiency among banks.

The competition-fragility hypothesis suggests that increased bank competition from new entrants and existing rivals puts downward pressure on a bank's profitability. To overcome these challenges, a bank undertakes risky strategies, such as lowering lending standards, delaying the reporting of expected loan losses, and shifting its revenue mix from traditional lending services to fee-based services. Bushman et al. (2016) use 10-K filings of banks and apply a textual based measure of bank competition. They find support to the bank-fragility hypothesis. Individual bank risk and systemic risk in the banking sector increase as the competitive environment among banks intensifies. They validate their main results using the bank deregulation index of Johnson and Rice (2008) as a measure of bank competition (their table 11).

Bank deregulation can increase bank risk not only through the competition-fragility hypothesis but also through the acquisition-fragility hypothesis. Berger et al. (2022) show that interstate branching significantly increases a bank's cost of equity. This increase primarily compensates the bank's equity investors for the higher risk resulting from increased bank competition following the 1994 IBBEA. Their ex-ante measure of cost of equity is based on the analysts' earnings forecasts. More importantly, they examine subsamples of acquiring banks and passive banks that are likely targets of the acquirers. Their main finding is that the higher cost of equity is mainly restricted in the subsample of acquiring banks, which they term as “acquisition-fragility” hypothesis.

In a related subsequent study, Berger et al. (2023) analyze the effects of interstate branching on a bank's equity ratio (equity capital to total assets). The extension from their earlier work on the bank's cost of equity to the bank's equity ratio seems to be logical. Higher bank risk not only requires a higher cost of equity from investors but also necessitates higher capital requirements from bank regulators and supervisors. Bank equity capital acts as a buffer against the adverse exogenous shocks. Higher bank competition can force bank managers to take excessive risks due to moral hazard problems. A sufficient amount of bank equity capital helps maintain its financial health. Berger et al. (2023) find that banks in states with the most liberal interstate branching tend to have higher target equity ratios and adjust their equity ratios more quickly when deviations from the target occur.

¹¹Cornaggia et al. (2015) also use interstate banking, intrastate branching, and interstate branching in their empirical analysis.

The risk-shifting hypothesis indicates that bank geographic deregulation, such as interstate branching, can reduce an existing bank's charter value, as proxied by its market-to-book ratio. This is due to the potential entry of new banks after the deregulation. To avoid this decline in value, bank managers acting in the interests of shareholders undertake risky projects and increase payouts. This shifts risk from shareholders to creditors (depositors), and sometimes in the case of bailouts, to taxpayers. De Cesari et al. (2024) show that interstate branching increases a bank's payouts, which supports the risk-shifting hypothesis. Their empirical innovation uses bank-level restriction index instead of the state-level restriction index of Johnson and Rice (2008). For a multi-state bank (a bank with branches in multiple states), they compute the bank-level restriction index as a weighted average of the state-level restriction indices, with weights equal to the proportion of the bank's deposits in each state.¹²

2.2 | Interstate branching effects on corporate finance outcomes

A firm's cashflow identity (sources = uses) provides a unified framework to study major corporate finance decisions, such as financing, investments, and payouts (Lambrecht & Myers, 2017). With that idea, we review the effects of interstate branching on corporate finance outcomes related to financing, investment, and operations.

A bank can provide loans to a corporation either through bilateral (direct) lending or through a syndicate of banks. The main advantage for a bank to lend through a syndicate of banks is to diversify credit risk associated with a loan to a single-borrowing firm. The disadvantage is the higher coordination expenses among various banks due to moral hazard and adverse selection problems. The major costs of direct bilateral lending are screening and monitoring costs. The advances in information technology help reduce the information costs of lending. In addition, if a bank is able to diversify credit risk by lending to firms located in different geographic areas, then the natural implication is that direct (syndicate) lending increases (decreases). To test this research idea, Keil and Müller (2020) use interstate branching of 1994 as an exogenous shock to the credit supply and find empirical support to their research idea.¹³

How easily a firm can adjust its output price to a change in macroeconomic condition determines its capital structure. Some firms with higher managerial inefficiencies, higher customer antagonism, and lower market power, are unable to quickly change their output prices, resulting in sticky output prices. In contrast, firms that can adjust their output prices rapidly have flexible output prices. A firm with sticky output prices is likely underleveraged firm due to financial constraints and dependence on external finances. D'Acunto et al. (2018) apply this idea to the unique Bureau of Labor Statistics (BLS) data on the micro inputs of the Producer Purchase Index and use interstate branching for identification. They find that interstate branching provides credit access to an underleverage firm with a sticky output price. Therefore, the effect of interstate branching is that a firm with sticky output prices has a larger increase in leverage than a firm with flexible output prices.

Cornaggia et al. (2015) conjecture that large publicly traded corporations rely on the acquisitions of small private firms for their growth and innovation. In contrast, market impediments, such as the lack of available financing, inhibit a small firm's growth. The authors show that after interstate branching, small firms are able to secure financing from banks, resulting in a higher number of innovations. However, this is detrimental to large firms. After interstate branching, the innovations decline as they are unable to acquire small innovative firms. In a similar line of research, using the U.S. Census Bureau's Longitudinal Research Database of manufacturing firms, Krishnan et al. (2015) show that small firms, following interstate branching, are able to undertake productive investment projects that they could otherwise have forgone. In addition, a firm's total factor productivity increases following the interstate branching deregulation.

¹²Regarding interstate branching effects on an incumbent bank's disclosures, Burks et al. (2018) show an increase in disclosures after the interstate branch deregulation; however, the tone of these disclosures is mostly negative with respect to the relaxation of entry barriers.

¹³Other studies on interstate branching and firm credit supply include: Rice and Strahan (2010), who show that interstate branching helps reduce cost of bank credit by 80 to 100 basis points. Using commercial real estate data, Chu (2018) finds that interstate branching increases credit supply.

A firm's access to finances can influence its operational risk and investment policies. Before interstate branching deregulation, large, profitable, and well-diversified firms in states with restricted out-of-state bank branch entry were unable to choose among banks to meet their financing needs. However, after the IBBEA of 1994, out-of-state banks competed aggressively for these less-risky borrowers and offered larger loans at lower interest rates. The direct impact on these profitable borrower firms is the reduction in operational risk and increase in capital expenditures. Local incumbent banks are then left to serve riskier borrowers and offer them loans at higher interest rates. For these risky borrowers, the implication is a further increase in operational risk. These are the main findings of Basu et al. (2025).

A supplier firm's financial health depends on the financial well-being of its customer firm, especially when a supplier firm relies only on a few customer firms. Therefore, if a customer firm is able to obtain bank financing at a cheaper rate, the probability of financial distress for the supplier firm is reduced. Lian (2024) assesses this idea by using interstate branch deregulation as an exogenous shock to a firm's access to bank financing. The results show that when a customer-supplier relationship is strong, the probability of a supplier firm's financial distress decreases if its customer firm is in a state that imposes no restrictions on the out-of-state bank-branch entry.¹⁴

2.3 | Interstate branching effects on household finance outcomes

A household's balance sheet provides a thread to connect the extant research on the effects of interstate branching on household financial outcomes.¹⁵ Three articles in the household finance literature are closely related to our study.

For a typical household in the U.S., personal wealth is largely dependent on the value of the home. Using Home Mortgage Disclosure Act data, Favara and Imbs (2015) show that banks' supply of mortgage credit to households increases in states that allow unrestricted out-of-state bank branch entry. Further, they find an increase in house prices following interstate branching deregulation. Our focus, by contrast, is on unsecured consumer credit rather than secured mortgage credit.

A growing family also requires durable consumer goods such as appliances, furniture, electronics, and automobiles. These assets are generally financed by unsecured consumer credit. Using data from the Survey of Income and Program Participation, Célerier and Matray (2019) show that household wealth through the acquisition of durable assets increases following interstate branching deregulation. Our main finding of increase in consumer credit post interstate branching deregulation provides a potential financing mechanism through which households purchase durable goods.

Using data from the Panel Study of Income Dynamics, Brown et al. (2019) show that a household's propensity to hold debt and the amount of household leverage increase following interstate branching deregulation. They also find no statistically significant change in the level of households' unsecured credit card debt. Our study examines the effects of interstate branching on unsecured credit by using actual borrower-level credit file data.

3 | BANK DEREGULATION EFFECTS ON CONSUMER CREDIT IN THE FULL SAMPLE OF U.S. COUNTIES

3.1 | Data

The sample consists of panel data for 3,143 counties from the first quarter of 1994 to the fourth quarter of 2005. The independent variable-of-interest is the state-level bank deregulation index (variable *Deregulation*). State-year values for this variable were obtained from Appendix A of Johnson and Rice (2008), Table I of Rice and Strahan

¹⁴In a related study, Shenoy and Williams (2017) use the 1994 interstate branching deregulation for identification and show that supplier firms with access to bank credit offer more trade credit to their customer firms.

¹⁵For a recent survey on household finance, see Gomes et al. (2021).

TABLE 1 Outstanding consumer credit in the U.S. (in billions of dollars).

	Variable	Full sample 1994-2005	1995	2000	2005
Total consumer credit	<i>at99</i>	293.43	196.23	314.09	404.89
Revolving debt	<i>re33</i>	109.47	73.04	103.99	182.04
Retail debt	<i>rt33</i>	6.19	6.62	6.86	4.05
Bank credit card debt	<i>re33p</i>	103.27	66.42	97.13	177.98

Note: This table reports annual data on outstanding consumer credit, including outstanding bank credit card debt. The data are presented for the entire U.S. for the overall sample period (1994-2005) and for years 1995, 2000, and 2005. The data source is county-level quarterly data from TrenData of TransUnion, LLC. Variable definitions according to TrenData are as follows: *at99* is the “Total Balance of All Trades, Excluding Mortgage”. The variable *re33p* serves as a proxy for bank credit card debt and is calculated as the difference between TrenData variables *re33* and *rt33*. According to TrenData, *re33* is the “Total Balance of All Revolving Trades”, and *rt33* is the “Total Balance of All Retail Trades”.

