Lender of Last Resort and Local Economic Outcomes*

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This version: February, 2023

Abstract

Economic recovery from financial crises is typically slow, possibly due to credit rationing by financial intermediaries. This paper used novel, archival, panel data on local manufacturing and banking conditions in the United States to investigate the link between policy, bank failures, and firm production and employment during the Great Depression. I study whether lender-of-last-resort policies of the Atlanta Federal Reserve Bank during the Depression strengthened the banking sector and eased firms' financial constraints. Consistent with prior literature, I find robust evidence in support of the former. However, I find little evidence in support of the latter, suggesting that lender of last resort policies were not an important determinant of local, non-banking, economic outcomes.

PRELIMINARY

JEL Classification: N21, N62, G01
Keywords: Lender of last resort, Great Depression, manufacturing, financial constraints

*This research has been supported by a Northwestern Kellogg Dean's Office Research Grant and a Dissertation Fellowship from the Economic History Association.

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1 Introduction

Between 1929 and 1933, more than half of all commercial banks in the United States closed. Some did so temporarily due to liquidity constraints, others shut down permanently after becoming insolvent, and the rest merged with other financial institutions to avoid liquidation. This significant negative shock to financial intermediaries propelled eight decades - and counting - of research into the causes and consequences of bank failures (Friedman and Schwartz (2008), Bernanke (1983), Temin (1976), Wicker (2000)).

One branch of this literature investigates the role of the Federal Reserve. The Federal Reserve has been criticized for not taking interventionist actions early during the Depression, mainly for failing to stem the decline in the money supply and not acting, collectively, as a lender of last resort for banks. Empirically, however, it is difficult to estimate the causal effects of Federal Reserve policies because changes in aggregate statistics could also be the result of simultaneous and endogenous reactions by households, firms, and subnational governments. The ideal scenario is to observe the differences in two places that are ex-ante on a similar economic trajectory, but that experienced different policy regimes before and after the onset of the Depression.

This paper uses novel, archival, panel data on local manufacturing and banking conditions in the United States to investigate the link between policy, bank failures, and firm production and employment. I use the divergent policies enacted by the Atlanta Federal Reserve Bank (henceforth "Atlanta"), first brought to the literature by Richardson and Troost (2009) with additional contributions by Jalil (2014) and Ziebarth (2013), as my empirical laboratory. Atlanta, unlike the other Federal Reserve banks at the time, acted as a lender of last resort inside its region: it extended credit to solvent but illiquid banks in order to prevent runs on otherwise healthy banks. Because the Federal Reserve borders bisect states and consumer markets, I can compare the local economic trajectories before and during the Great Depression using quasi-exogenous incidence of bank failures.

In the first part of my analysis, I investigate the difference in bank failures between counties just outside the Atlanta border and those just inside it and explore its robustness. I find that banks failed less often inside the Atlanta region in 1929 and 1930 even after accounting for pre-exisiting differences in local banking conditions, excluding outliers and individual border segments, and measuring bank distress in different ways. I perform placebo randomization tests of the Federal Reserve borders and find that the baseline results are unlikely to have occurred by chance. Additionally, I do not find much evidence that bank distress differed across borders of Federal Reserve districts

that did *not* follow different lender of last resort policies. The results, taken together, suggest that credit conditions were more favorable in the early years of the Depression inside the counties of the Atlanta district.

I turn to local manufacturing outcomes in the second part of my analysis. By combining an industry-level credit survey and pre-Depression industry-by-county data, I construct proxies of financial constraints of small and medium sized manufacturers in each county around the Atlanta region border. The survey shows that the vast majority these manufactures relied on commercial banks to finance both working capital and long-term investment, but the degree of these constraints varied by industry. By exploiting the geographical differences in the types of manufacturing along the Atlanta border, I compare economic activity across counties with less and more banking failures. Since commercial banks survived at a higher rate inside the Atlanta region, my hypothesis is that manufacturing output and employment shrank less and recovered quicker there as compared to counties just outside the Atlanta region. Furthermore, I test whether the results are strongest for counties with firms in the highly constrained industries.

I do not find evidence to support this hypothesis, which contrasts with the results of the existing literature. First, manufacturing outcomes were worse, not better, in counties inside the Atlanta region, despite having more banking resources. Second, I do find evidence that the county-level financing constraints, on average across all counties, predict worse outcomes after, but not before, the Depression. Yet, the combination of pre-Depression measures of financial constraints and banking panics during the Depression was not an important determinant of local economic outcomes, as one might expect. Even though the Atlanta Federal Reserve policies strengthened the banking sector early on in the Depression, there was no positive downstream effect on firms, possibly due to the banking sector's reluctance to extend credit.

The rest of the paper is organized as follows. Section 2 describes the historical background and surveys the literature. Section 3 discusses the data while Section 4 presents the empirical strategy and reports the robust banking results. Section 5 analyzes manufacturing outcomes and Section 6 concludes.

2 Historical Background and Literature Review

This section summarizes the historical and institutional background of banks and firms during the Depression.[1] I then describe new survey evidence documenting the interactions between

[1]For a more holistic literature review, see Wicker (2000) and Temin (1976).

commercial banks and small to medium-sized manufacturers (Bureau (1935)).

2.1 Banking crises

The sequence of events during the Great Recession (2007 – 2009) – a financial crisis, a deep economic recession, a slow recovery - revitalized the study of how distress in financial markets propagates to households and firms. The closest historical analog to what the U.S. economy was experiencing in the late 2000s is the Great Depression (1929 – 1937). Sparked by a stock market crash in the fall of 1929 and fueled by banking failures in the ensuing four years, the Depression has been one of the most studied events in U.S. economic history. Among others, Friedman and Schwartz (2008) and Bernanke (1983) consider bank panics as a critical driver of the economic contraction and the Depression's depth and length. From a policy perspective, understanding why financial institutions fail and which policies (if any) prevent failure are perhaps the defining questions for financial market regulators and central banks.

There are two main hypotheses surrounding the causes of bank failures during the Depression in the United States. The first hypothesis is that banks became insolvent once the underlying value of their assets - mainly mortgages, business loans, and bonds – declined in value (Temin (1976), White (1984), Calomiris and Mason (2003)). Simply put, banks invested poorly in the years leading up to 1929. They made too many loans to businesses that would eventually fail, too many loans to stock speculators who would get wiped out in the 1929 crash, and too many mortgages during the post-World War I construction boom of the 1920s. The empirical evidence for the solvency hypothesis comes in various forms: state-level bank failures and economic and loan characteristics, bank-level data and loan quality, and the quantity and changes in bond yields. The outcome of interest in these studies is, typically, the probability or severity of bank suspensions, and they have found that fundamental economic shocks can predict bank failure well. It is doubtful, these studies conclude, that policy interventions, such as lender of last resort policies that provide liquidity assistance, could have done much to rescue failing banks during the Depression.

The second hypothesis is that mass withdrawals brought down the banking sector by fearful and anxious depositors – the illiquidity hypothesis. The stock market crash created uncertainty about future economic prospects. In addition, news reports on failures of large and connected institutions created uncertainty about the financial soundness of the banking sector. As a result, individuals lost trust in the system and rushed to withdraw money from banks, while banks could not liquidate assets to meet demands and had no other option but to cease operations (Friedman and

Schwartz (2008), Wicker (2000)). Under this hypothesis, the Federal Reserve could have alleviated the crisis by acting as a lender of last resort: lending cash to banks in exchange for illiquid assets at non-fire sale prices. Some have heavily criticized the Federal Reserve System for not doing enough to stop the Depression with this reasoning.

Both hypotheses are conceptually plausible and empirically justified, depending on the time, place, and level of aggregation of the data. No single factor can fully explain the extent of banking panics during the Great Depression. The best available evidence on the relative significance of the solvency and liquidity channels comes from Richardson (2007). Using quarterly data at the bank level during 1929-1933, he finds that the bank failures changed over time: early on, small rural banks failed at an increasing rate. The collapse of Caldwell and Company and the Bank of the United States in 1930 propagated bank runs. By 1931, once Britain left the gold standard, asset value declined, and most banks that failed were, in fact, insolvent. Nearly three-fourths of failed institutions were deemed insolvent, one quarter was solvent and reopened for business or merged with other banks. Of those that suspended operations, one-half did so due to depositor withdrawals.

2.2 What was the scope of Federal Reserve intervention?

The Federal Reserve has been criticized for not taking interventionist actions early during the Depression, mainly for failing to stem the decline in the money supply and not acting, collectively, as a lender of last resort for banks. Empirically, however, it is difficult to estimate the causal effects of Federal Reserve policies because changes in aggregate statistics could also be the result of simultaneous and endogenous reactions by households, firms, and subnational governments. The ideal scenario is to observe the differences in two places that are ex-ante on a similar economic trajectory, but that experienced different policy regimes before and after the onset of the Depression.

The application of Federal Reserve policies to Mississippi, whose northern and southern counties were under two policy regimes that differed significantly until 1931, is such an example (Richardson and Troost (2009), Jalil (2014), Ziebarth (2013)). The southern counties were under the jurisdiction of the Atlanta Federal Reserve Bank (6th District), whose leaders followed "Bagehot's rule": a doctrine stipulating that central bankers should extend credit to illiquid institutions during financial panics, thus staving off losses due to runs on healthy banks. In his historical account of the Atlanta Federal Reserve Bank, Gamble (1989) recounts instances where Bank officials physically carried currency into banks to portray to worried depositors that banks were solvent. In the north, however, the St. Louis Federal Reserve Bank (8th District) was a proponent of the "Real Bills" view

that the supply of credit should contract during recessions since a lower level of economic activity required less credit to sustain it. The Bank maintained this stance until the summer of 1931.[2] Thus, for the first two years of the Depression, banks in Mississippi were subject to two fundamentally different policies. What was the result?

Using bank-level and county-level data, Richardson and Troost (2009) find striking results. Bank survival rates, credit, and commercial activity were all quantitatively higher in 6th District Mississippi counties when compared to nearby Mississippi counties in the 8th District, especially during the 1930-1931 panics. The evidence presented in their paper indicates that lender of last resort policies, if applied broadly, may have curtailed the initial wave of banking panics. Expanding the geographic scope to the full border, Jalil (2014) tests whether bank performance in counties located within 50 miles of the entire 6th District border, not just in Mississippi, depends on the Federal Reserve policy regime. Using county-level bank data, he finds that bank suspension rates in 1929 and 1930 were systematically lower inside the 6th District than in nearby counties across the border.[3]

2.3 Banking panics and local economic outcomes

The direct cost of bank closures – loss of wealth to depositors who were paid back a fraction of their claims after receivers liquidated a bank – is only one channel through which bank failures can hurt local economies. Another channel is the increased costs of financial intermediation (Bernanke (1983)). Banks, unwilling to take on risks in an uncertain environment, invest in safe assets and are reluctant to extend credit even to credit-worthy businesses, who then halt hiring and production. Thus, when firms need funds to invest or refinance debt obligations, they cannot find lenders and their output declines.

