# "Loans For the Little Fellow:" Credit, Crisis and Recovery in the Great Depression*

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**Abstract**

While the effect of credit on having a financial crisis is well-studied, its impact on recovering from the crisis is unresolved. This paper establishes the causal effect of loan supply shocks on the real economy using newly-collected archival data and a novel empirical strategy. The Bank of America was the only bank in California large and geographically diversified enough to weather the Great Depression without shutting lending down completely. However, it did not select into better performing cities before the Depression. I find that cities with access to more stable lending from 1929 to 1933 had smaller contractions in economic activity in the same period. While cities with relatively little credit access during the 1930's did not recover to 1929 levels until 1940, Bank of America-branched cities grew during the Depression. Confirming the city-level results, there is a credit availability wage premium in individual-level data, even when controlling for workers' pre-crisis characteristics. These increases in wages are driven by a reallocation towards nontradable employment at the expense of the agricultural sector.

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# 1 Introduction

From 2007 to 2009, United States real GDP fell by 4 percent. Even when the economy began to expand again, growth remained unusually weak. This sort of severe contraction and slow recovery in output is typical of financial crises. Due to the large welfare costs associated with financial crises, a robust literature has studied the effects of credit booms on economic activity.[1]. In contrast, little is known about the effect of credit during a financial crisis. Furthermore, existing work focuses on how credit provision affects household and firm balance sheets, leaving open the question of how labor markets bear the burden of adjustment to lending shocks.

Credit busts may be a product of pre-crisis conditions, or a reaction to the current state of the economy, introducing a host of empirical issues. To address these identification problems, I employ a novel empirical strategy to measure the causal effect of loan supply shocks on the economy and provide evidence on labor market adjustments during the Great Depression. First, I use a newly-constructed dataset to measure the dynamic response of local economic activity to an exogenous decline in loan supply which is unrelated to both the preceding credit boom and contemporaneous economic conditions. I establish several new facts about the movement of the business cycle during the credit bust. Second, using linked worker-level microdata, I isolate the channel through which labor markets mediate loan supply shocks to the real economy.

In order to measure the effect of credit shocks on the real economy, I have assembled a new panel of city-level banking and economic activity data from a variety of archival data sources. Research shows that differences in credit access have large effects even across small distances, making it crucial to measure economic activity at a disaggregated level [Nguyen,

[1] The literature on the effect of credit growth on economic growth is vast. Claessens et al. [2012], Jordà et al. [2017], and Krishnamurthy and Muir [2017] document stylized facts about economc growth around financial crises. Jordà et al. [2013], Reinhart and Rogoff [2009] demonstrate how credit booms are likely to lead to financial crises. For details on the credit boom in the 2000's in particular, and its effects on the economy, see Mian and Sufi [2014] Ivashina and Scharfstein [2010], Chodorow-Reich [2014], Mondragon [2014], Greenstone et al. [2014] and Chen et al. [2017]

2014, Petersen and Rajan, 2002]. To measure local economic activity at a fine enough level of spatial disaggregation, I hand-collected annual city-level real estate values and population for all California cities over 20 years via from California Board of Equalization [various years]. I measure changes in credit at the city level using both bank balance sheets and novel branch-level data published in court hearings and congressional testimony [Transamerica Corporation vs Federal Reserve Board, 1953, 71st Congress, 1931]. Finally, to capture effects of lending on labor markets, I match the same individuals over time using the 1930 and 1940 full count US censuses [Ruggles et al., 2017] and automated linking methods [Abramitzky et al., 2012]. I use these newly-compiled data to test, and then apply, my identification strategy.

My empirical strategy takes advantage of the expansion of Bank of America branches in the late 1920's. At the time, banks were largely constrained to operation in only one city, leaving them wholly exposed to local shocks. With little access to external liquidity in the 1930's, banks were forced to cut lending to keep enough assets on had in the case of a bank run. The Bank of America, the only one in the country to operate in multiple metropolitan areas, was large and geographically-diversified enough to weather the financial crisis promote small business and household loans to its customers in an effort to get, as its advertising slogan went,"back to good times [Bonadio, 1994]." I show that cities with Bank of America branches in 1929 were indistinguishable from non-branched places in California, its state of operation, based on observables and pre-1929 economic growth, resolving the key identification challenge of crisis credit busts. From 1929 to 1933, the Bank of America cut lending by 30 percent, which was half the size of the average unit bank's loan contraction. Due to the quasi-random allocation of this bank lending shock, I compare the evolution of economic activity in the 1930's in cities based on whether or not they had a Bank of America branch, and therefore more stable credit, at the onset of the Great Depression. Then, I use the linked worker dataset to measure changes in city labor markets as a function of crisis credit availability. Using these results, I illustrate the mechanism through which financial instability hurts the real economy.