(2010), and the replication kit of Favara and Imbs (2015). Because consumer credit data are available quarterly, annual values of the deregulation index were adjusted to reflect the year in which state legislation became effective. For example, Florida's deregulation index changed from zero to one on the effective date June 1, 1997. The required adjustment is that, for the first and second quarters of 1997, the index value is zero, and for the third and fourth quarters, the value is one. The variable *Deregulation* measures the degree of a state's interstate branching bank deregulation. Following Favara and Imbs (2015), it is calculated as four minus the restriction index of Johnson and Rice (2008). The highest value of four indicates that a state has removed all barriers to the entry of out-of-state banks, allowing them to open branches without restrictions. The lowest value of zero indicates that the state has retained all four possible barriers, preventing out-of-state banks from entering the state after the IBBEA.

The TrenData database of TransUnion provides quarterly data on outstanding consumer loan balances. These loans exclude mortgages and student loans. The TrenData variable *at99* reports the level of consumer loans and is defined as the “Total Balance of All Trades, Excluding Mortgage”. TrenData also provides data on revolving credit. According to TrenData, a revolving trade (account) is a trade with an open line of credit issued by any kind of business (e.g., bank, clothing, credit union, department store, finance company, or savings and loan company). The TrenData variable *re33* is defined as the “Total Balance of All Revolving Trades”. In addition, TrenData provides data on retail credit. According to TrenData, a retail trade is a revolving account issued by one of the following types of business: camera, clothing, computer, department store, jewelry, or sporting goods. The TrenData variable *rt33* is defined as the “Total Balance of All Retail Trades”. For this study, the proxy for bank credit card debt (variable *re33p*) is defined as the difference between the outstanding balances of all revolving trades and retail trades. The variable *re33p* is equal to *re33* minus *rt33*. Table 1 presents the total value of consumer credit data in the U.S. for the full sample period (1994-2005) as well as for the years 1995, 2000, and 2005.

3.2 | Data visualization

Figure 1 shows trends in consumer credit from the first quarter of 1996 to the fourth quarter of 2005. The trends are shown for the counties with the extreme values of the bank deregulation index (*Deregulation*). The counties with the most restrictions on out-of-state bank branch entry have a deregulation index equal to zero, and their trend is shown with a dashed line. In contrast, counties with a deregulation index equal to four have no entry barriers for out-of-state banks to open branches, and their trend is shown with a solid line. The dotted line represents the trend of outstanding consumer credit balance for a typical U.S. county. The upper panel of Figure 1 plots the average

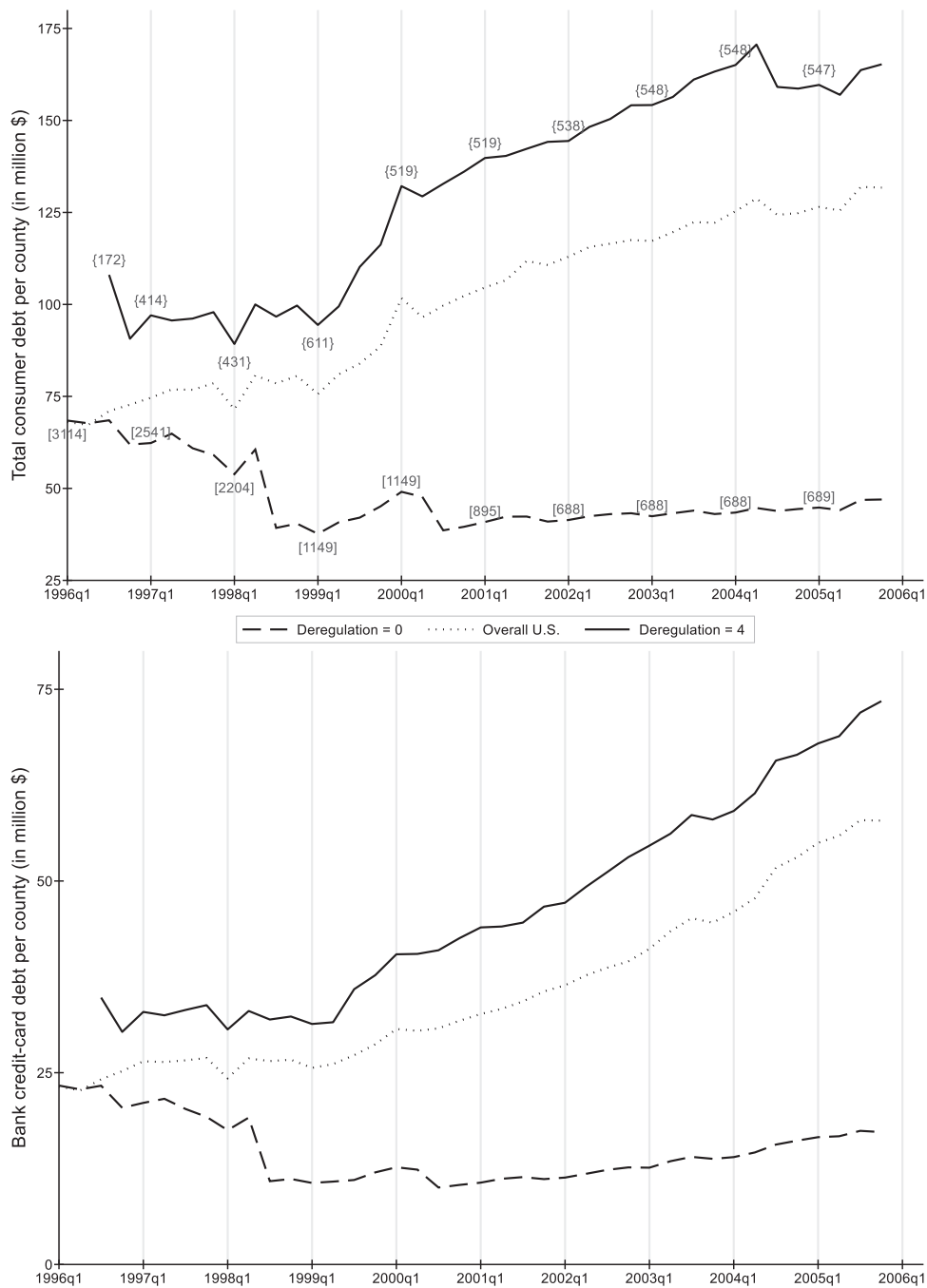


FIGURE 1 Interstate branching and consumer credit trends. *Note:* This figure shows the trends in consumer credit for counties with the extreme values of bank deregulation index (*Deregulation*). The upper panel plots the average balance of total consumer credit (*at99*) per county. The lower panel shows the balance of bank credit card debt (*re33p*) per county. These numbers are expressed per million U.S. dollars. The variable definitions are presented in the notes to Table 1. The numbers in parentheses in the upper panel (near the solid and dashed lines) are the number of counties for computing the average value. These numbers are the same for both panels.

balance of total consumer credit (variable *at99*) per county, while the lower panel shows the average balance of bank credit card trades (variable *re33p*) per county. These values are expressed in millions of U.S. dollars. The numbers in parentheses in the upper panel, located near the solid and dashed lines, indicate the number of counties used to compute the average values. These numbers are the same for both panels.

As shown in Figure 1, the average total consumer credit gradually increases in counties with a deregulation index of four from the first quarter of 1998 to the end of the second quarter of 2004. That is not the case for a county with a deregulation index equal to zero. For these counties, the average level of consumer debt initially declines and then remains almost flat post-2000. Regarding the trends for bank credit card debt, the average value increases after 1999 for counties with a deregulation index equal to four. The most restrictive counties also show a minor increase in the average bank credit card debt after 2000.

In summary, Figure 1 suggests that consumer credit trends differ between the least restrictive counties (*Deregulation* = 4) and the most restrictive counties (*Deregulation* = 0) in the U.S. It also suggests that the national trend generally follows that of the least restrictive counties. This data visualization exercise suggests that patterns in outstanding consumer credit depend on the level of bank-branch geographic deregulation.

3.3 | Empirical analysis

The data visualization exercise of the previous subsection indicates the difference in consumer credit trends based on the values of the deregulation index. This section documents the results of an empirical analysis aimed at understanding those differences in a regression framework.

The empirical specification is the fixed-effect panel data model, similar in spirit to that by Favara and Imbs (2015). The dependent variable is the annual log-change of the outstanding balance of consumer loans. It measures a county's annual growth of consumer credit as of a given quarter (*t*). Specifically, a county's past consumer credit growth is calculated as the natural logarithm of the ratio of consumer credit balance (TrenData variable *at99*) in the current quarter (*t*) to that in the same quarter of the previous year (*t* - 4).¹⁶ The empirical specification is given as follows:

$$\ln\left(\frac{Y_{c,t}}{Y_{c,t-4}}\right) = \beta_0 + \beta_1 \times \text{Deregulation}_{s,t-4} + \beta_2 \times \ln\left(\frac{X_{c,t}}{X_{c,t-4}}\right) + A_c + B_t + \epsilon_{c,t}, \quad (1)$$

where *c* indexes counties, *s* indexes states, and *t* indexes quarters. The dependent variable (*Y*) is the outstanding balance of consumer credit (variable *at99*) and the outstanding balance of bank credit card debt (variable *re33p*). The control variable (*X*) is the number of people seeking a job (variable *unemp*). It reflects a county's labor market condition. These data are available at a monthly frequency from the BLS. The monthly data are aggregated quarterly by taking the arithmetic average. The variable-of-interest, *Deregulation*, is the categorical variable on a five-point scale. It is the previous year (fourth quarterly lag) value of the interstate branching deregulation index. The vectors *A* and *B* are the dummy variables controlling for county and quarter fixed effects, respectively, and the error term is ϵ . In this setting, the coefficient β_1 is the difference-in-differences. It captures the effect of bank geographic deregulation (interstate branching) on the growth rate in consumer credit. Since the legislative event occurs at the state level and consumer credit data are at the county level, standard errors are clustered at the state level.

Table 2 reports the effects of bank geographic deregulation (interstate branching) on consumer credit, using the empirical specification of Equation (1). The sample consists of all county-quarter observations of 3,143 U.S. counties

¹⁶The corporate finance articles based on quarterly Compustat data use a similar approach to calculate a firm's annual past asset growth (Desai & Vijh, 2025; Ma, 2019). It is computed as the natural logarithm of the ratio of total assets (Compustat item *ATQ*) in the current quarter to that in the same quarter of the previous year.