The experimental setting in Mississippi and the Atlanta Federal Reserve border can be used to study whether bank failures drive local economic conditions. Ziebarth (2013) collects plant-level data from the Census of Manufactures during the Depression and uses a difference-in-differences design to compare north versus south Mississippi plants. He finds a 37 percent fall in physical output in the north but no differential effect on total workers – the effect is driven by the intensive

[2]The St. Louis Federal Reserve accomodated the seasonal business cycles of its main industry (agriculture) by expanding and contracting credit procyclically. During panics, the St. Louis Fed required double collateral (giving up 2 dollars of liquid assets for 1 dollar in cash) which discouraged banks from accessing the discount window Wheelock (1997). In July 1931, it reversed course and eased collateral requirements.

[3]The Atlanta Fed (District 6) shared a border with four other Federal Reserve Districts: Richmond (District 5), St. Louis (District 8), Cleveland (District 4), and Dallas (District 11).

margin. Aggregating at the county level, he finds a significant adverse effect on the number of workers.

However, this establishment-level data contain no financial information and, therefore, cannot adequately measure the needs for external finance. Studying a set of large industrial firms whose employment and financing needs can be jointly observed, Benmelech et al. (2019) provides new evidence that financial frictions were responsible for much of the decline in employment. They estimate that employment in these large firms would have been about 9–30 percent higher without financial frictions. Consistent with Ziebarth's work, they find a larger drop in employment if the firm was located in a county where at least one national bank failed.

At the state level, Mladjan (2019) provides evidence that financially dependent manufacturing industries also exhibited steeper declines in output relative to peers. He shows that this differential is largest in states most affected by banking suspensions. His results show that bank suspensions could explain a third of the decline in manufacturing output during the Great Depression. He proxies for external access to credit by the fraction of capital expenditure that is not covered by cash flow from operations by industry.

2.4 New evidence on bank lending: the 1935 Survey of Credit Conditions

Were firms credit rationed during the Depression? For small and medium sized manufacturing firms, the answer is yes. Responding to the allegations of credit rationing coming from the leaders of small and medium-sized manufacturing plants, the U.S. Commerce Department decided to conduct a survey of credit conditions in 1935. These leaders were alleging that banks were withholding loans and that it was hard to obtain credit for working capital purposes or long-term requirements. They claimed that the lack of adequate credit had delayed industrial recovery. The questionnaires, prepared by the U.S. Census Bureau, were sent to all manufacturers employing, on average, 30 – 190 wage earners as reported in 1933. Out of 16,500 firms surveyed, over 46 percent submitted returns. Of these, 6,158 were judged suitable for tabulation. Of the 6,158, 71 percent were classified as borrowers of capital. Of the 4,387 borrowers, 45 percent reported credit difficulty.

Figure 1 displays the main results of the survey by industry. There are three striking features of the data. First, small manufacturers relied heavily on banks as a source of working capital: approximately 80 percent reported some reliance on bank lending to finance their operations. Second, many manufacturers also depended upon these banks to finance long-term investment, while relatively few tapped security markets to do so. Lastly, the manufacturers in need of assistance in

funding their long-term needs who found no sources available constituted a significant proportion of credit-constrained firms.

One concern with the survey results is that only the financially weak firms returned the survey. However, many small manufacturing establishments which reported credit difficulty appeared to be financially sound and creditworthy based on current and net-worth-to-debt ratios. For example, of the 1,964 firms reporting problems in borrowing, 23 percent had current ratios of 3.0 or over, and 42 percent had 2.0 or more, which were, at the time, regarded as safe credit risks. In addition, the survey found that 33 percent of the total number reporting credit difficulty had net worth to debt ratios of 3 or more, while in the group with net worth to debt ratios as high as 2.0 was 50 percent.[4]

3 Data

I discuss the details of the archival data sources used to construct my sample in this section. The unit of observation is the county between 1926 and 1937. Except for those from the 1930 U.S. Decennial Census and the 1927 Market Data Handbook, variables are reported at an annual (for banking) or biennial (for manufacturing) frequency. I then merged the manufacturing data with publicly available datasets on the Inter-university Consortium for Political and Social Research (ICPSR) website.

3.1 Banking

I use data on bank suspensions from the Federal Deposit Insurance Corporation (FDIC) and collect new data on county-level conditions of national banks from the Office of the Comptroller of Currency (OCC) annual report. The county-level panel compiled by the FDIC in 1937 is available on ICPSR and has been extensively used in previous research on the Great Depression. The variables include the total number of banks and deposits suspended within the calendar year and deposits in banks in operation as of the last day of the year for 1920 – 1936, reported separately for national- and state-chartered banks. The data is available for all counties in the continental United States besides Wyoming.

However, the FDIC data does not contain any information about local banking conditions in the 1920s or 1930s at the county level besides suspensions. Therefore, I digitize tables from the

[4]See Tables 15 through 26 in the Survey report. The survey collected information about current liabilities, short-term notes, fixed assets, long-term obligations.

OCC annual reports, which report aggregated call report statistics (assets and liabilities) of national banks at the county level.[5] Regarding assets, the variables include total loans and discounts, the value of bonds and securities, total due from other banks, the value of real estate owned, and cash holdings. Regarding liabilities, the variables include total deposits, capital stock, circulation, rediscounts, and surplus and profits. These variables are reported during the last week of March or the first week of April for all years except for 1928, when the call date was February 28. I collected the data from 1924 to 1931, the OCC's last year of county-level reporting. Every county with at least one national bank active on the call date is included in the sample.[6]

3.2 Manufacturing output and spatial industry composition

Manufacturing revenue, employment of wage-earners, and the number of manufacturing establishments come from the Census of Manufactures. I digitized the 1937 publication containing 1929 – 1935 biennial observations (Bureau (1937))[7]. I also digitized the special tabulation of the Census done by the Commerce Department in 1927, as reported in the Market Data Handbook of the United States (Stewart (1929)).

The geographic coverage of the manufacturing sample is not nationwide. The Census does not disclose aggregated data if the reporting of such data would allow for firm-level identification. The Census covers all establishments (single plants or factories) reporting products produced of $5,000 or more. Thus, counties with minimal manufacturing activity are not included in the sample. Furthermore, the loss of manufacturing establishments during the Great Depression brought some counties under the reporting threshold for 1931, 1933, or 1935. Therefore, the coverage is not balanced in the full sample, though I will only use balanced samples in my analysis.[8]

Pre-Depression industrial composition comes from a special tabulation of the 1927 Census contained in the Market Data Handbook of the United States. This source gives the total number of establishments by manufacturing industry in each county. I aggregate industries to the 15 primary manufacturing industries in the Survey of Credit Conditions.[9] The main limitation of establishment

[5] The OCC annual report is available on FRASER.

[6] I drop all observations where the banking variables are missing (negative), which removes 23 counties from sample.

[7] To the best of my knowledge, this source is new to the literature, though others have used plant-level or state-level variables from the Census before.

[8] For more information about the Census of Manufactures and its coverage across years, see Vickers and Ziebarth (2019)

[9] The industries are food and kindred products, textiles, iron and steel, forest products, leather, rubber, paper and allied products, printing and publishing, chemicals, petroleum and coal, stone/clay/glass, nonferrous metals, machinery, transportation equipment, and miscellaneous.

count-level data is that the economic significance of establishments varies widely. For example, nationally, the average establishment in the textile industry employed 63 wage-earners, while an average establishment in chemicals employed about half as many - 33 - in 1927.

To go from count distributions to revenue and employment distributions, I multiply count shares by state-industry averages of per-establishment wages, number of wage-earners, and output. The state-industry averages come from the same reports of the Census in 1927. To help illustrate, consider a county in Michigan that reported 10 establishments in textile manufacturing and 5 in iron and steel manufacturing in 1927. If Michigan's average output per textile plant is half that of a steel plant, the estimated output shares for this county would be 50:50. I compute analogous shares using total wages paid to wage-earners, total number of wage earners, and the number of establishments.

Finally, as discussed in Section 2.4, I take the aggregated survey results from the 1935 Survey as industry-level measures of financial constraints, as listed in Figure 1, Panel B. I base my analysis on three pieces of information contained in Tables 2 and 26 of the Survey: (1) how many firms were borrowing, (2) how many firms found it difficult to borrow, and (3) how many borrowers found it difficult to borrow. Then, using estimated product shares, I compute the industry weighted average of credit difficulty at the county level. Using the example from above, if 30 percent of iron and steel but only 10 percent of textile plants found it difficult to borrow, constraint (2) takes the value of 0.2 (0.5 x 0.30 + 0.5 x 0.10). Figure 2 displays the distribution of constraints in the sample of counties using each (1) – (3) and the four different weighing schemes described above.

3.3 Other Data

I use two pieces of spatial data. First, I use Geographic Information Systems (GIS) software to identify counties within 50 miles of all Federal Reserve Districts. I further classify these bordering counties into border segments – e.g., Atlanta – St. Louis segment – including counties on both sides of the border. I follow Jalil (2014) as closely as possible in identifying these segments. Figure 3 plots the Atlanta Federal Reserve District border regions.

Second, I transcribe the consumer markets map from the U.S. Department of Commerce Market Data Handbook. This map groups counties into mutually exclusive consumer markets as of 1927. According to the makers of the map, the 632 areas were determined from a consumer perspective, stemming from an effort by the International Magazine Company to simplify selling by "determining the minimum number of points from which maximum results might be expected."

According to the source, the trading centers (cities) were selected after studying population, geographical characteristics, sources of wealth, transportation, and trade outlets. Boundaries for each consumer market around each trading center were defined by "a study of those factors which influence the trend of buying habits," though it is unclear how exactly each factor was taken into consideration.

3.4 Summary Statistics

Table 1 reports the summary statistics. The total number of observations for the banking variables includes 365 border counties for nine years and 364 counties for one year (1934, missing bank data for one county). The 1204-1230 observations for manufacturing include between 190 - 210 border counties reporting manufacturing activity for six years (1927 – 1937, biennially). Manufacturing industry data as of 1927 is for 212 border counties. The condition of national banks from aggregated call reports is available for between 168 and 184 border counties.

Across all counties, there is a strong negative relationship between manufacturing activity and bank failures. Figure 4 plots a binscatter of county-level change in the log of nominal per-capita manufacturing output between 1933 and 1929 (y-axis) and the cumulative number of bank suspensions as a proportion of all banks in 1927 (x-axis). I include only the counties with at least one suspended bank and manufacturing activity in 1933 and 1929 are included (1623 counties).