I show that credit busts have large and persistent effects on the economy using local projections. Cities with Bank of America branches had eight percent smaller declines in economic activity during the crisis itself. By 1940, Bank of America-branched cities had grown by 25 percent over the course of the decade, while non-branched cities struggled to reach 1929 levels of activity. Using local projections, I demonstrate that the large differences in economic activity in 1940 occur at the start of the recovery. The small differences in the size of the contraction compounded immediately, as economic activity rebounded above pre-crisis levels in 1934 in credit-rich areas and stagnated elsewhere. I show that it was credit during the 1929 to 1933 period which determined the shape of cities' recovery from the financial crisis using the post-1933 resumption of branch expansion. I also rule out other competing explanations, such as financial development, branch selection on unobservables, and New Deal spending. To understand how credit during a financial crisis can create such large, lasting differences in economic activity, I turn to individual-level data covering the labor market during the 1930's.

Labor markets transformed in the face of these differential credit shocks. I compare workers' outcomes based on their exposure to the aggregate credit shock during the 1930's, controlling for pre-crisis characteristics. Levels of unemployment and labor force participation were no different in credit-rich places than credit-scarce places, matching the idea that even non-branched places had recovered from the Depression by 1940. However, workers in Bank of America-branched places had moved up the occupational ladder more than their non-branched equivalents, and as a result were earning higher wages. These differences are driven by reallocation of labor away from agriculture and into retail and services. The decline in the willingness of banks to lend caused large differences in economic outcomes through persistent differences in nontradable production.

In contrast to modern work on credit during the Great Recession,for which individual-level labor data are unavailable, these results point to labor movements magnifying the initial lending shock. Huber [2018] and Chen et al. [2017] suggest firms' difficulty borrowing translated into slow overall growth due to declines in innovation and reallocation to costly non-bank credit, respectively. Other evidence suggests that the fall in consumption in the face of declines in mortgage and household credit deepened the downturn [Mian and Sufi, 2014, Mondragon, 2014]. I find evidence that in response to a smaller fall in lending, cities with Bank of America branches increased employment in the nontradable sector, which was higher-skilled than the agricultural sector. The difference in skill level was a barrier to convergence for workers living in credit-scarce areas, even though total employment rebounded. The impact of local demand during the financial crisis, therefore, had effects on wages and occupational upgrading which lasted into the recovery. These results illustrate an additional channel for credit to affect the economy during a financial crisis and verify that the patterns seen in the Great Recession occurred in an additional context.

Unlike earlier studies of the role of credit in the Great Depression, my estimation strategy takes advantage of a nationally representative set of industries and expands the window of analysis to cover the recovery. At the time, California's economy almost exactly duplicated the national distribution of employment across industries, increasing the external validity of my results, which cover the entire state Department of Education [1937]. Previous work focuses on bank failures in either large, industrialized cities in the Northeast and Midwest or the rural South (see Benmelech et al. [2017] and Lee and Mezzanotti [2014] for the former and Ziebarth [2013] and Richardson and Troost [2009] for the latter.) The large differences I find in economic activity extend the emprical test of Bernanke [1983] done by Calomiris and Mason [2003] on state and county responses to lending cuts from 1929 to consider the recovery as well.

Finally, this study demonstrates the importance of branch banking for stability during financial crises. Starting with Jayaratne and Strahan [1997], research has demonstrated that states which relax branch banking restrictions grow faster during periods of economic expansion. Unlike other advanced economies at the time, the United States had a largely unit bank-based system in the 1930's, as well as a much larger financial crisis. American regulators debated whether the lack of geographic diversification and small scope of domestic banks exacerbated fragility in the system in part due to Bank of America's resilience during the crisis. Carlson and Mitchener [2009] find that bank failures were less likely in cities with Bank of America branches as competing unit banks shored up their asset portfolio to maintain profitability. I focus on the importance of the first large-scale branch banking network for insulating local communities during the 1930's due to its reduced risk exposure. Despite regulator skepticism about the safety of branch banking, the Bank of America was able to cut lending by less than its unit bank competitors, leading to large differences in economic activity during the Great Depression. In the next section, I provide background on this bank.