TABLE 2 Interstate branching effects on consumer credit.

Panel A: Summary statistics of annual log-change of variables									
Variables	Mean	Median	SD	P10	P25	P75	P90	N	
DI_at99	0.0848	0.0816	0.2351	−0.1075	−0.0067	0.1738	0.2831	150,619	
DI_re33p	0.1217	0.1196	0.2388	−0.0910	0.0209	0.2218	0.3411	150,606	
DI_unemp	−0.0060	−0.0144	0.2169	−0.2513	−0.1315	0.1148	0.2517	150,660	
Panel B: Dependent variable -- Annual log-change in total consumer debt (DI_at99)									
				(1)					(2)
Deregulation				0.0067**				0.0066**	
				(2.3)				(2.3)	
DI_unemp								0.0118**	
								(2.5)	
Constant				0.1025***				0.1033***	
				(11.7)				(11.8)	
N				150,619				150,441	
within R ²				0.09				0.09	
Panel C: Dependent variable -- Annual log-change in bank credit card debt (DI_re33p)									
				(1)					(2)
Deregulation				0.0091**				0.0092**	
				(2.5)				(2.6)	
DI_unemp								0.0082	
								(1.2)	
Constant				0.1420***				0.1425***	
				(13.8)				(13.9)	
N				150,606				150,428	
within R ²				0.09				0.10	

Note: This table reports the effects of interstate branching on consumer credit for the full sample of county-quarter observations for the 3,143 U.S. counties (50 states plus the District of Columbia) from the first quarter of 1994 to the fourth quarter of 2005. Panel A reports summary statistics of the annual log-change in a given variable. The prefix *DI_* denotes the annual log-change of a variable. It is the natural logarithm of the ratio of the value of that variable for the current quarter to that for the fourth previous quarter. The variable definitions of *at99* and *re33p* are in the notes of Table 1. The control variable *unemp* is the number of unemployed people. These data are obtained from the Bureau of Labor Statistics. Panel B and Panel C report regression results. The dependent variable for Panel B is the annual log-change in outstanding consumer debt (*DI_at99*), whereas that for Panel C is the annual log-change in the outstanding bank credit card debt (*DI_re33p*). The variable *Deregulation* is the fourth quarter lag value of the five-point scale deregulation index. It is computed as 4 minus the restriction index of Johnson and Rice (2008) and Rice and Strahan (2010). Each regression specification controls the county and quarter fixed effects. The absolute value of *t*-statistics, based on robust standard errors clustered at the state level, are reported in the parentheses below the coefficients. The symbols ** and *** denote the statistical significance at the 5% and 1% levels, respectively. The abbreviations N, SD, P, and R² are the number of non-missing county-quarter observations, standard deviation, percentile values, and R-squared, respectively.

(50 states plus the District of Columbia) for the first quarter of 1994 to the fourth quarter of 2005. Panel A of Table 2 provides descriptive statistics of the main dependent variables, DL_{at99} and DL_{re33} , and the control variable, DL_{unemp} . The reported statistics are the mean, standard deviation, median, 10th percentile, 25th percentile, 75th percentile, 90th percentile values, and the number of county-quarter observations with non-missing values. The prefix $DL_{}$ denotes the annual log-change. For example, the variable DL_Y is the term $\text{Ln}\left(\frac{Y_{c,t}}{Y_{c,t-4}}\right)$ of Equation (1).

As shown in Panel A of Table 2, the mean, median, and standard deviation values of the annual log-change in total consumer debt (percent) are 8.5, 8.2, and 23.5, respectively. The corresponding statistics for the annual log-change in bank credit card debt are 12.2, 12.0, and 23.9, respectively. This suggests that the bank credit card debt increased at a higher rate than that for the total consumer debt. The median values are close to the mean values, which suggest that the annual log-change data of consumer credit is normally distributed. The average annual log-change in the number of people seeking employment is close to -0.6%. These data indicate that consumer credit grew during a period of favorable labor market conditions. In the empirical analysis, we aim to explain the annual growth rate of consumer credit with respect to the degree of bank geographic deregulation, as measured by the five-point scale variable *Deregulation*.

Panel B of Table 2 reports the regression results of the effects of interstate branching on total consumer credit, using the empirical specification in Equation (1). The dependent variable is the annual log-change in the outstanding balance of consumer debt (variable DL_{at99}). As reported in the first column, the coefficient on *Deregulation* is 0.0067. This coefficient can be interpreted as follows: Suppose a state currently has all four entry barriers in place for out-of-state banks to open branches (*Deregulation* = 0). If the state removes at least one of these barriers, a typical county in that state would experience an annual increase of 0.67% in the level of consumer loans. This change is statistically significant at the 5% level (*t*-statistic: 2.3).

Panel C of Table 2 shows the regression results for the effects of interstate branching on bank credit card debt. The dependent variable is the annualized change in bank credit card debt (variable DL_{re33p}). The coefficient value on *Deregulation* is 0.0091. Its interpretation is as follows: Suppose that a state currently disallows an out-of-state bank to open branches in its jurisdiction (*Deregulation* = 0). If that state removes all the barriers to interstate branching, then a typical county of that state experiences additional annual growth of 3.64% in bank credit card debt. This change is statistically significant at the 5% level (*t*-statistic: 2.5).

In summary, the empirical findings of Table 2 show that interstate branching deregulation has increased the level of consumer credit, including the level of bank credit card debt, in the U.S. The next section focuses on whether geographic diversification opportunities help explain the effect of interstate branching.

4 | DEPOSIT CONCENTRATION AND THE INTERSTATE BRANCHING EFFECTS ON CONSUMER CREDIT

The effects of the Riegle-Neal Act of 1994 vary across geographical areas. Even before the law was enacted, several large banks had already opened subsidiary banks through the BHC structure in profitable counties (Kane, 1996). Bank competition is therefore higher in these counties due to the presence of many banks. As a result, the economic impact of the law is more pronounced in areas served by fewer banks. In other words, the effects of interstate branching deregulation on consumer credit are likely to be greater in counties with less bank competition. This section contains the analysis on two subsamples of counties based on the degree of bank competition.¹⁷

¹⁷We use the terms bank competition, deposit concentration, and geographic diversification possibilities interchangeably.

4.1 | Data

The annual Summary of Deposits (SOD) data from the Federal Deposit Insurance Corporation (FDIC) allow for the computation of a proxy variable that measures a county's bank competition. The bank-deposit concentration, based on the Herfindahl-Hirschmann Index (HHI), serves as this measure. It is calculated as the sum of the squares of the ratio of a county's deposits held by a particular bank to the total deposits held by all banks in that county, multiplied by 100. HHI value ranges from 0 to 10,000. A value equal to 10,000 indicates that a single bank holds all the deposits in the county, suggesting monopoly power and no competition. Values close to zero indicate that deposits are distributed among several banks in the county. County-level bank deposit data are as of June 30 of each calendar year. Therefore, for the first two quarters, HHI values are computed using the previous year's SOD data, and for the last two quarters, HHI values are computed using the current year's SOD data. For each quarter (t), counties are divided into two groups based on the HHI values from the fourth previous quarter ($t - 4$). A county in the 'Low HHI' group has an HHI value below the median, while a county in the 'High HHI' group has an above-median HHI value. In other words, counties in the 'Low HHI' group exhibit higher bank competition, whereas those in the 'High HHI' group exhibit lower bank competition.

4.2 | Data visualization

Before analyzing the effects of interstate branching on consumer credit for subsamples of counties based on the degree of bank competition, a data visualization of consumer credit trends is helpful. Figure 2 plots trends in average bank credit card debt for a 2×2 classification of counties. These classifications are defined by the extreme values of the deregulation index ($Deregulation = 0$ versus $Deregulation = 4$) and by whether a county belongs to the 'Low HHI' or 'High HHI' group. The upper panel of Figure 2 plots the trends of bank credit card debt for the 'High HHI' counties, and the lower panel plots the trends of bank credit card debt for the 'Low HHI' counties. In both panels, the solid line represents the least-restricted counties ($Deregulation = 4$), and the dashed line represents the most-restricted counties ($Deregulation = 0$) in terms of allowing out-of-state banks to open branches within the county. The numbers in parentheses near the lines indicate the number of counties used to compute the average value of bank credit card debt.

As shown in the upper panel for counties with low bank competition, the average bank credit card debt increases during most quarters of the sample period for counties that impose no barriers to out-of-state bank branch entry. This pattern does not hold for counties with all entry barriers in place. As shown by the dashed line, the average bank credit card debt remains nearly constant throughout the sample period. These trends in the upper panel suggest that interstate branching deregulation affects the growth rate of bank credit card debt in counties with low bank competition.

As shown in the bottom panel of Figure 2, until the second quarter of 1999, trends in bank credit card debt decline for Low HHI counties, irrespective of the degree of bank deregulation. After that, the trends reverse and increase throughout the remainder of the sample period. More importantly, both lines—solid and dashed—show that trends in credit card debt move synchronously. Therefore, it seems that the interstate branching deregulation plays no role in the growth rate of bank credit card debt in a typical county with high bank competition.

4.3 | Empirical analysis

Table 3 reports the results of a regression analysis on the effects of interstate branching deregulation on consumer credit for the subsamples based on bank competition. The empirical specification is the same as the one shown in Equation (1), with the only difference being that it is used on two subsamples: counties with high bank competition (the 'Low HHI' group) and counties with low bank competition (the 'High HHI' group).