4 Policy regimes and banking outcomes across Federal Reserve borders

I begin my analysis by investigating whether banks failed at a lower rate in counties in the Atlanta District than in similar counties located just outside it. Corroborating the main findings of Jalil (2014), I find that the answer is: yes. This result is especially strong when the policies between the District and the other Federal Reserve banks differed in 1929 and 1930. I then explore the robustness of this finding.

4.1 Empirical Design

The outcome of interest is bank failure. I measure failure at the county level using suspensions and remaining deposits in active banks at the end of the year as a share of pre-Depression (1927) banks and total deposits, respectively. Both measures are essential as banks can reopen after a temporary suspension with a limited impact on lending behavior. The suspensions data, however, does not differentiate between liquidations and suspensions. Changes in the total value of deposits

at the end of the year reflect more permanent shocks to the banking sector and serve as an additional check. To further control for the effect of outliers, I create a binary variable that takes the value of 1 if any bank was suspended within the year and 0 otherwise. I define each variable separately for national and state chartered banks.

I introduce various control variables in my analysis. I compute two measures to account for unobserved time-varying confounders due to fundamental banking differences between counties. First, I define the pre-Depression (1927) "capitalization ratio" as the total surplus and capital divided by total assets. Higher capitalization ratios reflect lower leverage of the banking sector and a higher probability of withstanding depositor withdrawals. Second, I compute logarithmic loan growth between 1924 and 1929. Higher loan growth could potentially correlate with decreased loan quality and a higher default rate in the 1930s. Finally, to control for non-financing industry-level time-varying confounders, I use the 1927 manufacturing revenue by industry shares in order to identify the dominant industry in each county. I interact the dominant industry dummy variable with time dummies to account for national industry trends.

Are there underlying differences between counties that could potentially explain differences in bank failure rates? I use several variables from the 1930 Decennial Census to check for significant differences among counties across the border. I define the unemployment rate in 1930 as total unemployed over total population, "crop failure" as the proportion of land crops failed divided by total cropland in the county, and "labor force participation" as gainfully employed workers divided by total county population. Table 2 shows that counties on the border of the Atlanta District were similar. There are some differences, but they are small. For example, although fewer banks were in the average county inside the District, the total amount of deposits in 1928 was the same. There were slightly fewer manufacturing establishments on average, and the farms were smaller. Notably, the counties did not differ in their suspension rates as of 1927 and had the same (estimated) proportion of manufacturing firms facing financial constraints.

I compare county-level outcome variables before and after the onset of the Great Depression across the District boundary using a dynamic difference-in-differences design:

$$S_{jk} = \alpha_j + \beta_k + \sum_{i=1926}^{1933} (Atl_j T_i) \cdot \gamma_i + X_{jk} + \epsilon_{jk} \tag{4.1}$$

where T_i is a year dummy taking the value of 1 if $i = k$ and 0 otherwise and Atl_j takes the value of 1 if the county belongs to the Atlanta District and 0 otherwise. I use county (α_j)

and year (β_k) fixed effects to account for all unobserved but static county variables and national trends in bank failure rates. The control variables in X_{jk} include border-region by year fixed effects and, in various specifications, proxies for baseline banking and manufacturing interacted with year dummies. The coefficients of interest are γ_i, which capture the time-varying difference in outcome S in counties inside the District compared to average outcomes within border regions. The omitted interaction year is 1927, and I cluster the standard errors at the county level.

4.2 Baseline Results

Table 3 presents the replication results of Jalil (2014) using the specification in 4.1. Panel A gives the estimates of the coefficients of interest when the outcome variables are suspension rates - proportion of suspended to non-suspended banks - and Panel B presents them for active rates - proportion of active to 1927 active banks and deposits.

In both panels, the estimates show that county bank failure occurred at similar rates around the Atlanta border before the Depression, relative to 1927 levels and controlling for local shocks inside a border region. The results in column (1) show that banks inside the District counties failed at rates 6 and 5 percent lower in 1929 and 1930, respectively, which is consistent with the results in Jalil (2014). At the mean number of banks, this translates to 0.24 and 0.2 fewer suspended banks in each year, or approximately 0.45 more banks remaining on average in a county after 1930 in the Atlanta District. After 1931, the coefficients are not significantly different than zero. These years are also when more banks closed to due solvency issues and when there was a convergence of policy between Atlanta and its neighboring districts. Columns (2) and (3) show that the effect on the suspension rate is similar for both state and national banks. Finally, columns (4) – (6) show that a county in the District was 14 percent less likely to experience any bank failure in 1929, but the effect does not extend to 1930.

In Panel B, I show that the qualitative evidence is very similar when considering the number and deposits of active banks at the end of each year. On average, the estimates reveal that counties in the Atlanta region contained 10 percent more banks by the end of 1930 and 7 percent more deposits compared to banks in neighboring counties after accounting for time-invariant county level characteristics. These results are qualitatively similar to those using suspensions as the outcome variable in Panel A. Interestingly, these effects are pronounced for nationally-chartered banks, where the effect is present even at the end of 1931.

4.3 Robustness Results

Despite generally balanced counties on either side of the border and the plausibly exogenous historical placement of Federal Reserve boundaries, concerns about interpreting the results in Table 3 as the causal effects of the Atlanta Federal Reserve policies remain. Tables 4 and 5 present the results with additional controls and different samples. The stability of the baseline estimates in columns (2) - (11) provides strong evidence in favor of a causal interpretation.

The first concern is that the small pre-Depression differences in county characteristics across the Atlanta border as shown in Table 2 - total number of banks in 1927, population, number of manufacturing establishments, average farm size, and the labor force participation rate - could contribute to the divergence in bank failure rates during 1929 and 1930. For example, if smaller farms tend to default at higher rates on mortgages, the presence of relatively smaller farms just outside the District may explain larger bank failure rates in 1929 and 1930. In column (2), I control for these pre-Depression differences by interacting the non-balanced covariates with time dummies, and I do not find any change in the baseline estimates.

The second concern is that omitted underlying differences in bank conditions – such as bank leverage or historical loan growth before the Depression – could be causing the differences in bank failures. Using the county-level OCC data on nationally-chartered banks, I define the pre-Depression (1927) "capitalization ratio" as the total surplus and capital divided by total assets. Higher capitalization ratios reflect lower leverage of the banking sector and a higher probability of withstanding depositor withdrawals. I also compute logarithmic loan growth between 1924 and 1929. Higher loan growth could potentially correlate with decreased loan quality and a higher default rate in the 1930s. I interact both county-level measures with time dummies and include them in the specification. The results are shown in column (3) and, again, I do not find any meaningful differences with the baseline.

The third concern is that firms in counties just outside the border are in more pro-cyclical industries than are those just inside the Atlanta region and thus caused more strain on the banking sector in 1929 and 1930. To control for industry-level time-varying confounders, I use the 1927 manufacturing revenue by industry shares in order to identify the dominant industry in each county. I interact the dominant industry dummy variable with time dummies to capture dynamic effects and include them in the specification in column (4). The results are slightly attenuated but remain significant.

In columns (5) - (13) I address the remaining concerns of sample selection and standard

error clustering. In column (5), I limit the analysis to the counties in Mississippi, and I find larger, but noisier, point estimates consistent with Richardson and Troost (2009) and Ziebarth (2013). Next, to account for unobserved differences in state-level policies, I limit the analysis to counties that belong to consumer market areas bisected by the Federal Reserve border.[10] I then show that potential spillovers across the region are not driving the results by estimating the specification with and without counties within 25 miles (columns 7 and 8). Column 9 reports spatial standard errors using the methods of Colella et al. (2019) and 100 kilometer cutoff distance. Finally, columns 10 - 13 exclude outside of the specified border region. I find quantitatively similar results even after these counties are excluded.

4.3.1 Placebo tests

Next, I conduct a randomization test in which I assign placebo borders within each border-region to all counties in the sample. I do this 1,000 times and estimate equation 4.1 using the main outcome variable, bank suspension rates, and collect the estimated coefficients in γ for 1929 and 1930. I plot the two distributions in Figure 5. The vertical lines indicate the baseline effects estimated using the true Atlanta Federal Reserve borders. As is clear from the figure, the true estimates lie in the tail of the distribution (98th percentile) of the placebo estimates, and the distribution of placebo estimates for both years is centered around zero. These results provide supporting evidence that the estimated baseline impacts of the differing policies of the Atlanta Fed on banking failures is unlikely to have occurred by chance.

Finally, instead of permuting counties into placebo borders, I extend the analysis to actual border counties in regions that did not differ in their policy regimes. If the differences in Federal Reserve policies are driving these outcomes – and the robustness exercises have pointed to a causal interpretation – then it must also be true that the *absence* of these differences should result in *little or no change* in bank failures. In districts that did not differ in their policies from their neighbors, what is the prevalence of significant differences in bank failures in their border counties? I re-estimate the main specification for the four districts around Atlanta (Kansas City, Dallas, Cleveland, Richmond) and plot the results in Figure 6. The variable Atl_k is defined analogously for each specification: it takes the value of 1 if the county is located inside the Federal Reserve district specified and 0 if it is located in the border region of that same district but outside the border. In the same figure, I plot the Atlanta estimates in red for reference. While the some coefficients are statistically large

[10] With the exception of Mississippi and Tennessee, the border runs along state lines.

- namely, Dallas and Cleveland counties in 1932 and Richmond counties that appeared worse off throughout - the baseline results for the Atlanta district are still relatively large in 1929 and 1930.

4.3.2 What happened to bank lending?

While the results in the previous subsection provide evidence that the incidence of bank failure differed significantly based on Federal Reserve policies, they say little about how the non-failed banks responded. Banks may respond to local banking panics by refusing to lend and, instead, amassing safe assets like government bonds. Ideally, I would like to use a full panel of national and state-level banks through 1937. However, the available data from the OCC is for national banks only and for years up to 1931. Using this limited sample, I next investigate differences in the county-level composition of assets and liabilities for national banks across the Atlanta border.

Table 6 presents the estimates of specification 4.1 using the available OCC data between 1926 and 1931. Columns (1) - (5) use log total loans, bonds, assets, surplus, and number of banks as outcome variables while columns (6) - (9) use the same variables on a per-bank basis. The result in column (1) shows that national banks had in total, on average, 11 percent more outstanding loans as of 1931 inside the District than outside it, as compared to those banks in counties outside the border. They did not, as columns (2) and (3) shows, own more bonds or have more assets, but they did report more surplus and profits as reported in column (4).