# 2 Historical Context

## 2.1 Bank Branching in California

California's financial experience in the Great Depression was unique. The state suffered a 45 percent contraction in per capita personal income from 1929 to 1933, matching the national average, as plotted in Figure 1. However, California's banking sector did not mirror the decline in the rest of the country. Only three percent of California's 1929 deposits were in banks that failed, as compared to 12 percent in the rest of the nation. Contemporary explanations for this difference centered on the uniqueness of California's banking system.

At the time, it was the only state with widespread branch banking.[2] One bank, the Bank of America, had over half of the branches active in California in 1929.[3] Rivals called

[2]The McFadden Act in 1927 permitted national banks to branch according the statutes in their state of operation, so both national and state banks were subject to the same branching rules in each state. Although other states permitted bank branching, California was the only one with take-up of multi-city branching. At this time, branching across state lines was illegal.

[3]The bank known now as Bank of America started as the Bank of Italy in 1904. It changed names several times in the 1920's, and ended up as the Bank of America National Trust and Savings Association in 1930. For the sake of expositional convenience, I will refer to the components of the Bank of America National

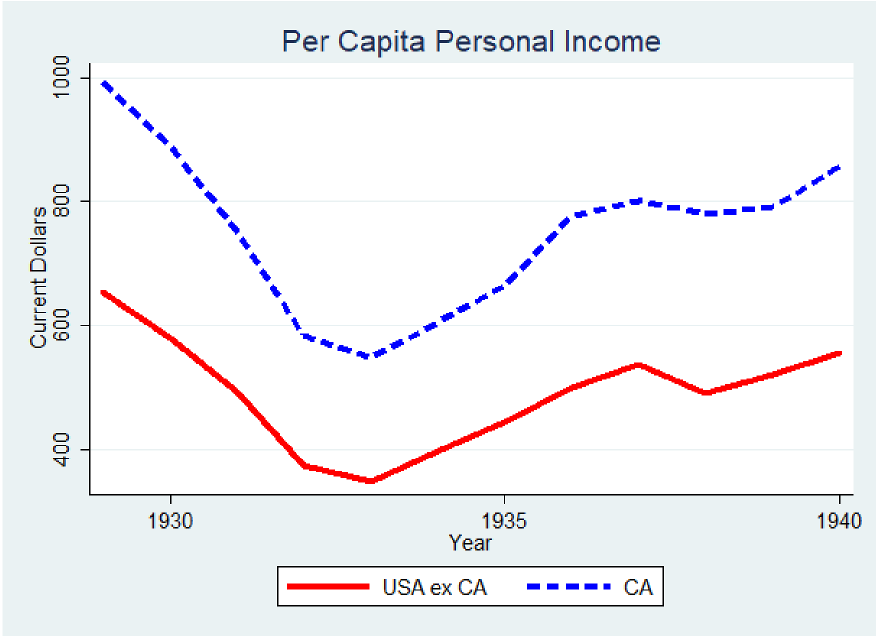



Figure 1
Source: FRED.

it a "huge financial octopus" with 467 total branches in 232 towns in 1929, stretching all over the state [71st Congress, 1931]. Its branches outside of San Francisco and Los Angeles constituted 40 percent of the total branches operating outside of banks' headquarter cities in the nation. Figure 2 plots the number of cities served by the Bank of America and the next three largest bank branching systems in California from 1922 to 1939. Other banks expanded more rapidly in the early 1920's, but did not keep pace with the Bank of America after 1925. From 1926 to 1929, the Bank of America opened branches in 110 new cities. Expansion paused during the early 1930s. However, from 1935 to 1937, the Bank of America acquired a presence in 40 more cities.[4]

Unlike the Bank of America, the three next largest branching banks operated in at most two parts of the state (e.g. San Diego and Los Angeles), and never in both northern and southern California. Figure 3a maps the cities of California; circles mark places home to

Trust and Savings Association as the Bank of America throughout.

[4]Once the banking sector stabilized in 1934, regulators in Washington, DC permitted the Bank of America to resume branching. In 1937, the US Treasury Department deemed the bank's dividends too large, and halted the bank's expansion [James and James, 1954].