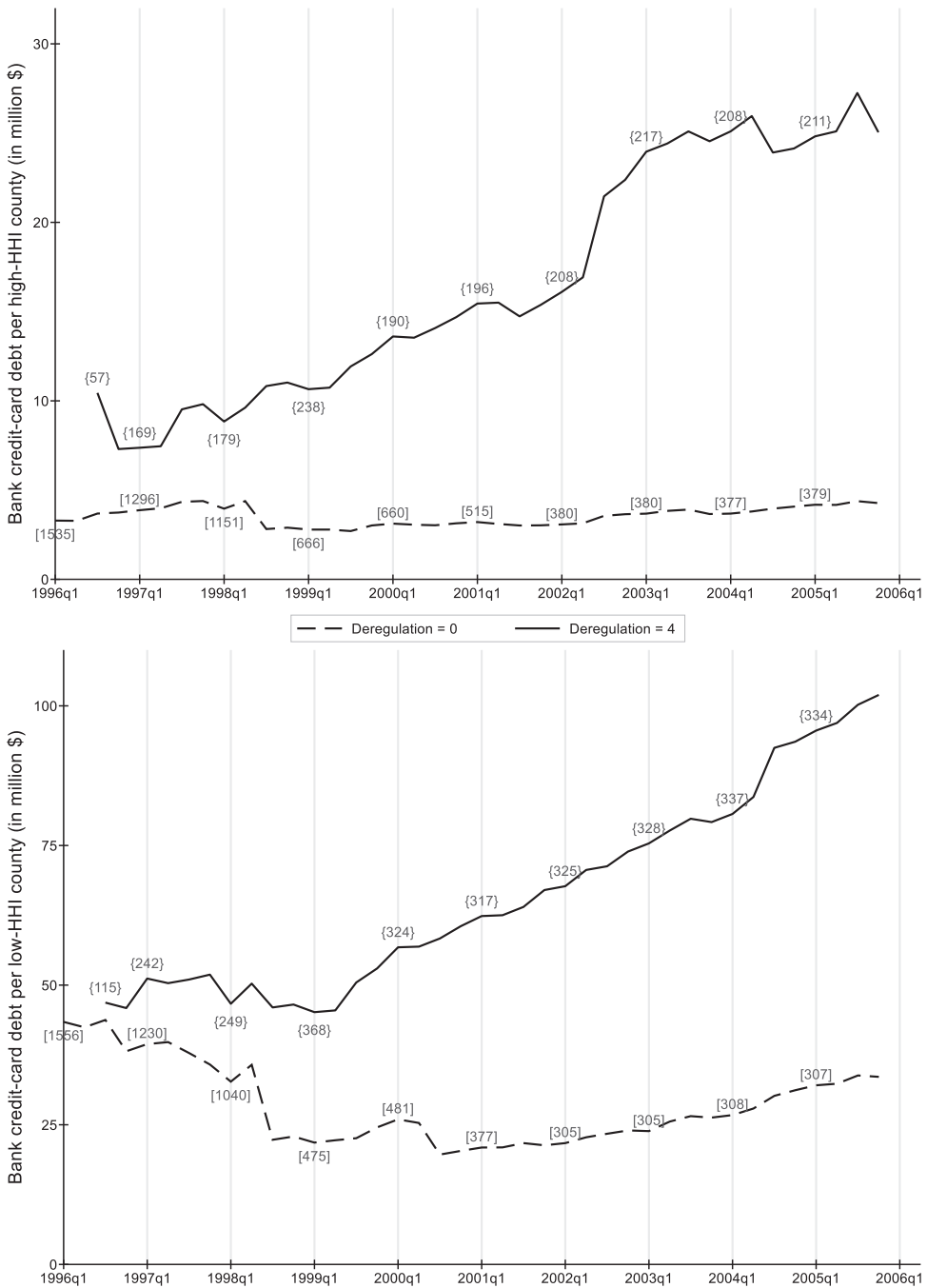


FIGURE 2 Interstate branching, deposit concentration, and bank credit card debt trends. *Note:* This figure shows the trends in bank credit card debt (*re33p*) for the group of counties based on HHI and extreme values of bank deregulation index (*Deregulation*). A county with low (High) HHI has an HHI value below (above) the median HHI. A county's HHI is defined as the sum of the squared proportions of deposits at the bank level. The numbers in parentheses near the solid and dashed lines indicate the number of counties used to compute the average value of bank credit card debt.

TABLE 3 Interstate branching effects for counties with low and high deposit concentration.

Panel A: Summary statistics of annual log-change of variables based on Herfindahl-Hirschmann Index (HHI) groups								
	Low HHI				High HHI			
	Mean	Median	SD	N	Mean	Median	SD	N
DI_at99	0.0831	0.0806	0.2183	74,714	0.0865	0.0832	0.2417	74,635
DI_re33p	0.1183	0.1173	0.1881	74,705	0.1251	0.1234	0.2687	74,632
DI_unemp	-0.0054	-0.0177	0.1963	74,724	-0.0070	-0.0110	0.2328	74,701

Panel B: Dependent variable - Annual log-change in consumer debt (DI_at99)				
	Low HHI		High HHI	
	(1)	(2)	(3)	(4)
Deregulation	0.0030 (1.2)	0.0030 (1.2)	0.0092** (2.3)	0.0093** (2.3)
DI_unemp		0.0179** (2.1)		0.0066 (1.0)
Constant	0.1026*** (10.6)	0.1038*** (10.5)	0.1035*** (10.3)	0.1036*** (10.4)
N	74,714	74,688	74,635	74,606
within R ²	0.08	0.09	0.10	0.10

Panel C: Dependent variable - Annual log-change in bank credit card debt (DI_re33p)				
	Low HHI		High HHI	
	(1)	(2)	(3)	(4)
Deregulation	0.0045 (1.7)	0.0045 (1.7)	0.0124** (2.4)	0.0125** (2.4)
DI_unemp		0.0062 (0.6)		0.0084 (1.3)
Constant	0.1355*** (13.3)	0.1359*** (13.3)	0.1496*** (13.2)	0.1498*** (13.1)
N	74,705	74,679	74,632	74,603
within R ²	0.12	0.12	0.09	0.09

Note: This table reports the effects of interstate branching on consumer credit for subsamples based on the HHI. The HHI is calculated as the sum of the squares of the proportion of deposits held by each bank within a county in a given quarter. Based on the previous year's HHI values, a High (Low) HHI county is defined as one with an above- (below-) median HHI value. The sample period spans from the first quarter of 1994 to the fourth quarter of 2005. Panel A reports the summary statistics of the annual log-change (prefix *DI_*) of a given variable. It is the natural logarithm of the ratio of the value of that variable for the current quarter to that for the fourth previous quarter. The dependent variable for Panel B is the annual log-change in outstanding consumer debt (*DI_at99*), whereas that for Panel C is the annual log-change in the outstanding bank credit card debt (*DI_re33p*). The variable definitions of *at99* and *re33p* are presented in the notes to Table 1. The control variable *unemp* is the number of unemployed people. The variable *Deregulation* is the fourth quarter lag value of the five-point scale deregulation index based on Johnson and Rice (2008). Each regression specification controls the county and quarter fixed effects. The absolute value of *t*-statistics, based on robust standard errors clustered at the state level, are reported in the parentheses below the coefficients. The symbols ** and *** denote the statistical significance at the 5% and 1% levels, respectively. The abbreviations N, SD, and R² are the number of non-missing county-quarter observations, standard deviation, and R-squared, respectively.

Panel A of Table 3 reports summary statistics for both groups. The reported statistics are mean, median, standard deviation, and the number of county-quarter observations. The average annual growth rate in consumer loans for counties with low deposit concentration (high bank competition) is 8.31%. That statistic for counties with low bank competition is 8.65%. Similarly, the average annual growth of bank credit card debt is 12.51% for counties with low bank competition, compared with 11.83% for counties with high bank competition. Therefore, as far as the average growth rate of consumer credit is concerned, the subsample of 'High HHI' counties does not appear to differ significantly from that of 'Low HHI' counties.

Panel B of Table 3 documents the interstate branching effect on the change in total consumer debt for both the groups based on deposit concentration. The dependent variable is DI_at99 . Panel C of Table 3 highlights the results on the effects of bank-branch deregulation on changes in bank credit card debt for the two subsamples based on HHI. As shown in Column (1), the coefficient values on *Deregulation* are 0.0030 and 0.0045 for Panel B and Panel C, respectively. These values are statistically insignificant. As reported in the third Column of Panel B and Panel C of Table 3, the interstate branching effect on consumer credit is stronger among counties with high bank deposit concentration. The coefficient of 0.0124 on *Deregulation* in Column (3) of Panel C is interpreted as follows: Suppose a state currently has imposed all four barriers that prevent out-of-state banks from opening a branch in that state. If the state lifts at least one of these barriers, counties with low bank competition in that state experience an additional 1.24 percentage-point increase in bank credit card debt. This change is statistically significant at the 5% level (*t*-statistic: 2.4). Similarly, the coefficient of 0.092 on *Deregulation* as reported in Column (3) of Panel B can be interpreted in the same manner.

In summary, the results of Table 3 suggest that interstate branching deregulation effects on consumer credit are predominant in counties with low bank competition. A plausible explanation is as follows: Prior to the Riegle-Neal Act of 1994, some U.S. counties were too expensive for a large bank to set up a subsidiary bank through the BHC structure. The law facilitated the expansion of branch networks. Large banks are now willing to extend consumer loans in counties where they do not have a deposit base and are not solely dependent on local economic cycles. Perhaps, the large bank finds these areas beneficial for geographic risk diversification (Aguirregabiria et al., 2016).

4.4 | Interstate branching effects on consumer credit for rural and urban counties

In the previous subsection, a county's deposit concentration served as a proxy for bank competition and the possibility of geographic risk diversification. In this subsection, as an additional validation, we use subsamples of counties based on whether they are rural or urban. Rural areas tend to have a lower population density and lower economic activity, which make them unprofitable for a large bank (Lawrence & Watkins, 1986). After the passage of the IBBEA, a large bank may extend consumer loans to rural areas for the purpose of geographic risk diversification.

Following Ratcliffe et al. (2016), a county is classified as rural if more than 50% of its population is rural, and as urban if more than 50% of its population is urban. Data on a county's rural (urban) population come from the decennial Census that we obtain from the IPUMS National Historical GIS (NHGIS) website.¹⁸ For the sample periods of 1990-1999 and 2000-2005, we use data from the 1990 and 2000 decennial Censuses, respectively.

Appendix Table A2 reports the results. A typical rural county, on average, has higher growth in consumer credit and credit card debt than those for a typical urban county. The interstate branching effect on consumer debt is larger among rural counties than that for urban counties. Regarding credit card debt, interstate branching deregulation has a positive effect in both subsamples. However, the magnitude of the effect is higher for rural counties. Overall, this additional analysis confirms earlier findings using deposit concentration as a proxy for bank competition.