5 Did banking suspensions lead to worse local economic outcomes?

I have shown so far that the commercial banking sector inside the District fared relatively better during the first two years of the Depression than it did just outside it. If the hypothesis that bank suspensions lead to more costs of credit intermediation and if bank lending is an essential input to production, then, *ceteris paribus*, we should see less economic activity outside the district than inside it.

The empirical strategy is unchanged from the one described in the previous section: using a dynamic difference-in-differences design, I compare manufacturing outcomes between counties 50 miles within and outside the District border, before and after the onset of the Great Depression, accounting for time-varying border-region confounders. I add, however, an additional explanatory variable: the average estimated credit difficulty at the county level based on 1927 count data. I code the variable $constraint_j$ as a binary variable taking the value of 1 if county j is above the median and zero otherwise. In all specifications, the omitted interaction year is 1927, and standard

errors are clustered at the county level.

$$S_{jk} = \alpha_j + \beta_k + \sum_{i=1926}^{1933} (Atl_j T_i) \cdot \gamma_i + \sum_{i=1926}^{1933} (constraint_j T_i) \cdot \omega_i + X_{jk} + \epsilon_{jk} \tag{5.1}$$

To check whether the higher incidence of banking failures outside region was worse for financially constrained counties, I conduct a difference-in-difference-in-differences analysis, comparing geographically across the District border, below and above median estimated credit difficulty, and across years where the variable post takes the value of 1 for all years after 1929 and 0 otherwise:

$$S_{jk} = \alpha_j + \beta_k + (constraint_j \times Atl_j \times post_k) \cdot \nu_i + X_{jk} + \epsilon_{jk} \tag{5.2}$$

where $post_k$ takes the value of 1 for all years k after 1929.

Table 7 shows the estimated coefficients of the difference-in-differences specification using manufacturing outcomes. Columns (1) - (4) use log output (revenue), log county manufacturing wages, log number of establishments, and log number of wage-earners as the outcome variable, respectively. To ensure that the results are not driven by a handful of outliers, I discard counties in the bottom two or top two percentiles in the change in manufacturing revenue between 1929 and 1931. I control for differences in pre-period banking by interacting the capitalization ratio and log loan growth between 1924 and 1929 with year fixed effects. Finally, to account for differences in business failure rates based on firm size, I include terciles of average manufacturing plant size (defined as number of workers divided by number of plants in 1929) by year fixed effects. In columns (5) - (8), I add the estimated credit difficulty by year fixed effects to the specification.

Unlike the banking suspension and lending results shown so far, I do not find evidence that local manufacturing fared better inside the District. On the contrary, the results show that local economic outcomes were worse across all the outcome variables. Consider the estimates in column (1): the results show a 3 to 10 percent decrease in annual revenue for the manufacturing sector in the Atlanta counties, though noisily estimated. On the other hand, I do find that credit difficulty correlated negatively and significantly with manufacturing output. The estimated effects are all highly significant and stable across the outcome variables, implying that counties with estimated above median credit difficulties had outcomes 20 to 30 percent lower than those without difficulty after, but not before, 1929.

This negative effect is not driven by differential credit demand across counties, as proxied by pre-Depression industrial composition. Figure 7 plots the difference-in-differences estimates ω_i for

each year using total borrowing firms, total firms with credit difficulty, and total borrowers with credit difficulty as a proportion of all firms as three measures of $constraint_j$. Each variable is defined as an indicator taking the value of 1 if the county is above the sample median, and 0 otherwise. The figure shows that borrowing activity (green) cannot explain the difference in outcomes.

However, I do not find that the effect of financial constraints was magnified in counties that also experienced a banking panic. Table 8 reports the result of the triple difference. That is, the coefficient estimate on triple interaction term in the last row implies that manufacturing activity was not different across the border in counties that, ex-ante, were more likely to suffer from financial rationing, as was the hypothesis.

6 Summary

This paper used novel, archival, panel data on local manufacturing and banking conditions in the United States to investigate the link between policy, bank failures, and, ultimately, firm production and employment. Using the divergent policies enacted by the Atlanta Federal Reserve Bank as my empirical laboratory, I find that credit conditions appeared more favorable in the early years of the Depression inside counties of the Atlanta district. The robustness of this result, as well as a host of placebo checks, points to a causal interpretation of how lender of last resort policies from the Federal Reserve stymied banking panics.

I then combined industry-level credit survey and 1927 industry-by-county data to construct measures of financial constraints for each county. Using manufacturing panel data, I do not find evidence to support the hypothesis that banking panics translated to more local economic distress to counties just outside Atlanta, which contrasts with the results of the existing literature. Manufacturing outcomes were worse, not better, in counties inside the Atlanta region, despite having more banking resources. I do find strong evidence that the county-level financing constraints predict worse outcomes after, but not before, the Depression. However, the interaction between pre-Depression measures of financial constraints and banking panics during the Depression is, surprisingly, not an important determinant of local economic outcomes. Further research should explore the explanations as to why there was a lack of a downstream effect on firms. One explanation, should the data become available, is that the banking sector became more risk-averse and did not lend to businesses.

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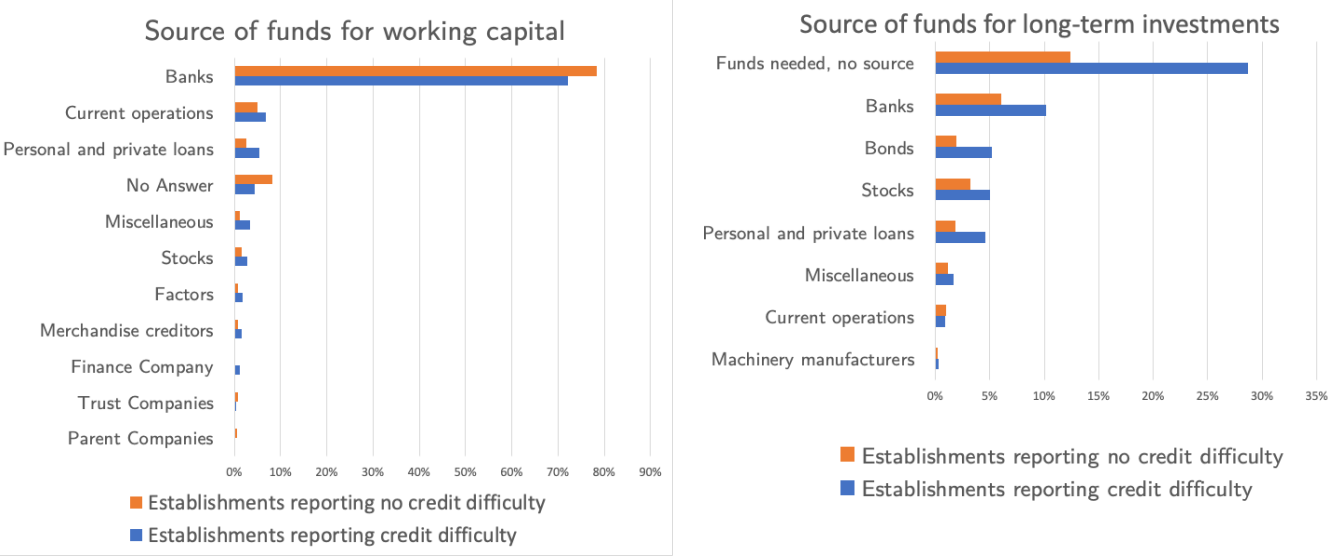
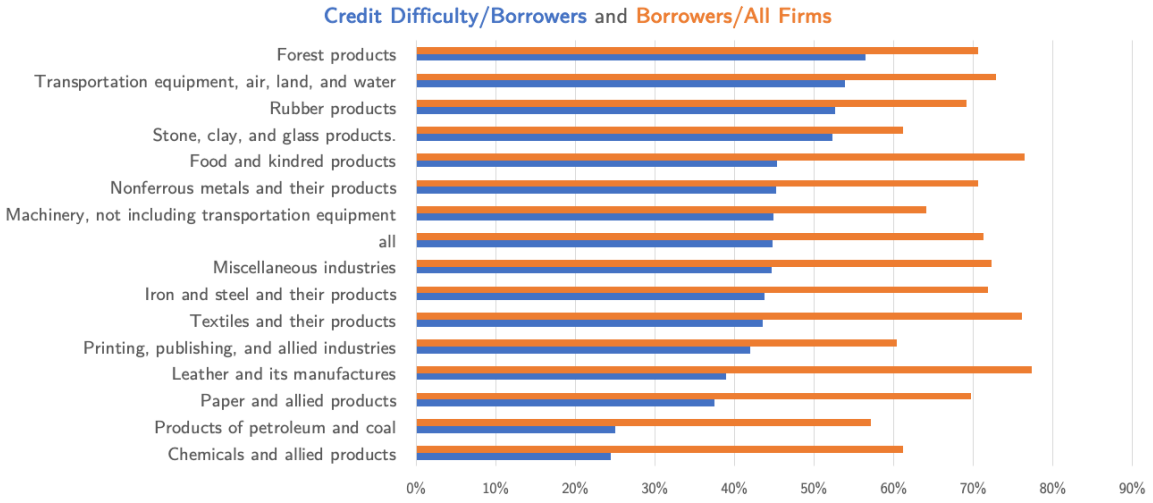
Figure 1: Financing of Small and Medium U.S. Manufacturers, 1935