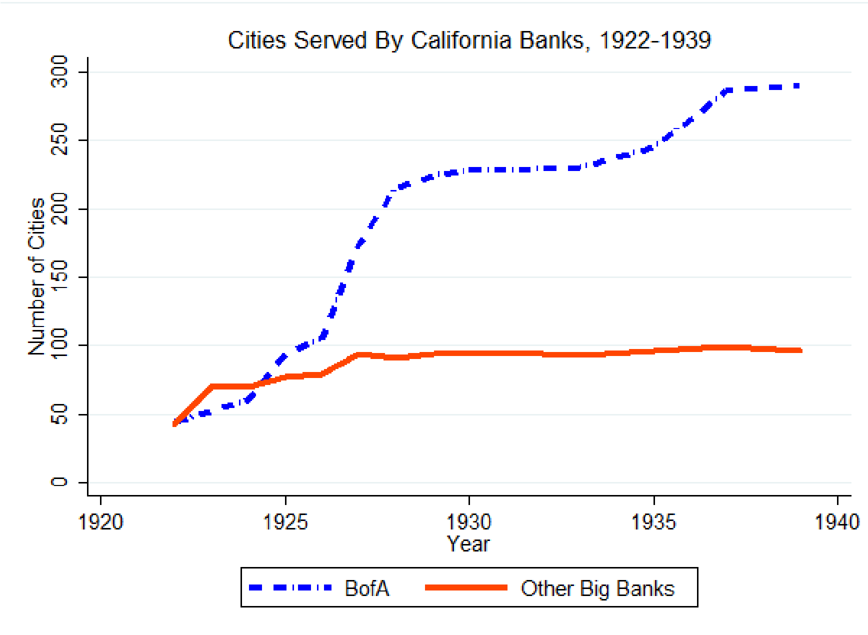
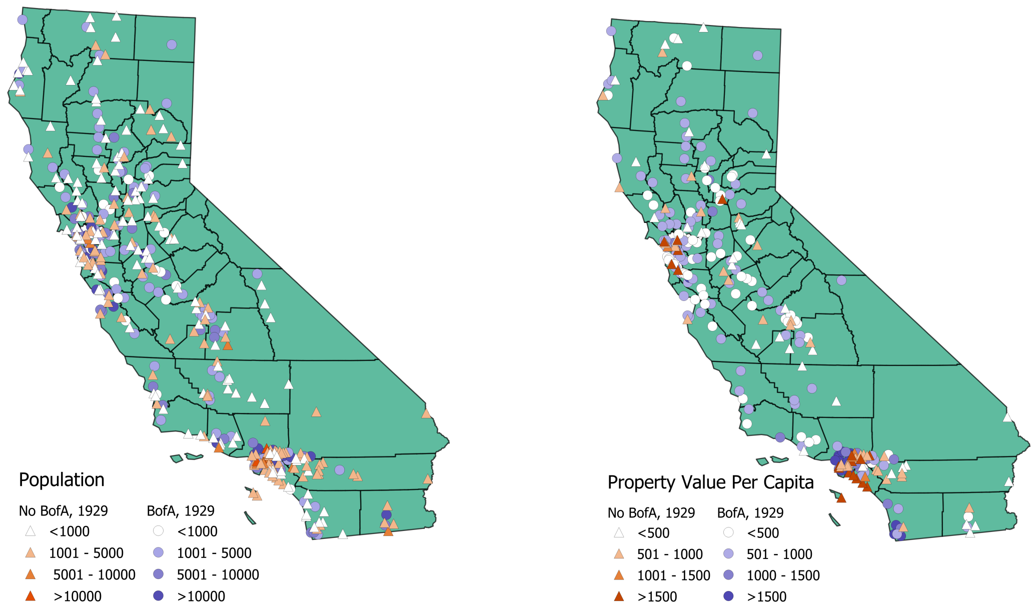



Figure 2

Source: Banking reports, *Transamerica v. Federal Reserve*, and author's calculations. The other big banks are the only other banks to operate branches in more than four cities in 1929: Security Trust, California Bank, and American Trust Company.

at least one Bank of America branch in 1929 and triangles are cities without any Bank of America branches in 1929. The darker the color, the larger the population in 1929. Particularly in the Central Valley, the agricultural region running down the middle of the state, cities with similar population levels and location levels had different levels of exposure to Bank of America at the start of the Depression. There is no clear geographic pattern to the bank's locations. Its leaders set a goal of putting a branch in every city in the state, regardless of size or remoteness, and it is clear that they made progress towards that goal, despite steep regulatory opposition.