¹⁸Steven Manson, Jonathan Schroeder, David Van Riper, and Steven Ruggles. IPUMS National Historical Geographic Information System: Version 14.0 [Database]. Minneapolis, MN: IPUMS. 2019. <https://doi.org/10.18128/D050.V14.0> [last accessed on 8/21/25].

4.5 | Interstate branching effects on consumer credit for high and low income growth counties

A consumer lender, typically a large bank, is more likely to extend loans to a borrower whose income is growing. This is due to the unsecured nature of the consumer credit, where the lender gets repaid primarily from the future income of the borrower. In addition, the borrower generally uses consumer credit for intertemporal consumption smoothing—bringing forward the future income to finance the current consumption. Therefore, the interstate branching effect on consumer credit is likely to be higher in the case of local economies (counties) that are growing. However, geographic expansion of branch networks provide diversification-related benefits to a bank. Due to increased risk sharing after geographic deregulation, banks are less likely to rely solely on the local economic cycles of communities. In those communities, they may lend more. As a result, counties with low income growth can also experience an increase in consumer credit after the interstate branching deregulation.

Appendix Table A3 reports interstate branching effects on consumer credit for subsamples based on per capita income growth. A county's income growth for a given year is measured as the percentage change in per capita income from the previous year. The per capita income data are obtained from the Bureau of Economic Analysis. Based on the previous year's income growth values, a High Growth (Low Growth) county is defined as one with the above-median (below-median) income growth.

As shown in Panel A, the average and median values of bank credit card debt growth are similar for 'Low Growth' and 'High Growth' counties. More importantly, as shown in Panel B and Panel C, the effects of interstate branching on consumer credit are positive for both subsamples—counties with high income growth and counties with low income growth. However, the effect is stronger in the 'High Growth' counties, which is expected. As shown in Columns (1) and (2) of Panels B and C, the coefficient on *Deregulation* is positive and statistically significant at the 10% level for the 'Low Growth' counties. These results suggest that consumer lenders are willing to extend credit in counties with low income growth following interstate branching deregulation, perhaps due to increased risk sharing and diversification-related gains.

Overall, the results of Section 4 indicate that the effect of interstate branching on unsecured consumer credit is most pronounced in areas with highly concentrated bank deposits, rural population, or high income growth. In essence, these findings help strengthen the earlier demonstrated effects of intrastate branching on secured bank loans. Following geographic deregulation, banks either extended more credit, lent more efficiently, served previously underserved areas, or provided credit to individuals who previously lacked credit access.

5 | TRANSMISSION OF INTERSTATE BRANCHING EFFECTS ON CONSUMER CREDIT THROUGH NEW ACCOUNTS

The previous two sections suggest that, (1) the removal of regulatory constraints on out-of-state banks' ability to open branches (interstate branching) increases the annual growth of consumer credit, including bank credit card debt, and (2) the effects of interstate branching on consumer lending are more predominant in counties with high deposit concentration (i.e., low bank competition). This section identifies a potential channel—newly opened credit accounts—through which the interstate branching increases consumer credit.

5.1 | Data

The TrenData variable *at07* provides information on recently opened credit accounts (also known as "trades") of a county. According to TrenData, it is defined as, the "number of trades opened in the past 12 months". TrenData also provides information on newly opened installment credit accounts and retail credit accounts.

Specifically, the variable *in07* measures the newly opened installment trades during the past year. It is defined as, the “number of installment trades opened in the past 12 months”. Similarly, variable *rt07* is defined as, the “number of retail trades opened in the past 12 months”. Using the information content of *at07*, *in07*, and *rt07*, the proxy for newly opened bank credit card accounts is *re07p*. It is computed as *at07* minus *in07* minus *rt07*. Appendix Table A1 shows the average number of new credit accounts for the entire U.S. during the annual sample period from 1994 to 2005. It also provides the number of new credit accounts for the years 1995, 2000, and 2005. In the U.S., the number of bank credit card accounts opened in the past 12 months was 11 million in 1995. That number increased to 15 million in 2005. These numbers show that not only did the level of consumer credit increase during the 1994–2005 period, but also the number of new accounts, which suggests extensive margin effects.

5.2 | Data visualization

Figure 3 serves a similar purpose to that of Figure 2. The y-axis shows the average number of new credit accounts opened in the past 12 months for a typical county of a 2×2 classification. The classifications are based on the extreme values of the deregulation index and HHI groups. The upper panel shows the trends for a county with an above-median HHI, whereas the lower panel shows the trends for a county with a below-median HHI. In both panels, the solid (dashed) line captures the values for counties with the least (most) restrictions on out-of-state banks' entry through branch establishment.

As reported in the upper panel, the average number of newly opened accounts increases in most quarters of the sample period for counties that impose no barriers to out-of-state banks' entry. However, the trend is nearly flat for counties that circumvent the IBBEA by erecting all possible entry barriers. The upper panel implies that the degree of bank deregulation has an influence on the growth of new accounts in counties with low bank competition. As shown in the lower panel, from the second quarter of 1996 to the first quarter of 1999, the average number of newly opened accounts declines in counties with high bank competition, irrespective of the degree of bank deregulation. A similar phenomenon is observed again in the post-2002 period.

Overall, Figure 3 suggests that the interstate branching seems to increase the number of new credit accounts in counties with low bank competition.

5.3 | Empirical analysis

Table 4 reports the effects of interstate branching on the newly opened accounts in the past 12 months for groups of counties based on bank competition. Panel A shows the summary statistics. The average growth in the number of new credit accounts for counties with low bank competition is 4.5%. That statistic is 3.9% for counties with high bank competition. Similarly, the number of new bank credit card accounts grows, on average, by 7.5% per year in counties with low bank competition. That statistic is 6.5% per year for counties with high bank competition. These average values indicate that the extensive margin effects seem to be larger in counties with low bank competition.

Panel B and Panel C report the results of a difference-in-differences analysis of Equation (1), where the dependent variable is the annual log-change in the number of newly opened accounts in the past 12 months. As shown in Column (3) of Panel B, the coefficient on variable *Deregulation* is 0.0112 and it is statistically significant at the 1% level (*t*-statistic: 3.7). Similarly, as shown in Column (3) of Panel C, the coefficient on *Deregulation* is 0.0082, and it is statistically significant at the 5% level.

In summary, the analysis of this section shows that the interstate branching deregulation increases the number of new credit accounts in a county with low bank competition.

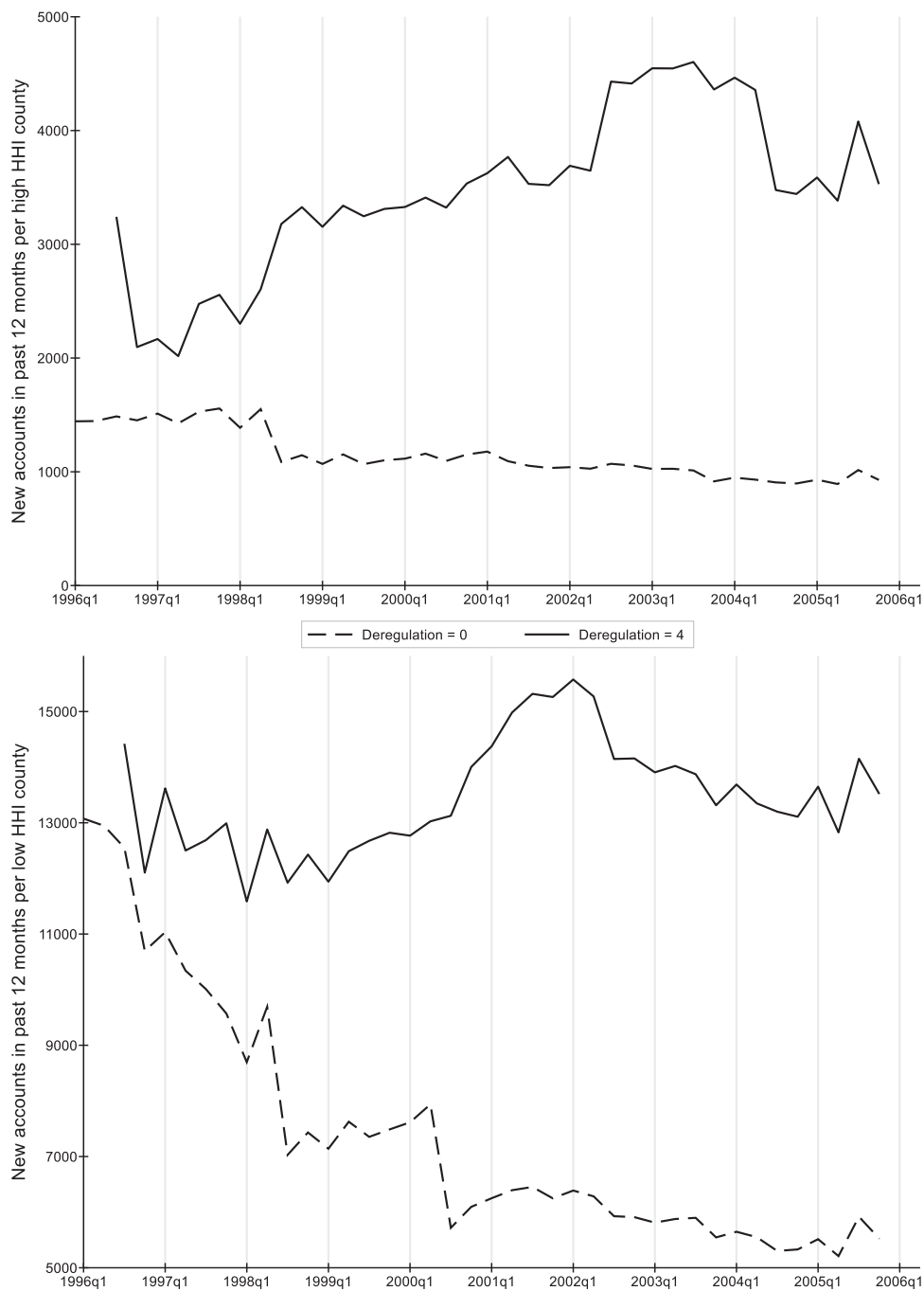


FIGURE 3 Interstate branching, deposit concentration, and new accounts in the past 12 months trends. *Note:* This figure shows the trends in new accounts in the past 12 months (*at07*) for the group of counties based on HHI and extreme values of bank deregulation index (*Deregulation*). A county with low (High) HHI has an HHI value below (above) the median HHI. H A county's HHI is defined as the sum of the squared proportions of deposits at the bank level. The numbers of counties for computing the average values of new accounts are the same as those shown in parentheses near the solid and dashed lines of Figure 2.