Panel A: Sources of funds

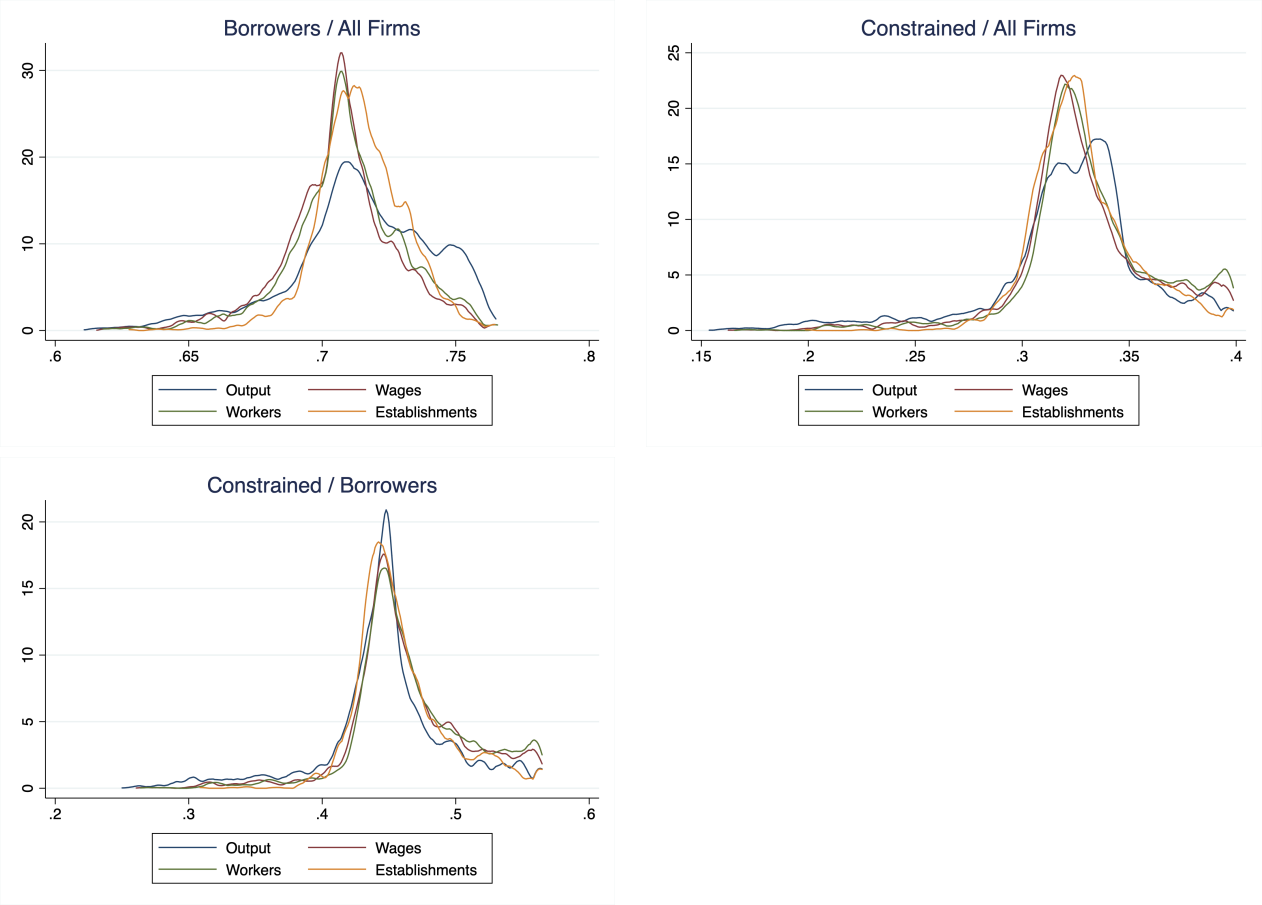


Panel B: Credit difficulty and demand by industry



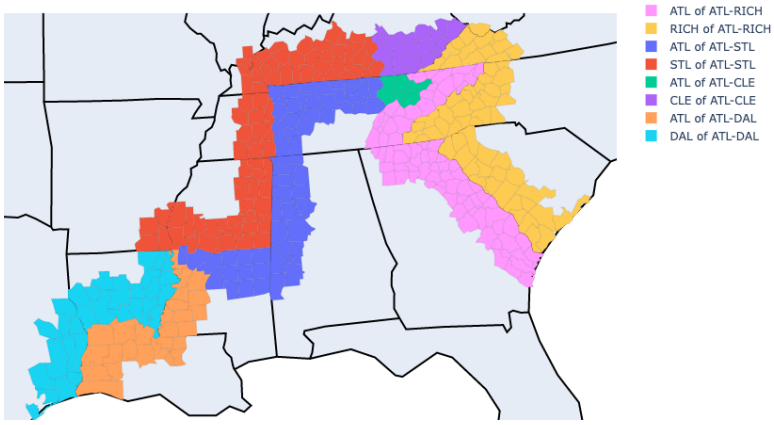
Notes: This figure presents the results of a survey of 6,158 manufacturing firms from the *Survey of reports of credit and capital difficulties* (1935) conducted by the Business Advisory Council for the Department of Commerce. See Section 2.4 for a complete explanation of the representativeness of the sample and survey collection methods. Panel A: author calculation from Table 26 of the *Survey*. Panel B: author calculation of Table 6 of the *Survey*.

Figure 2: Distribution of County-Level Financing Constraints of Small - Medium Manufacturers



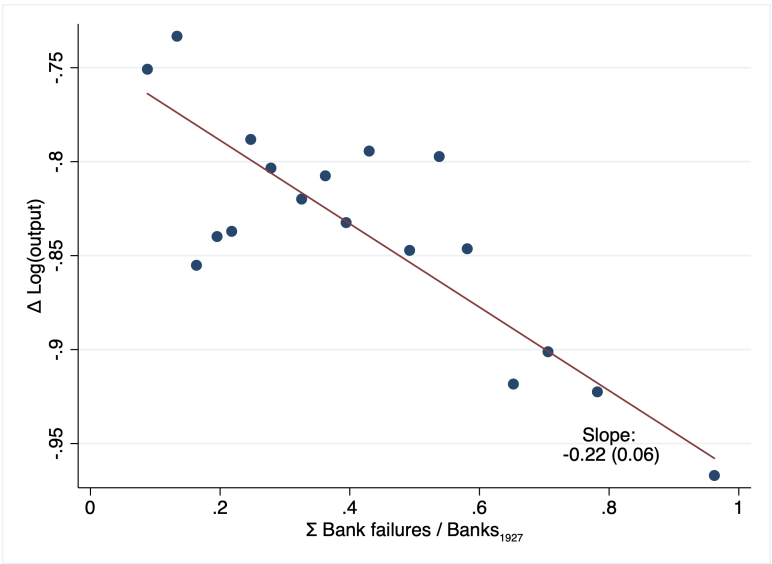
Notes: This figure plots the distribution of county-level financing constraints computed using industry-level measures as reported in the *Survey of reports of credit and capital difficulties* (1935) and industry by county count data as of 1927. Blue line weighs the count data by state-level average output per industry. Red line weighs the counts by state-level industry wages, while the green and yellow lines weigh it by the state-level number of workers and the state-level number of establishments by industry, respectively. "Borrower / All Firms" is the estimated number of borrowers divided by total number of manufacturing firms within a county. "Constrained / All Firms" is the estimated proportion of all manufacturing firms who reported being unable to find financing in 1935. "Constrained / Borrowers" is the estimated proportion of all borrower who also report being unable to find financing in 1935.

Figure 3: Counties around the Atlanta Federal Reserve District Border



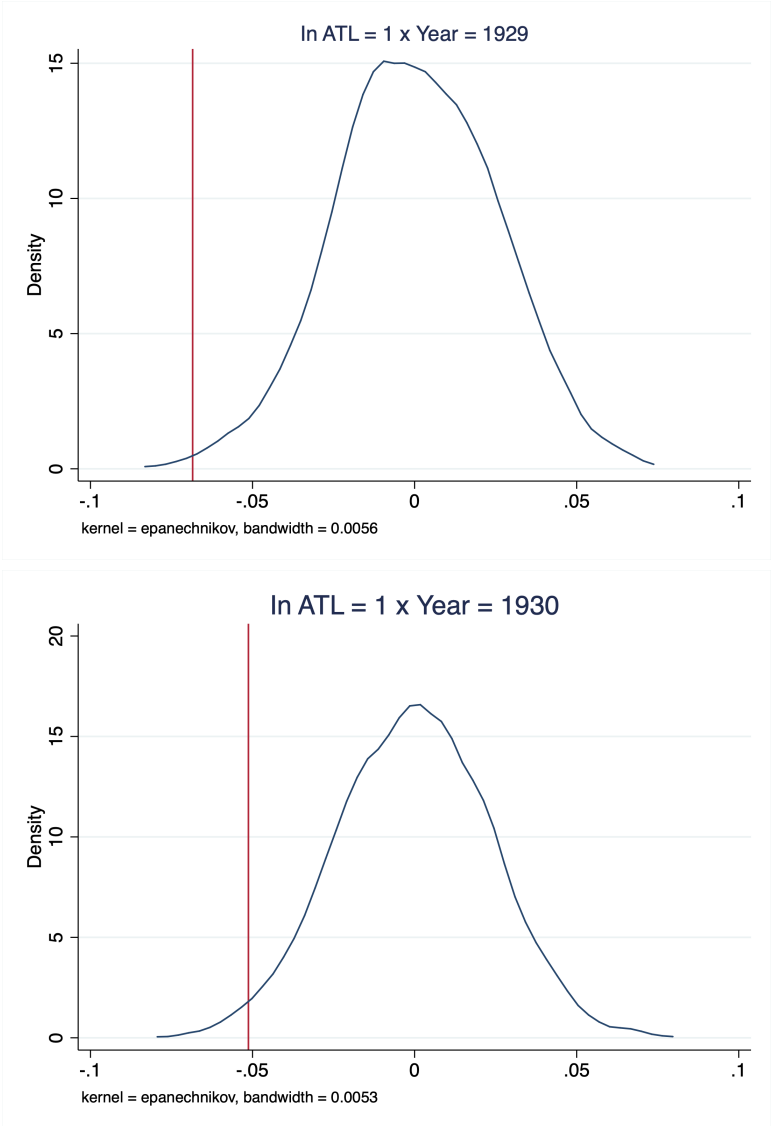
Notes: This maps shows the border regions of the Atlanta Federal Reserve district. The four border regions are: Atlanta - St. Louis, Atlanta - Dallas, Atlanta - Cleveland, and Atlanta - Richmond. The 50 mile buffer was generated using Geographic Information System (GIS) software the the 1996 Census publication of the Census bureau.

Figure 4: Manufacturing decline during the Great Depression and banking failures



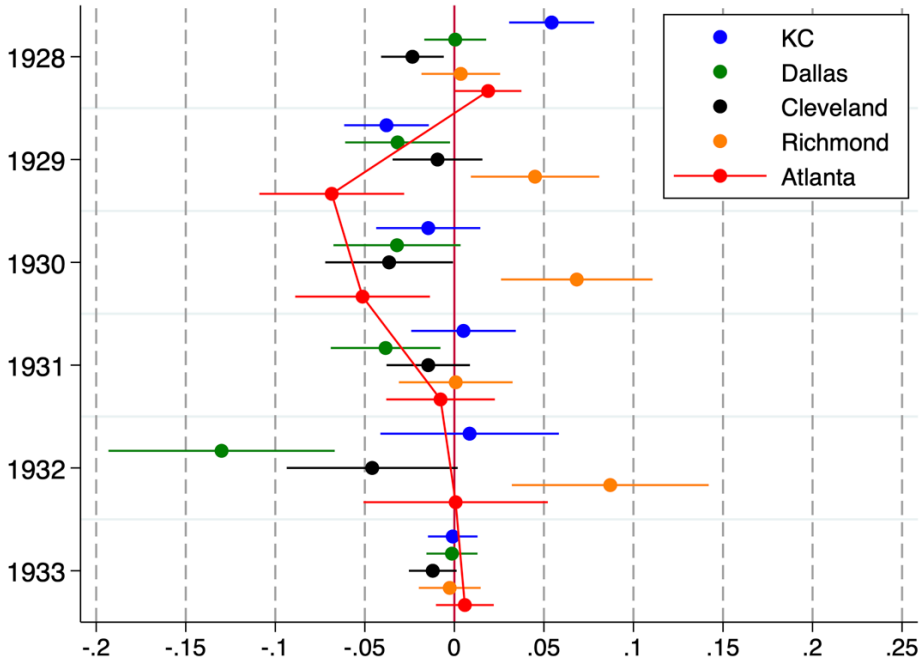
Notes: This figure plots a binscatter plot of county-level change in the log of manufacturing output between 1933 and 1929 (y-axis) and the cumulative number of bank suspensions as a proportion of all banks in 1927 (x-axis). Only the counties with at least one suspended bank and manufacturing activity in 1933 and 1929 are included (1623 counties). Manufacturing data comes from Census of Manufactures and the banking data comes from the FDIC.