California branching rules in the 1920's and 1930's occupied a middle ground between the strict prohibition in other states at the time and the modern branching model. Due to state banking policy, bank branching expansion occurred through purchasing and converting existing banks, not establishing new branches. In order to open a branch in a city outside its headquarters, the expanding bank first had to purchase a bank in that city. Once a bank




(a) Population (b) Property values per capita

Figure 3: 1929 City Characteristics by BofA Status, 1929
Source: Banking reports, Minnesota Population Center [2016], California Board of Equalization [various years], Durham [1998], and author's calculations.

was acquired, regulators had to approve it as a branching office.[5] De novo, or brand-new, branch offices outside the bank's headquarter city, were only allowed in special cases like a town without any banking services. In either case, branching permits were only issued under the aegis of "public convenience and advantage." Because there was no consistent definition of this criterion, branching permit issuance was an uncertain business unless the branch was in the same city as bank headquarters.

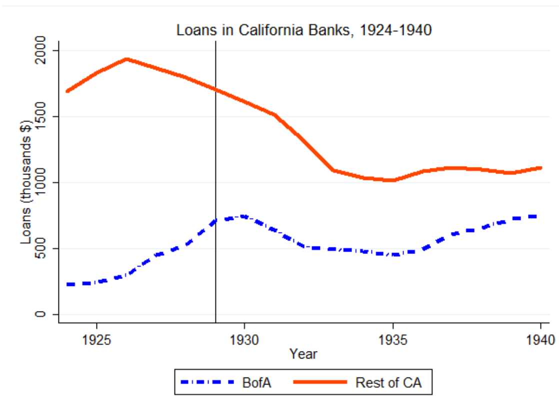
Regulators' attitude towards geographic diversification in general and the Bank of America more specifically, therefore were of paramount importance. To the alarm of the unit bank-dominated banking agencies, branch networks relied on acquisition, and directly de-

[5]Unfortunately, Bank of America's branch permit applications cannot be located by archivists at the California State Archive. Statistics on permit acceptance rates do not exist either, but a comparison of a former superintendent's memoirs and the state banking department's annual report indicate that even the most generous superintendent granted under one-third of applications [Wood]. State banking records do not indicate the process by which they chose which branches to approve. Will C. Wood, the former superintendent, recollected only that he visited Los Angeles and San Francisco to see several locations in person but gave no reasons for his decisions on permits in other areas [Wood].

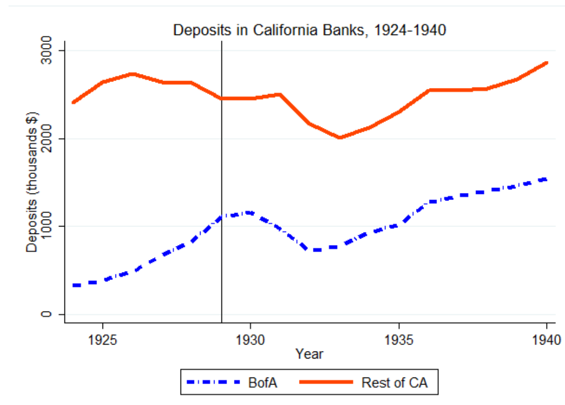
creased unit banks' market share by construction. The Bank of America, which was the only bank attempting widespread branch banking in the nation, attracted the bulk of regulators' dislike. Bureaucrats in the California banking department were particularly intransigent; in a 1926 lawsuit to overturn the de novo rule, the Bank of America alleged that regulators rejected any Bank of America permit where another big bank wanted to open a branch [Dana, 1947]. In the late 1920's, the state superintendent of banks wrote that "positively all of [his employees] were prejudiced against the Bank of [America] [Wood]." Throughout the 1920's, the Bank of America's statewide expansion was also hampered by regulatory skepticism about its plans to open branches all over the state. Despite it being legal, the very idea of branch banking was considered dangerously un-American by most state and national regulators, particularly branching across multiple cities [James and James, 1954]. These aspects of the branch opening process imposed significant checks on Bank of America's ability to choose where to expand. In Section 3.4, I demonstrate that the push and pull between the bank and its regulators led to no significant differences in observables between cities with and without Bank of America branches during the 1920's, allowing me to take the bank's location as quasi-random.