TABLE 4 Interstate branching effects on new credit accounts for counties with low and high deposit concentration.

Panel A: Summary statistics of annual log-change of newly opened accounts based on HHI groups								
	Low HHI				High HHI			
	Mean	Median	SD	N	Mean	Median	SD	N
DI_at07	0.0389	0.0312	0.1721	74,708	0.0446	0.0352	0.2120	74,633
DI_re07p	0.0652	0.0528	0.1878	74,705	0.0747	0.0584	0.2539	74,629
Panel B: Dependent variable – Annual log-change in credit accounts (trades) opened in past 12 months (DI_at07)								
	Low HHI				High HHI			
	(1)		(2)		(3)		(4)	
Deregulation		0.0018 (0.6)	0.0018 (0.6)		0.0112*** (3.7)		0.0114*** (3.8)	
DI_unemp			0.0006 (0.1)				–0.0005 (0.1)	
Constant		0.1996*** (19.6)	0.1996*** (19.5)		0.1846*** (12.9)		0.1846*** (12.8)	
N		74,708	74,682		74,633		74,604	
within R ²		0.26	0.27		0.22		0.22	
Panel C: Dependent variable – Annual log-change in bank credit card trades opened in past 12 months (DI_re07p)								
	Low HHI				High HHI			
	(1)		(2)		(3)		(4)	
Deregulation		–0.0009 (0.3)	–0.0010 (0.3)		0.0082** (2.0)		0.0083** (2.1)	
DI_unemp			–0.0007 (0.1)				–0.0057 (1.1)	
Constant		0.3346*** (27.0)	0.3345*** (26.9)		0.3511*** (18.9)		0.3508*** (18.9)	
N		74,705	74,679		74,629		74,600	
within R ²		0.38	0.38		0.31		0.31	

Note: This table reports the effects of interstate branching on new credit accounts opened during the year for subsamples based on the HHI. The HHI is calculated as the sum of the squares of the proportion of deposits held by each bank within a county in a given quarter. Based on the previous year's HHI values, a High (Low) HHI county is defined as one with an above- (below-) median HHI value. The sample period spans the first quarter of 1994 to the fourth quarter of 2005. Panel A reports summary statistics of the annual log-change (prefix *DI_*) of a given variable. It is the natural logarithm of the ratio of the value of that variable for the current quarter to that for the fourth previous quarter. The dependent variable for Panel B is the annual log-change in the number of total trades (accounts) opened in the past 12 months (*DI_at07*), whereas that for Panel C is the annual log-change in the number of bank credit card accounts opened in the past 12 months (*DI_re07p*). The variable definitions of *at07* and *re07p* are in the notes to Appendix Table A1. The control variable *unemp* is the number of unemployed people. The variable *Deregulation* is the fourth quarter lag value of the five-point scale deregulation index based on Johnson and Rice (2008). Each regression specification controls the county and quarter fixed effects. The absolute value of *t*-statistics, based on robust standard errors clustered at the state level, are reported in the parentheses below the coefficients. The symbols ** and *** denote statistical significance at the 5% and 1% levels, respectively. The abbreviations N, SD, and R² are the number of non-missing county-quarter observations, standard deviation, and R-squared, respectively.

5.4 | Additional analysis

TrenData also provides information on new accounts (trades) opened during a quarter. The variable *at05* is defined as, the “number of trades opened in the past 3 months”. In addition, TrenData variable *in05* measures the newly opened installment trades during this quarter. It is defined as, the “number of installment trades opened in the past 3 months”. The variable *rt05* captures the number of retail trades opened during the quarter. It is defined as, the “number of retail trades opened in the past 3 months”. The proxy for the number of new bank credit card accounts opened during a quarter is *re05p*. It is the difference between *at05* and the sum of *in05* and *rt05*. Appendix Table A1 shows the number of accounts opened in the past 3 months for the entire U.S.

Table 5 reports the results of an additional analysis to determine whether the interstate branching effects on consumer credit transmits through the new credit accounts opened in the past 3 months. Table 5 is a condensed version of Table 4. Panel A of Table 5 provides the summary statistics. The average growth in the number of new accounts opened during the quarter is 3.4% for counties with low bank competition. That statistic is 2.8% for counties with high bank competition. Similar average values are observed for the newly opened bank credit card accounts.

Panel B of Table 5 shows that interstate branching increases the total number of new credit accounts per quarter in counties with high deposit concentration.

TABLE 5 Deposit concentration and interstate branching effects on consumer credit through new accounts – Additional analysis.

Panel A: Summary statistics of annual log-change of accounts opened in past 3 months for HHI groups								
	Low HHI				High HHI			
	Mean	Median	SD	N	Mean	Median	SD	N
<i>DI_at05</i>	0.0276	0.0235	0.2247	74,702	0.0343	0.0297	0.3024	74,620
<i>DI_re05p</i>	0.0538	0.0519	0.2474	74,702	0.0648	0.0561	0.3660	74,527
Panel B: Bank deregulation and annual log-change in new credit accounts (trades) opened in past 3 months								
	Dependent variable: <i>DI_at05</i>				Dependent variable: <i>DI_re05p</i>			
	Low HHI		High HHI		Low HHI		High HHI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Deregulation</i>	−0.001 (0.3)	−0.001 (0.3)	0.008*** (2.8)	0.009*** (2.9)	−0.004 (1.1)	−0.005 (1.1)	0.006 (1.4)	0.007 (1.4)
<i>DI_unemp</i>		0.001 (0.1)		−0.006 (0.6)		0.000 (0.0)		−0.011 (1.1)
<i>Constant</i>	0.095*** (4.9)	0.095*** (4.9)	0.076*** (3.0)	0.075*** (3.0)	0.235*** (11.3)	0.235*** (11.2)	0.261*** (8.1)	0.261*** (8.1)
<i>N</i>	74,702	74,676	74,620	74,591	74,702	74,676	74,527	74,498
within <i>R</i> ²	0.48	0.48	0.28	0.28	0.44	0.44	0.26	0.26

Note: This table shows additional analysis to those reported in Table 4. The main difference is that the newly opened trades are measured over the past 3 months, instead of the past 12 months. The variable definitions of *at05* and *re05p* are in Appendix Table A1. Each regression specification of Panel B controls the county and quarter fixed effects. The absolute value of *t*-statistics, based on robust standard errors clustered at the state level, are reported in the parentheses below the coefficients. The symbol *** denotes statistical significance at the 1% level. *N*, *SD*, and *R*² are the number of non-missing county-quarter observations, standard deviation, and *R*-squared, respectively.

In summary, the effects of interstate branching on consumer credit are potentially transmitted through the opening of additional credit accounts in the areas of low bank competition.

6 | INTERSTATE BRANCHING EFFECTS ON CONSUMER DEFAULTS

In this section, the focus is on negative credit outcomes. The research question is whether the interstate branching deregulation also increases defaults on a consumer loan.

6.1 | Data

TrenData provides data on the number of consumers who are delinquent on their loan obligations. The variable *go42c* is defined as, the “number of consumers with at least one trade ever 60 or more days past due”. Similarly, the variable *revdlnq* is defined as, the “number of consumers whose worst delinquency on revolving trades is above 60 days”. Appendix Table A1 shows the number of delinquent consumers on any given consumer credit account or bank credit card (revolving) account for the entire U.S. for the years 1995, 2000, and 2005.

6.2 | Empirical analysis

Table 6 reports the effects of interstate branching deregulation on consumer defaults for counties with low and high bank competition. Panel A summarizes the consumer default measures. The average growth in consumer defaults in counties with low bank competition is 4.7%. That statistic is 3.8% in counties with high bank competition. These figures suggest that counties with low bank competition, on average, experience higher growth in consumer credit. However, in these counties, some consumers appear to be in financial distress and are unable to meet their loan obligations.

Panel B of Table 6 reports the results of regression analysis based on Equation (1). The dependent variable is the change in delinquencies. For regressions in Columns (1) to (4), the dependent variable is the change in the overall delinquencies, whereas for Columns (5) to (8), it is the change in the bank credit card delinquencies. The coefficient on *Deregulation* is statistically significant only for counties with low bank competition when the dependent variable measures overall delinquencies (Columns (3) and (4)). The coefficient value is statistically significant at the 10% level.

7 | INDIVIDUAL STATES MIGHT HAVE STARTED INTERSTATE BRANCHING BEFORE 1994

A concern is that states may have begun deregulating their interstate branching restrictions several years before the enactment of the Riegle-Neal Act of 1994 at the federal level, which could confound the results of this study.

Johnson and Rice (2008), citing Amel (1993), note that, “by 1994, while most states allowed interstate banking in some form, only eight states allowed any form of interstate branching.” Appendix Table A4 presents the interstate branching legislative comments of Amel (1993) for these eight states. As shown in the table, Utah is the only state that allowed unconditional and unrestricted interstate branching prior to IBBEA. Nevada allowed it for counties with a population less than 100,000. The remaining six states—Alaska, Massachusetts, New York, Oregon, Rhode Island, and North Carolina—allowed interstate branching prior to 1994 only on a reciprocity basis.¹⁹

¹⁹Similarly, Berger et al. (2020) in first paragraph of Section 2.1 write, “From 1978 to 1994, individual states started allowing BHCs to own commercial banks across state lines (so-called interstate banking), albeit interstate branching was still prohibited.” See also Aguirregabiria et al. (2016, p. 533, para. 3).

TABLE 6 Interstate branching effects on delinquencies.