Figure 5: Distribution of Estimated Coefficients of 1,000 Placebo Border Permutations



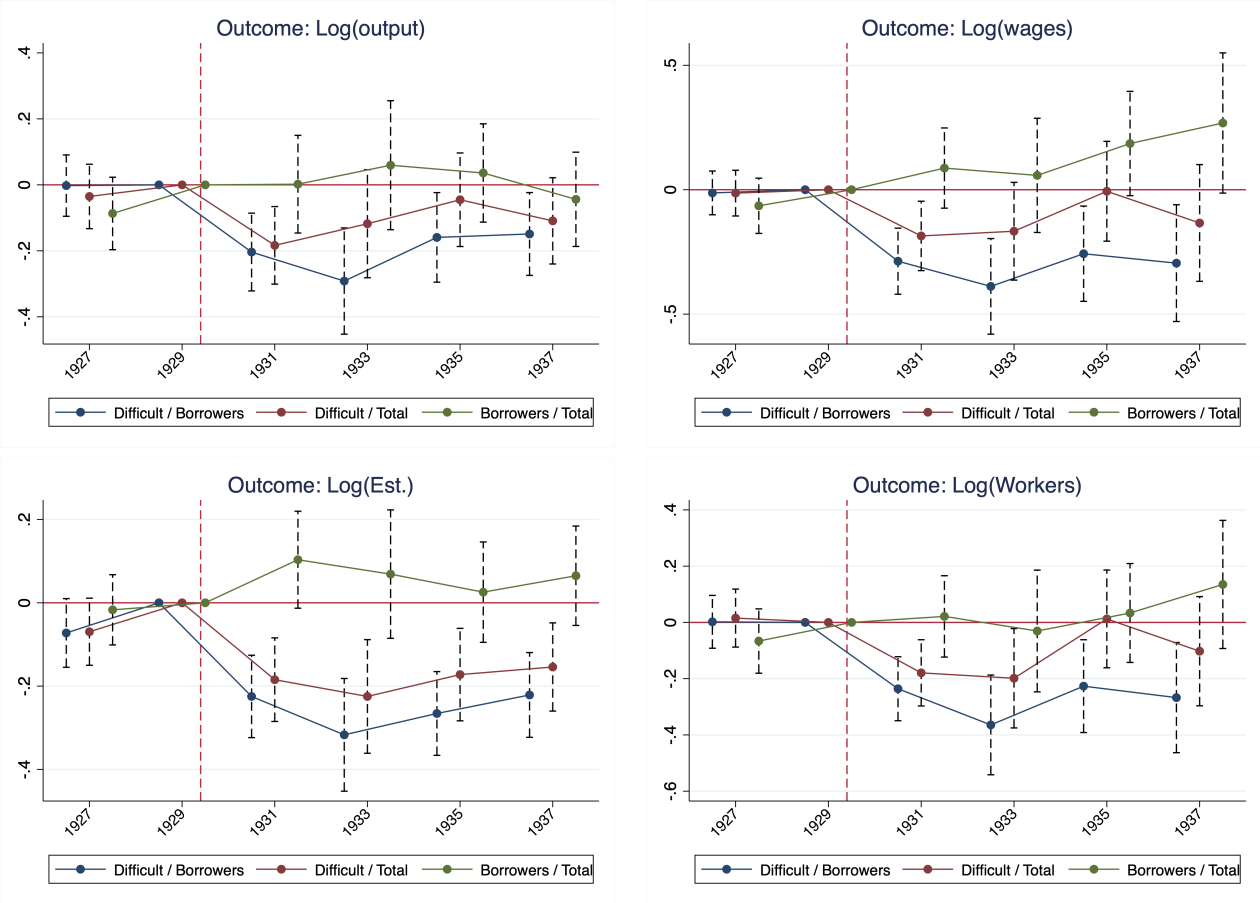
Notes: This figure plots the distributions of placebo effects computed using a randomization test as follows: I assign each county within each border-region without replacement a placebo border with uniform probability. I conduct this 1,000 times and re-estimate Equation 4.1 and store the 1929 and 1930 interaction terms of interest. The outcome variable is the annual suspension rate of all banks within a county. Control variables in X_{jk} include only border-region by year fixed effects. Vertical line shows the point estimates using actual borders.

Figure 6: Estimates across Federal Reserve Boundaries



Notes: This figure plots the estimated coefficients γ_i from Equation 4.1 using the Atlanta, Richmond, Cleveland, Dallas, and Kansas City Federal Reserve border regions in separate regressions. The outcome variable is the annual suspension rate of all banks within a county. Control variables in X_{jk} include only border-region by year fixed effects. Standard errors are clustered at the county level. 90 percent confidence interval shown.

Figure 7: Explaining the Drop in Manufacturing using Credit Demand vs, Credit Difficulty



Notes: This figure plots the estimated coefficients of the *constraint* x year fixed effects in the dynamic difference-in-differences specification of Equation 5.1. The blue line shows the estimates when *constraint* is defined as the estimated share of manufacturing borrowers experiencing difficulty obtaining credit. The green lines shows them when *constraint* is defined as the estimated share of all firms borrowing. Finally, the red line shows them when *constraint* is defined as number of firms reporting borrowing difficulty over total firms. Controls include boundary-region (e.g., Atlanta-St. Louis border) by year fixed effects and the omitted baseline interaction is 1927 across all specifications. The outcome variables come from Census of Manufactures. The time period is 1927 - 1937 (biennially) for all specifications and the standard errors are clustered at the county level. 90 percent confidence intervals shown.

Table 1: Summary Statistics

	count	mean	sd	p5	p25	p50	p75	p95
Banks (active - all)	4,014	3.44	2.53	1.00	2.00	3.00	5.00	8.00
Banks (suspended - all)	4,014	0.16	0.53	0.00	0.00	0.00	0.00	1.00
Banks (suspended - national)	4,014	0.03	0.18	0.00	0.00	0.00	0.00	0.00
Banks (suspended - state)	4,014	0.13	0.45	0.00	0.00	0.00	0.00	1.00
Deposits (active - all)	4,014	2.64	8.09	0.05	0.40	0.92	1.97	7.66
Deposits (suspended - all)	4,014	0.09	0.78	0.00	0.00	0.00	0.00	0.31
Deposits (suspended - national)	4,014	0.03	0.48	0.00	0.00	0.00	0.00	0.00
Deposits (suspended - state)	4,014	0.05	0.58	0.00	0.00	0.00	0.00	0.19
Capitalization ratio	184	0.15	0.06	0.08	0.11	0.13	0.17	0.25
Loan growth (1924-29)	168	0.11	0.44	-0.37	-0.04	0.10	0.26	0.62
Log(pop)	365	9.87	0.66	8.72	9.44	9.86	10.20	11.07
Unemp. rate	365	0.00	0.01	0.00	0.00	0.00	0.01	0.01
log(farm size)	365	6.59	0.33	6.06	6.43	6.60	6.76	7.11
crop fail	365	0.02	0.03	0.01	0.01	0.01	0.02	0.07
labor force	365	0.36	0.05	0.29	0.32	0.35	0.39	0.46
Products	1,204	6.47	21.89	0.14	0.58	1.47	4.15	20.93
Wages	1,204	1.03	2.44	0.02	0.11	0.29	0.83	3.95
Establishments	1,233	24.41	31.93	5.00	10.00	15.00	26.00	77.00
Workers	1,230	1.36	2.70	0.04	0.22	0.51	1.23	5.22
Difficulty/Borrowers	212	0.47	0.05	0.39	0.44	0.46	0.51	0.56
Difficulty/Total	212	0.34	0.04	0.27	0.32	0.34	0.36	0.40
Borrowers/Total	212	0.72	0.02	0.67	0.70	0.72	0.73	0.75
Observations	4224							

Notes: This table presents the summary statistics at the county-level for all counties within 50 miles of the Atlanta Federal Reserve District border (see Figure 2). Banks (count) and Deposits (millions of nominal dollars) are reported annually between 1926 and 1936. Capitalization ratio is defined as the total surplus and profits divided by assets for nationally chartered banks in 1928. Loan growth is change between the log of all loans between 1924 and 1929 for nationally chartered banks. Loans, surplus, total assets come from the Office of the Controller of Currency. The unemployment rate is defined as the total number of unemployed divided by total population in 1930. Crop fail is the proportion of all crops failed in 1930. Farm size is in acres. Labor force is the number of gainfully employed workers divided by total population in 1930. Products (millions of nominal dollars), Wages (millions of nominal dollars), Establishments (count), and Workers (thousands) come from the Census of Manufacturing, reported biennially between 1927 and 1937.