Panel A: Summary statistics of annual log-change of delinquencies for HHI groups								
	Low HHI				High HHI			
	Mean	Median	SD	N	Mean	Median	SD	N
DI_go42c	0.0384	0.0388	0.1371	74,708	0.0466	0.0465	0.1870	74,631
DI_revdlng	0.0072	0.0000	0.3096	74,651	0.0167	0.0000	0.4842	72,115
Panel B: Bank deregulation and annual log-change in number of delinquent consumers								
	Dependent variable: DI_go42c				Dependent variable: DI_revdlng			
	Low HHI		High HHI		Low HHI		High HHI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Deregulation	0.002 (1.3)	0.002 (1.3)	0.003* (1.8)	0.003* (1.9)	0.002 (0.5)	0.002 (0.5)	0.004 (0.9)	0.004 (1.0)
DI_unemp		0.013** (2.3)		0.013*** (2.9)		0.045*** (3.7)		0.048*** (3.0)
Constant	0.016*** (2.7)	0.017*** (2.8)	0.009 (0.9)	0.010 (0.9)	-0.037** (2.6)	-0.034** (2.4)	0.015 (0.8)	0.017 (0.9)
N	74,708	74,682	74,631	74,602	74,651	74,625	72,115	72,086
within R ²	0.13	0.13	0.09	0.09	0.35	0.35	0.16	0.16

Note: This table reports the results of effects of interstate branching on consumer defaults (delinquencies). The variables *go42c* and *revdlng* measure defaults and are defined in Appendix Table A1. The prefix *DI_* is the annual log-change of a given variable. Each regression specification of Panel B controls the county and quarter fixed effects. The absolute value of t-statistics, based on robust standard errors clustered at the state level, are reported in the parentheses below the coefficients. The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. N, SD, and R² are the abbreviations for number of non-missing county-quarter observations, standard deviation, and R-squared, respectively.

Another approach to cross-check the prevalence of interstate branching prior to the IBBEA is to examine branch-level data from SOD of FDIC. Table 7 shows the number of out-of-state branches, the percentage of number of out-of-state branches, and the percentage of deposits held by out-of-state bank branches as of June 30, 1993 (prior to the IBBEA enactment date), June 30, 1997 (near the IBBEA opt-out date), and June 30, 2005 (near the end of the sample period).

As shown in Table 7, as of June 30, 1993, there are 67 out-of-state bank branches in the U.S. By June 30, 2005, this number had increased to 28,140. In addition, on average, only 0.11% of total deposits in a state were held by out-of-state bank-branches; by June 30, 2005, this share had risen to 38.7% [these numbers are untabulated].²⁰ The data suggest that, prior to the IBBEA, both the number of out-of-state bank branches and the proportion of deposits held by out-of-state bank branches in a given state were negligible. Those numbers became significant across U.S. states by mid-2005. Therefore, it appears that, prior to the IBBEA of 1994, banks expanded geographically across state lines primarily via interstate banking rather than interstate branching.

As a robustness check, we assume that all eight previously mentioned states (Alaska, Massachusetts, New York, Oregon, Rhode Island, Nevada, North Carolina, and Utah) allowed interstate branching prior to 1994. For these states, we set the deregulation index equal to four for the entire sample period, from the first quarter of 1994 to fourth quarter of 2005. We then reproduce the results reported in Tables 2 and 3, which contain the main findings

²⁰Johnson and Rice (2008) on page 76 mention that, "In 1994, 62 out-of-state branches existed in a small number of states. By 2005, the number of out-of-state branches had grown to 24,728."

TABLE 7 Out-of-state branches across state and year.

State	As on June 30, 1993			As on June 30, 1997			As on June 30, 2005		
	N_Ot	%N_Ot	%D_Ot	N_Ot	%N_Ot	%D_Ot	N_Ot	%N_Ot	%D_Ot
AL	0	0.0	0.0	0	0.0	0.0	247	17.4	16.6
AK	0	0.0	0.0	32	24.1	14.6	69	56.1	56.4
AZ	1	0.1	0.0	384	45.6	37.5	809	79.4	81.5
AR	0	0.0	0.0	15	1.5	0.6	294	22.2	24.7
CA	0	0.0	0.0	110	2.6	1.7	2,447	48.7	58.1
CO	2	0.3	0.1	115	13.2	18.6	552	42.9	48.3
CT	1	0.2	0.0	245	49.4	62.7	401	67.1	69.9
DE	0	0.0	0.0	33	14.9	2.3	23	10.4	0.7
DC	0	0.0	0.0	138	76.2	73.4	155	92.3	97.1
FL	1	0.0	0.0	1,326	36.9	40.9	2,997	69.4	75.2
GA	0	0.0	0.0	687	35.3	45.0	934	37.7	38.6
HI	0	0.0	0.0	0	0.0	0.0	3	1.5	0.2
ID	0	0.0	0.0	295	84.0	89.0	289	72.1	70.5
IL	0	0.0	0.0	142	4.9	3.2	1,289	31.6	28.8
IN	0	0.0	0.0	227	12.0	8.4	692	34.0	33.3
IA	3	0.3	0.0	40	3.1	2.5	261	18.3	24.3
KS	0	0.0	0.0	170	14.8	18.7	179	13.2	17.1
KY	3	0.2	0.1	66	4.9	3.9	589	35.0	36.3
LA	0	0.0	0.0	29	2.2	1.9	361	25.1	30.3
ME	0	0.0	0.0	96	32.0	36.4	115	37.8	36.9
MD	0	0.0	0.0	450	33.7	37.1	756	53.8	62.1
MA	0	0.0	0.0	8	0.8	0.1	508	49.4	41.9
MI	0	0.0	0.0	78	3.1	2.9	916	32.8	32.5
MN	4	0.3	0.0	0	0.0	0.0	407	24.7	54.4
MS	0	0.0	0.0	12	1.2	0.9	231	20.6	20.1
MO	1	0.1	0.0	227	13.7	30.2	511	24.2	31.9
MT	0	0.0	0.0	0	0.0	0.0	61	17.1	18.3
NE	0	0.0	0.0	59	7.5	10.0	123	13.9	18.1
NV	0	0.0	0.0	215	68.7	66.0	268	61.8	50.7
NH	0	0.0	0.0	32	17.2	4.1	137	62.0	34.7
NJ	0	0.0	0.0	960	45.9	42.1	1,341	57.9	55.0
NM	1	0.2	0.0	55	11.8	7.0	214	47.9	51.4
NY	0	0.0	0.0	525	15.2	7.2	1,561	41.1	50.9
NC	0	0.0	0.0	41	1.9	1.2	316	13.2	5.3

TABLE 7 (Continued)

State	As on June 30, 1993			As on June 30, 1997			As on June 30, 2005		
	N_Ot	%N_Ot	%D_Ot	N_Ot	%N_Ot	%D_Ot	N_Ot	%N_Ot	%D_Ot
ND	0	0.0	0.0	27	7.5	15.9	89	22.6	28.3
OH	0	0.0	0.0	24	0.8	0.4	121	3.5	2.4
OK	0	0.0	0.0	0	0.0	0.0	233	19.4	20.6
OR	2	0.3	1.1	331	46.4	35.0	516	62.6	69.9
PA	5	0.1	0.0	3	0.1	0.0	917	27.4	28.1
RI	12	7.5	3.8	53	27.9	35.2	58	33.3	34.0
SC	0	0.0	0.0	292	30.4	39.7	406	35.1	41.6
SD	1	0.3	0.0	16	4.4	5.3	34	8.4	2.2
TN	0	0.0	0.0	71	4.0	3.4	897	44.1	42.6
TX	20	0.6	0.0	4	0.1	0.0	2,003	37.4	59.2
UT	2	0.5	0.1	93	19.3	12.8	260	48.1	10.2
VT	0	0.0	0.0	17	8.1	5.4	80	33.8	38.0
VA	0	0.0	0.0	243	11.4	15.4	978	43.3	47.8
WA	5	0.5	0.9	828	69.0	75.0	786	57.2	67.6
WV	0	0.0	0.0	63	10.9	10.5	228	36.9	41.8
WI	2	0.1	0.0	18	1.2	1.0	386	20.2	26.2
WY	1	0.9	0.0	14	9.8	3.7	92	46.9	43.1

Note: This table reports number of out-of-state branches (N_Ot), percentage of the number of out-of-state branches (%N_Ot), and percentage of deposits held by out-of-state branches (%D_Ot) for the 50 U.S. states and the District of Columbia on June 30 1993, 1997, and 2005. The data are from the FDIC Summary of Deposits.

of our article. Table 8 reports the results based on this “modified” sample. The results remain similar to those reported in Table 2 and Table 3. However, the statistical significance of the effect marginally declines.

Finally, as we saw earlier in Section 2, the extant literature that uses the interstate branching of 1994 as a natural experiment to identify the effects of bank deregulation on various economic outcomes, is still growing. Therefore, the effects of bank deregulation on consumer credit documented in this study are unlikely to be confounded by any prior state-level interstate branching.

8 | CONCLUSION

In the United States, between 1976 and 1992, 35 states removed restrictions on in-state banks opening branches anywhere within the state. Empirical banking research demonstrates that this geographic deregulation has positive effects: individual incomes increased, income inequality decreased, income became less volatile—particularly for self-employed individuals—and economic conditions for minority groups improved. The proposed mechanism for these effects is secured bank lending.

This article demonstrates a similar effect on unsecured consumer credit using county-level credit bureau data. After the passage of federal legislation Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, the consumer credit amounts and bank cards increased in areas with highly concentrated bank deposits. The effect is

TABLE 8 Empirics considering that interstate branching might have started prior to the IBBEA.

Panel A: Interstate branching effects on total consumer credit and bank credit card debt				
	Dependent variable: <i>DI_at99</i>		Dependent variable: <i>DI_re33p</i>	
	(1)	(2)	(3)	(4)
<i>Deregulation</i>	0.0061** (2.1)	0.0060** (2.1)	0.0073* (1.8)	0.0074* (1.8)
<i>DI_unemp</i>		0.0117** (2.4)		0.0081 (1.2)
<i>Constant</i>	0.1003*** (11.0)	0.1011*** (11.1)	0.1393*** (12.1)	0.1398*** (12.2)
N	150,619	150,441	150,606	150,428
within R ²	0.09	0.09	0.09	0.09

Panel B: Deposit concentration and interstate branching effects on consumer credit								
	Dependent variable: <i>DI_at99</i>				Dependent variable: <i>DI_re33p</i>			
	Low HHI		High HHI		Low HHI		High HHI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Deregulation</i>	0.004 (1.7)	0.003 (1.6)	0.008* (2.0)	0.008* (2.0)	0.004 (1.3)	0.004 (1.2)	0.011* (1.9)	0.011* (1.9)
<i>DI_unemp</i>		0.018** (2.1)		0.006 (1.0)		0.006 (0.6)		0.008 (1.3)
<i>Constant</i>	0.101*** (10.5)	0.102*** (10.5)	0.101*** (9.7)	0.101*** (9.8)	0.134*** (12.6)	0.134*** (12.6)	0.146*** (11.4)	0.147*** (11.3)
N	74,714	74,688	74,635	74,606	74,705	74,679	74,632	74,603
within R ²	0.08	0.09	0.10	0.10	0.12	0.12	0.09	0.09

Note: This table reports the results of analyses that attempt to address a concern that interstate branching might have occurred prior to the IBBEA. Specifically, based on the works of Amel (1993) and Johnson and Rice (2008), the following states: Alaska, Massachusetts, New York, Oregon, Rhode Island, Nevada, North Carolina, and Utah, might have allowed interstate branching prior to the enactment of the IBBEA of 1994. For these states, the value of *Deregulation* is taken equal to 4 for the entire sample period. The empirical specification for Panel A of Table 8 is the same as that used for Panels 2 and 3 of Table 2. And the empirical specification for Panel B of Table 8 is the same as that used for Panels B and C of Table 3. The remaining notes for Table 8 are similar to those provided for Tables 2 and 3.

stronger in rural areas and areas with high income growth. In essence, these findings help strengthen the earlier demonstrated effects of intrastate branching. Following geographic deregulation, banks either extended more credit, lent more efficiently, served areas previously underserved by banks, or provided credit to individuals who previously lacked credit access.

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APPENDIX A

TABLE A1 Additional consumer credit data for the entire U.S.

	Variable	Full sample 1994-2005	1995	2000	2005
<i>Number of new accounts (trades) opened (in millions)</i>					
Total in past 12 months	<i>at07</i>	23.47	22.26	23.72	24.82
Installment in past 12 months	<i>in07</i>	6.55	6.15	6.72	6.70
Retail in past 12 months	<i>rt07</i>	4.17	4.90	3.97	3.31
Bank credit card in past 12 months	<i>re07p</i>	12.75	11.22	13.03	14.82
Total in past 3 months	<i>at05</i>	4.90	4.64	4.97	4.86
Installment in past 3 months	<i>in05</i>	1.29	1.24	1.23	1.21
Retail in past 3 months	<i>rt05</i>	0.92	1.07	0.94	0.74
Bank credit card in past 3 months	<i>re05p</i>	2.69	2.33	2.80	2.92
<i>Number of (60+ days) delinquent consumers (in thousands)</i>					
On at least one trade ever	<i>go42c</i>	7,362.74	6,298.95	7,579.63	8,225.96
On bank credit card trade	<i>revdlnq</i>	544.91	480.65	590.75	402.56

Note: This Appendix table reports annual data of consumer credit variables for the U.S., in addition to those reported in Table 1, for the overall sample period (1994-2005) and for the years 1995, 2000, and 2005. The data source is the county-level quarterly data of TrenData of TransUnion, LLC. Variable definitions for the additional TrenData variables are as follows: *at07* represents the "Number of Trades Opened In The Past 12 Months"; *in07* is the "Number of Installment Trades Opened In The Past 12 Months"; *rt07* is the "Number of Retail Trades Opened In The Past 12 Months"; and *re07p* is a proxy for the number of bank credit card trades opened in the past 12 months, computed at *at07* minus *in07* minus *rt07*. The definitions of *at05*, *in05*, *rt05*, and *re05p* are the same as those of *at07*, *in07*, *rt07*, and *re07p*, respectively, except that the trades were opened in the past 3 months rather than the past 12 months. The variable *go42c* represents the "Number Of Consumers With At Least One Trade Ever 60 Or More Days Past Due", and *revdlnq* represents the "Number Of Consumers Whose Worst Delinquency On Revolving Trades Is Above 60 Days".

TABLE A2 Interstate branching effects on consumer credit for rural and urban counties.

Panel A: Summary statistics of annual log-change of variables based on rural versus urban groups								
	Rural Mean	Median	SD	N	Urban Mean	Median	SD	N
DI_at99	0.0878	0.0853	0.2345	97,423	0.0793	0.0772	0.2360	53,196
DI_re33p	0.1275	0.1261	0.2614	97,419	0.1110	0.1124	0.1901	53,187
DI_unemp	-0.0089	-0.0145	0.2272	97,487	-0.0008	-0.0143	0.1965	53,173
Panel B: Dependent variable - Annual log-change in consumer debt (DI_at99)								
	Rural		Urban					
	(1)	(2)	(3)	(4)				
Deregulation	0.0073** (2.3)	0.0072** (2.3)	0.0043 (1.4)	0.0043 (1.4)				
DI_unemp		0.0077 (1.2)		0.0150** (2.1)				
Constant	0.1132*** (12.5)	0.1138*** (12.5)	0.0810*** (7.7)	0.0818*** (7.9)				
N	97,423	97,374	53,196	53,067				
within R ²	0.10	0.10	0.07	0.07				
Panel C: Dependent variable - Annual log-change in bank credit card debt (DI_re33p)								
	Rural		Urban					
	(1)	(2)	(3)	(4)				
Deregulation	0.0098** (2.4)	0.0098** (2.5)	0.0068* (2.0)	0.0068* (2.0)				
DI_unemp		0.0060 (0.8)		0.0066 (0.8)				
Constant	0.1546*** (14.0)	0.1550*** (14.0)	0.1174*** (10.1)	0.1178*** (10.3)				
N	97,419	97,370	53,187	53,058				
within R ²	0.10	0.10	0.11	0.11				

Note: This Appendix table reports interstate branching effects on consumer credit for subsamples based on rural versus urban counties. A rural (urban) county is defined as one in which 50% or more of the population resides in a rural (urban) area, according to data from the U.S. Census Bureau. The sample consists of all U.S. counties, including the District of Columbia, from the first quarter of 1994 to the fourth quarter of 2005. Panel A reports summary statistics for the annual log-change of each variable. Variable definitions are provided in the notes to Table 1 and Table 2. Panels B and C report the regression results. The variable *Deregulation* is the fourth-quarter lag value of the five-point scale deregulation index based on Johnson and Rice (2008). Each regression specification controls the county and quarter fixed effects. The absolute value of *t*-statistics, based on robust standard errors clustered at the state level, are reported in the parentheses below the coefficients. The symbols *, ** and *** denote the statistical significance at the 10%, 5% and 1% levels, respectively. The abbreviations N, SD, and R² refer to the number of non-missing county-quarter observations, standard deviation, and R-squared, respectively.

TABLE A3 Interstate branching effects on consumer credit for low- and high- income growth counties.

Panel A: Summary statistics of annual log-change of variables based on income growth groups								
	Low Growth				High Growth			
	Mean	Median	SD	N	Mean	Median	SD	N
DI_at99	0.0807	0.0785	0.2329	75,158	0.0890	0.0847	0.2350	75,136
DI_re33p	0.1216	0.1196	0.2342	75,152	0.1218	0.1197	0.2414	75,129
DI_unemp	-0.0097	-0.0175	0.2185	75,198	-0.0025	-0.0116	0.2150	75,186
Panel B: Dependent variable - Annual log-change in consumer debt (DI_at99)								
	Low Growth		High Growth					
	(1)	(2)	(3)	(4)				
Deregulation	0.0056*	0.0056*	0.0075**	0.0075**				
	(1.8)	(1.8)	(2.2)	(2.3)				
DI_unemp		0.0056		0.0196**				
		(1.0)		(2.2)				
Constant	0.1062***	0.1065***	0.1018***	0.1028***				
	(9.9)	(9.9)	(9.3)	(9.5)				
N	75,158	75,136	75,136	75,102				
within R ²	0.08	0.08	0.09	0.09				
Panel C: Dependent variable - Annual log-change in bank credit card debt (DI_re33p)								
	Low Growth		High Growth					
	(1)	(2)	(3)	(4)				
Deregulation	0.0069*	0.0068*	0.0094**	0.0094**				
	(1.9)	(1.9)	(2.4)	(2.4)				
DI_unemp		0.0070		0.0146				
		(1.1)		(1.6)				
Constant	0.1524***	0.1528***	0.1326***	0.1333***				
	(15.9)	(16.0)	(9.3)	(9.3)				
N	75,152	75,130	75,129	75,095				
within R ²	0.10	0.10	0.09	0.09				

Note: This Appendix table reports interstate branching effects on consumer credit for subsamples based on per capita income growth. A county's income growth for a given year is defined as the percentage change in per capita income to relative to the previous year. The per capita income data are obtained from the Bureau of Economic Analysis. Based on the previous year's income growth values, a High Growth (Low Growth) county is defined as one with an above- (below-) median income growth value. The sample consists of U.S. counties, including the District of Columbia, from the first quarter of 1994 to the fourth quarter of 2005. Panel A reports summary statistics of the annual log-change of each variable. Variable definitions are provided in the notes to Table 1 and Table 2. Panels B and C report the regression results. The variable *Deregulation* is the fourth-quarter lag value of the five-point scale deregulation index based on Johnson and Rice (2008). Each regression specification controls the county and quarter fixed effects. The absolute value of *t*-statistics, based on robust standard errors clustered at the state level, are reported in the parentheses below the coefficients. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. The abbreviations N, SD, and R² are for the number of non-missing county-quarter observations, standard deviation, and R-squared, respectively.

TABLE A4 Interstate branching legislation notes for the selected eight states.

State	Effective date	Legislation effect
Alaska	January 1, 1994	National reciprocal
Massachusetts	July 1, 1983	Regional reciprocal: CT, ME, NH, RI, VT
	September 4, 1990	National reciprocal; De novo entry is permitted
New York	June 23, 1993	National reciprocal; De novo entry is permitted
Oregon	November 4, 1993	National reciprocal
Rhode Island	June 27, 1985	National reciprocal; De novo branches are permitted
Nevada	July 1, 1985	permitted in counties with a population less than 100,000; De novo entry is permitted
North Carolina	October 1, 1993	National reciprocal; De novo entry is permitted
Utah	July 1, 1991	National nonreciprocal

Note: Sourced from Amel (1993).