Table 2: Covariate Balance (Atlanta vs. Rest)

	All	ATL in	ATL out	Difference
Banks (active - all)	4.31	3.84	4.72	0.88**
	(2.95)	(2.81)	(3.02)	(0.00)
Deposits (active - all)	3188.22	3546.18	2876.15	-670.02
	(8561.38)	(11171.39)	(5347.80)	(0.46)
Log(pop)	9.87	9.78	9.94	0.17*
	(0.66)	(0.71)	(0.60)	(0.02)
Urban share	0.11	0.12	0.10	-0.02
	(0.17)	(0.19)	(0.15)	(0.35)
Unemp. rate	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.00)	(0.65)
log(est)	2.94	3.05	2.84	-0.21*
	(0.78)	(0.80)	(0.76)	(0.02)
log(farm size)	6.59	6.65	6.55	-0.10**
	(0.33)	(0.29)	(0.36)	(0.01)
crop fail pc	2.35	2.37	2.33	-0.04
	(3.14)	(3.63)	(2.66)	(0.89)
labor force	0.36	0.36	0.35	-0.01*
	(0.05)	(0.05)	(0.06)	(0.10)
Bank Suspension Rate (All) pc	1.25	1.02	1.44	0.41
	(5.52)	(4.87)	(6.03)	(0.48)
Difficulty/Borrowers pc	47.12	46.98	47.25	0.28
	(5.26)	(4.98)	(5.52)	(0.70)
Borrowers/Total pc	71.59	71.63	71.55	-0.07
	(2.41)	(2.32)	(2.51)	(0.83)
Difficulty/Total pc	33.88	33.80	33.95	0.15
	(3.82)	(3.61)	(4.02)	(0.77)
Observations	365	170	195	365

Notes: This table reports variable averages among counties within 50 miles of the Atlanta Federal Reserve District ("District") border. Column (1) reports the averages for all counties along the border (365) and columns (2) and (3) report them only for those in the District and for those outside the District, respectively. Column (4) computes the difference and reports the T-test on the equality of means. The variables "Banks (active - all)", "Deposits (active - all)", and "Bank Suspension Rate (All)" reported here are as of 1927 and come from the FDIC. "Difficulty/Borrowers", "Borrower/Total," and "Difficulty/Total" are estimated measures of credit access estimated using 1927 manufacturing industry by county establishment data and the 1935 credit survey of manufacturing industries. All other variables come from the 1930 U.S. Census. For detailed variable descriptions and sources, please see the text.

Table 3: Bank Suspension and Active Rates around the ATL Border

Panel A: Suspension rates

	Bank Suspension Rate			I(Bank Suspended)		
	All	National	State	All	National	State
	(1)	(2)	(3)	(4)	(5)	(6)
In ATL=1 × Year=1926	0.007	0.001	0.009	0.001	-0.001	-0.008
	(0.013)	(0.005)	(0.015)	(0.040)	(0.019)	(0.040)
In ATL=1 × Year=1928	0.019*	-0.032	0.025*	0.071*	-0.030	0.065*
	(0.011)	(0.029)	(0.013)	(0.040)	(0.034)	(0.037)
In ATL=1 × Year=1929	-0.068***	-0.064*	-0.070***	-0.143***	-0.077*	-0.139***
	(0.025)	(0.035)	(0.027)	(0.054)	(0.044)	(0.053)
In ATL=1 × Year=1930	-0.051**	-0.056	-0.044*	-0.004	-0.040	-0.002
	(0.023)	(0.041)	(0.025)	(0.050)	(0.052)	(0.049)
In ATL=1 × Year=1931	-0.008	0.003	-0.003	-0.032	-0.027	-0.035
	(0.018)	(0.029)	(0.020)	(0.048)	(0.044)	(0.046)
In ATL=1 × Year=1932	0.001	0.043	-0.014	-0.006	0.057	-0.034
	(0.031)	(0.059)	(0.033)	(0.056)	(0.075)	(0.054)
In ATL=1 × Year=1933	0.006	-0.013	0.007	0.033	-0.008	0.023
	(0.010)	(0.015)	(0.010)	(0.028)	(0.017)	(0.026)
R-sq	0.14	0.17	0.12	0.13	0.18	0.12
N	2,820	1,340	2,721	2,820	1,340	2,721
Year FE	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓
Border-region x Year FE	✓	✓	✓	✓	✓	✓

Panel B: Active rates

	Bank Active Rate			Deposit Active Rate		
	All	National	State	All	National	State
	(1)	(2)	(3)	(4)	(5)	(6)
In ATL=1 × Year=1926	-0.001	-0.023	-0.009	-0.004	-0.015	-0.031
	(0.020)	(0.015)	(0.026)	(0.020)	(0.025)	(0.028)
In ATL=1 × Year=1928	0.012	-0.002	0.015	0.006	0.004	0.009
	(0.015)	(0.009)	(0.019)	(0.015)	(0.028)	(0.020)
In ATL=1 × Year=1929	0.011	0.028	0.024	-0.007	0.051	0.003
	(0.020)	(0.037)	(0.025)	(0.020)	(0.049)	(0.031)
In ATL=1 × Year=1930	0.101***	0.142***	0.102***	0.073**	0.096*	0.084**
	(0.029)	(0.054)	(0.034)	(0.030)	(0.055)	(0.040)
In ATL=1 × Year=1931	0.026	0.112*	0.025	0.030	0.038	0.052
	(0.030)	(0.060)	(0.036)	(0.029)	(0.058)	(0.039)
In ATL=1 × Year=1932	0.019	0.086	0.013	0.010	0.022	0.023
	(0.029)	(0.060)	(0.035)	(0.025)	(0.050)	(0.032)
In ATL=1 × Year=1933	0.020	0.054	0.027	0.048*	0.043	0.082**
	(0.033)	(0.068)	(0.037)	(0.028)	(0.062)	(0.038)
R-sq	0.39	0.26	0.32	0.62	0.45	0.52
N	2,863	1,472	2,808	2,861	1,469	2,804
Year FE	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓
Border-region x Year FE	✓	✓	✓	✓	✓	✓

Notes: This table reports the estimated coefficients of the in-ATL x year fixed effects in the generalized difference-in-differences specification of Equation 4.1. Controls include boundary-region (e.g., Atlanta-St. Louis border) by year fixed effects and the omitted baseline interaction is 1927. Outcome variables are the county x year level and indicated by the column header. "Bank suspension rate" is defined as the number of banks suspended divided by end of year total number of banks in operation. "I(Bank Suspended)" is a binary variable taking the value of 1 if at least one bank suspended operations during the year. "Bank Active Rate" is the number of banks in operation at the end of the year divided by number of banks in operation in the same county in 1927. "Deposit Active Rate" is defined analogously. "National" and "State" refer to nationally chartered vs. state chartered banks. Not all have both a national and state banks. The sample period is 1926 - 1933. The standard errors are clustered at the county level.

Table 4: Robustness: Banks Suspended (All Types)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
In ATL=1 × Year=1926	0.007	0.002	0.002	-0.006	-0.024	-0.048	-0.000	0.021	0.007	0.004	0.014	0.006	0.007
	(0.013)	(0.017)	(0.008)	(0.018)	(0.027)	(0.043)	(0.014)	(0.026)	(0.019)	(0.013)	(0.018)	(0.014)	(0.015)
In ATL=1 × Year=1928	0.019*	0.026**	0.014	0.015	0.017	0.026	0.012	0.029	0.019	0.009	0.024	0.018	0.023*
	(0.011)	(0.012)	(0.015)	(0.014)	(0.055)	(0.024)	(0.013)	(0.024)	(0.018)	(0.011)	(0.015)	(0.012)	(0.013)
In ATL=1 × Year=1929	-0.068***	-0.076***	-0.075**	-0.053*	-0.133	-0.066	-0.066**	-0.078**	-0.068**	-0.052*	-0.061*	-0.083***	-0.070**
	(0.025)	(0.028)	(0.029)	(0.029)	(0.091)	(0.052)	(0.032)	(0.037)	(0.030)	(0.030)	(0.033)	(0.024)	(0.028)
In ATL=1 × Year=1930	-0.051**	-0.047*	-0.054*	-0.038	-0.189	-0.106*	-0.039	-0.075*	-0.051*	-0.031	-0.047*	-0.053**	-0.068**
	(0.023)	(0.027)	(0.031)	(0.033)	(0.118)	(0.063)	(0.028)	(0.040)	(0.029)	(0.029)	(0.025)	(0.024)	(0.027)
In ATL=1 × Year=1931	-0.008	-0.006	0.020	0.018	-0.056	-0.020	-0.022	0.012	-0.008	-0.018	0.005	-0.004	-0.013
	(0.018)	(0.020)	(0.028)	(0.026)	(0.048)	(0.048)	(0.022)	(0.036)	(0.020)	(0.018)	(0.026)	(0.019)	(0.021)
In ATL=1 × Year=1932	0.001	-0.006	0.056	0.022	0.029	0.002	-0.019	0.028	0.001	0.058	0.002	-0.016	-0.023
	(0.031)	(0.033)	(0.036)	(0.037)	(0.091)	(0.061)	(0.039)	(0.054)	(0.039)	(0.039)	(0.045)	(0.031)	(0.033)
In ATL=1 × Year=1933	0.006	-0.001	0.009	0.010	-0.031	-0.010	-0.004	0.021	0.006	0.000	0.012	0.004	0.007
	(0.010)	(0.009)	(0.007)	(0.008)	(0.030)	(0.009)	(0.010)	(0.021)	(0.017)	(0.011)	(0.013)	(0.010)	(0.011)
R-sq	0.14	0.16	0.20	0.20	0.27	0.33	0.15	0.14	0.14	0.18	0.14	0.14	0.11
N	2,820	2,504	1,331	1,672	302	907	1,805	1,015	2,820	1,765	1,715	2,605	2,375
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pre-period balance x Year		✓											
Pre-period banking x Year			✓										
1927 industry x Year				✓									
Mississippi sample					✓								
Split consumer areas sample						✓							
Distance: 0-25mi							✓						
Distance: 25mi-100mi								✓					
Spatial SE									✓				
Removing border:										RICH	STL	CLE	DAL

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table reports the estimated coefficients of the in-ATL x year fixed effects in the generalized difference-in-differences specification of Equation 4.1. Controls include boundary-region (e.g., Atlanta-St. Louis border) by year fixed effects and the omitted baseline interaction is 1927 across all specifications. Outcome variable is the bank suspension rate for all banks, defined as the number of banks suspended within the year divided by end of year total number of banks in operation. Column (1) includes no additional controls. Column (1) includes 1927 active banks, log population, log number of manufacturing establishments, log of average farm size, labor force x year fixed effects. Column (3) includes 1928 capital ratio, 1924-1929 log growth rate of national bank loans by year fixed effects. Column (4) includes a set of manufacturing industry dummy variables based on the dominant industry within the county as of 1927. Column (5) uses only Mississippi counties and column (6) uses only consumer markets that are bisected by the District border. Column (7) uses only counties within 25 miles. Columns (8) - (11) remove one border segment. The time period is 1926 - 1933 for all specifications and the standard errors are clustered at the county level.

Table 5: Robustness: Deposits Active (All Types)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
In ATL=1 × Year=1926	-0.004	-0.026	-0.016	-0.029	-0.025	0.001	-0.004	0.004	-0.004	-0.003	0.003	-0.006	-0.007
	(0.020)	(0.023)	(0.018)	(0.026)	(0.055)	(0.049)	(0.024)	(0.035)	(0.043)	(0.020)	(0.028)	(0.021)	(0.023)
In ATL=1 × Year=1928	0.006	0.012	0.000	0.009	0.052	-0.048*	-0.004	0.020	0.006	-0.024	0.015	0.006	0.021
	(0.015)	(0.016)	(0.017)	(0.019)	(0.037)	(0.028)	(0.016)	(0.031)	(0.036)	(0.017)	(0.020)	(0.015)	(0.015)
In ATL=1 × Year=1929	-0.007	-0.002	-0.006	0.002	0.043	-0.007	-0.014	0.007	-0.007	-0.038	0.014	-0.006	0.000
	(0.020)	(0.023)	(0.023)	(0.027)	(0.069)	(0.057)	(0.023)	(0.039)	(0.036)	(0.024)	(0.027)	(0.021)	(0.022)
In ATL=1 × Year=1930	0.073**	0.088***	0.044	0.023	0.112	0.029	0.069*	0.075	0.073*	0.019	0.091**	0.080**	0.091***
	(0.030)	(0.034)	(0.035)	(0.033)	(0.082)	(0.074)	(0.039)	(0.050)	(0.040)	(0.035)	(0.040)	(0.032)	(0.035)
In ATL=1 × Year=1931	0.030	0.032	-0.005	0.009	0.069	0.028	0.020	0.040	0.030	-0.018	0.060	0.032	0.039
	(0.029)	(0.032)	(0.041)	(0.035)	(0.076)	(0.057)	(0.036)	(0.054)	(0.040)	(0.033)	(0.039)	(0.031)	(0.033)
In ATL=1 × Year=1932	0.010	0.017	-0.017	-0.005	0.064	-0.041	0.013	0.001	0.010	-0.013	0.033	0.013	0.008
	(0.025)	(0.028)	(0.035)	(0.032)	(0.045)	(0.059)	(0.030)	(0.047)	(0.037)	(0.029)	(0.034)	(0.026)	(0.028)
In ATL=1 × Year=1933	0.048*	0.049	-0.003	0.000	0.082	0.028	0.055	0.030	0.048	-0.002	0.060	0.047	0.077**
	(0.028)	(0.032)	(0.038)	(0.036)	(0.060)	(0.064)	(0.035)	(0.050)	(0.039)	(0.032)	(0.038)	(0.029)	(0.031)
R-sq	0.62	0.64	0.70	0.69	0.79	0.77	0.63	0.63	0.62	0.65	0.60	0.63	0.62
N	2,861	2,534	1,344	1,687	312	919	1,838	1,023	2,861	1,783	1,742	2,645	2,413
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pre-period balance x Year		✓											
Pre-period banking x Year			✓										
1927 industry x Year				✓									
Mississippi sample					✓								
Split consumer areas sample						✓							
Distance: 0-25mi							✓						
Distance: 25mi-100mi								✓					
Spatial SE									✓				
Removing border:										RICH	STL	CLE	DAL

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table reports the estimated coefficients of the in-ATL x year fixed effects in the generalized difference-in-differences specification of Equation 4.1. Controls include boundary-region (e.g., Atlanta-St. Louis border) by year fixed effects and the omitted baseline interaction is 1927 across all specifications. The outcome variable is bank deposits in active banks at the end of the year divided by bank deposits of active banks in the same county in 1927. Column (1) includes no additional controls. Column (1) includes 1927 active banks, log population, log number of manufacturing establishments, log of average farm size, labor force x year fixed effects. Column (3) includes 1928 capital ratio, 1924-1929 log growth rate of national bank loans by year fixed effects. Column (4) includes a set of manufacturing industry dummy variables based on the dominant industry within the county as of 1927. Column (5) uses only Mississippi counties and column (6) uses only consumer markets that are bisected by the District border. Column (7) uses only counties within 25 miles. Columns (8) - (11) remove one border segment. The time period is 1926 - 1933 for all specifications and the standard errors are clustered at the county level.

Table 6: Banking Results

	County totals					Per bank			
	Loans	Bonds	Total Assets	Surplus	Banks	Loans	Bonds	Total Assets	Surplus
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
In ATL=1 × Year=1926	0.015	0.029	-0.005	0.004	0.041*	-0.026	-0.012	-0.045	-0.036
	(0.041)	(0.055)	(0.039)	(0.056)	(0.023)	(0.034)	(0.050)	(0.032)	(0.046)
In ATL=1 × Year=1928	0.025	-0.045	-0.008	0.010	0.029	-0.004	-0.074	-0.038	-0.019
	(0.038)	(0.062)	(0.036)	(0.053)	(0.019)	(0.035)	(0.059)	(0.032)	(0.049)
In ATL=1 × Year=1929	0.031	-0.010	0.035	0.085	0.023	0.008	-0.033	0.012	0.062
	(0.039)	(0.078)	(0.036)	(0.061)	(0.024)	(0.034)	(0.074)	(0.030)	(0.055)
In ATL=1 × Year=1930	0.025	-0.098	0.014	0.015	0.035	-0.011	-0.133*	-0.021	-0.021
	(0.057)	(0.083)	(0.052)	(0.078)	(0.034)	(0.052)	(0.079)	(0.046)	(0.074)
In ATL=1 × Year=1931	0.116*	0.008	0.090	0.162*	0.059	0.057	-0.051	0.031	0.103
	(0.065)	(0.105)	(0.057)	(0.091)	(0.052)	(0.056)	(0.099)	(0.047)	(0.083)
R-sq	0.15	0.16	0.12	0.07	0.08	0.12	0.20	0.11	0.06
N	1,061	1,061	1,061	1,060	1,061	1,061	1,061	1,061	1,060
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pre-period cap	✓	✓	✓	✓	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table reports the estimated coefficients of the in-ATL x year fixed effects in the generalized difference-in-differences specification of Equation 4.1. Controls include boundary-region (e.g., Atlanta-St. Louis border) by year fixed effects and the omitted baseline interaction is 1927 across all specifications. The outcome variables come from the OCC and represents county totals for national banks only. The time period is 1926 - 1931 for all specifications and the standard errors are clustered at the county level.

Table 7: Manufacturing Results

	log(rev)	log(wage)	log(est)	log(n_work)	log(rev)	log(wage)	log(est)	log(n_work)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
In ATL=1 × Year=1929	-0.080	-0.068	0.043	-0.091	-0.080	-0.067	0.043	-0.091
	(0.052)	(0.049)	(0.052)	(0.056)	(0.052)	(0.049)	(0.053)	(0.056)
In ATL=1 × Year=1931	-0.017	-0.080	-0.063	-0.044	-0.019	-0.083	-0.060	-0.042
	(0.074)	(0.093)	(0.056)	(0.091)	(0.073)	(0.091)	(0.054)	(0.090)
In ATL=1 × Year=1933	-0.024	-0.084	-0.090	-0.057	-0.026	-0.087	-0.086	-0.054
	(0.104)	(0.125)	(0.070)	(0.136)	(0.104)	(0.123)	(0.067)	(0.134)
In ATL=1 × Year=1935	-0.089	-0.083	-0.131*	-0.128	-0.091	-0.086	-0.127*	-0.125
	(0.098)	(0.131)	(0.072)	(0.114)	(0.098)	(0.131)	(0.069)	(0.113)
In ATL=1 × Year=1937	-0.007	-0.083	-0.117*	-0.082	-0.009	-0.086	-0.114*	-0.078
	(0.090)	(0.140)	(0.067)	(0.118)	(0.090)	(0.140)	(0.065)	(0.118)
Above Median: Difficult/Borrow=1 × Year=1929					0.010	0.036	0.028	0.029
					(0.055)	(0.048)	(0.054)	(0.050)
Above Median: Difficult/Borrow=1 × Year=1931					-0.175**	-0.216**	-0.145**	-0.162*
					(0.085)	(0.090)	(0.060)	(0.084)
Above Median: Difficult/Borrow=1 × Year=1933					-0.237**	-0.283**	-0.205**	-0.262**
					(0.113)	(0.129)	(0.083)	(0.121)
Above Median: Difficult/Borrow=1 × Year=1935					-0.191*	-0.248**	-0.229***	-0.243**
					(0.099)	(0.119)	(0.080)	(0.114)
Above Median: Difficult/Borrow=1 × Year=1937					-0.190*	-0.302*	-0.182**	-0.299**
					(0.099)	(0.170)	(0.073)	(0.141)
R-sq	0.65	0.45	0.61	0.34	0.66	0.46	0.63	0.35
N	636	636	678	672	636	636	678	672
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
County FE	✓	✓	✓	✓	✓	✓	✓	✓
No outliers	✓	✓	✓	✓	✓	✓	✓	✓
Pre-period banking x Year	✓	✓	✓	✓	✓	✓	✓	✓
Border-region x Year	✓	✓	✓	✓	✓	✓	✓	✓
Avg. size tercile (1929) x Year	✓	✓	✓	✓	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table reports the estimated coefficients of Equation 4.1. Controls include boundary-region (e.g., Atlanta-St. Louis border) by year fixed effects, the 1928 capital ratio and 1924-1929 log growth rate of national bank loans by year fixed effects, and terciles of the average size of manufacturing plant in 1929 by year fixed effects. The omitted baseline interaction is 1927 across all specifications. The outcome variables come from Census of Manufactures. The time period is 1927 - 1937 (biennially) for all specifications and the standard errors are clustered at the county level.

Table 8: Interaction between financial constraints and bank failure around the Atlanta border

	log(rev)	log(wage)	log(est)	log(n_work)
	(1)	(2)	(3)	(4)
Above Median: Difficult/Borrow=1 × post=1	-0.235**	-0.287**	-0.218***	-0.342***
	(0.095)	(0.121)	(0.066)	(0.117)
post=1 × In ATL=1	-0.031	-0.059	-0.133**	-0.122
	(0.097)	(0.125)	(0.064)	(0.107)
Above Median: Difficult/Borrow=1 × post=1 × In ATL=1	0.064	0.014	0.026	0.168
	(0.147)	(0.195)	(0.100)	(0.174)
R-sq	0.65	0.46	0.62	0.35
N	636	636	678	672
Year FE	✓	✓	✓	✓
County FE	✓	✓	✓	✓
No outliers	✓	✓	✓	✓
Pre-period banking x Year	✓	✓	✓	✓
Border-region x Year FE	✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table reports the estimated coefficients of Equation 5.2. Controls include boundary-region (e.g., Atlanta-St. Louis border) by year fixed effects, the 1928 capital ratio and 1924-1929 log growth rate of national bank loans by year fixed effects, and terciles of the average size of manufacturing plant in 1929 by year fixed effects. The variable *post* takes the value of 1 for all years after 1929 and 0 otherwise. The omitted baseline interaction is 1927 across all specifications. The outcome variables come from Census of Manufactures. The time period is 1927 - 1937 (biennially) for all specifications and the standard errors are clustered at the county level.