## 2.2 Lending in the Great Depression

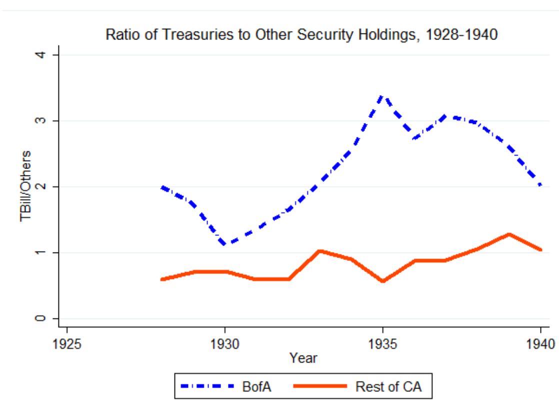
Founded in 1904 by A.P. Giannini as the Bank of Italy, the Bank of America became the third-largest bank by deposits in the United States in 1929. By buying banks in cities all over California, Giannini could amass deposits from dozens of towns with very different seasonal money demand. With such a large deposit base, the bank was able to lend widely. The *American Banker* noted that the Bank of America "never deviate[d] and it never [gave] up" on trying to lend as much as possible, like a tobacco company selling cigarettes (quoted in James and James [1954]). Officers at the bank's headquarters in San Francisco monitored branch loan officers, most of whom were holdovers from when the branch was a unit bank, closely; if a disproportionate number of loans were going to the local elite, Giannini himself was likely to show up unannounced to question why the branch manager had refused to grant loans [James and James, 1954]. A contemporary remarked that the Bank of America "kicked the top hat off of California banking," by lending to people outside of the elite group which had traditionally attracted credit (quoted in Posner [1956]). These lending habits, though established in the 1920's, differentiated Bank of America from other California banks during the 1930's.



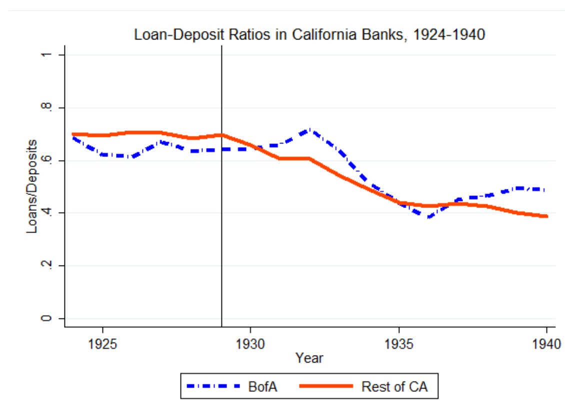

(a) Outstanding Loans




(b) Total Deposits




(c) US Treasuries-Other Securities Ratio




(d) Loan-Deposit Ratios

Source: Banking reports and author's calculations.

Figure 4: Loans, Deposits, and In vestments, 1924-1940

In comparison to other banks, the Bank of America maintained a higher level of loan supply during the 1930's, as plotted in Figure 4a. Figure 4d illustrates that in contrast to loan-deposit ratios before 1929, which were parallel, the Bank of America's loan-deposit ratio remained stable at 0.64 from 1929 to 1933, unlike the average for the rest of the state which fell from 0.70 to 0.54 over the same period. Deposits remained stable throughout the state, due to the paucity of bank failures, as can be seen in Figure 4b.

This drop reflects a differential change in the willingness to lend. In contrast to other California banks, the Bank of America maintained its pre-crisis lending policies. For example, loans in the 1930's did not just go to customers in large cities; the Bank of America's representative testified to Congress in 1931 that loan-deposit ratios were over 0.70 for branches in cities with populations under 50,000 [71st Congress, 1931].[6] When the 20 largest cities in the state are excluded, Bank of America's lending policy is even more striking. On average, all other California cities experienced a decline in unit bank lending from 1929 to 1934 of 60 percent, roughly twice the Bank of America decline. As a result, more loans were made in towns with a Bank of America branch during the Great Depression than in non-Bank of America branched towns.

# 3 Data and Empirical Strategy

This paper's identification rests on the comparison of cities with and without access to Bank of America's relatively generous bank lending policies during the Great Depression. Assessing the validity and impact of this exogenous loan supply shock requires information on each city's banking and economic environment during the branch expansion period of the 1920's and the Depression of the 1930's. Therefore, I have assembled a panel of city-level financial and economic data from a variety of archival sources. In addition, I have constructed a linked worker-level dataset using the 1930 and 1940 Census to decompose the mechanisms behind my city-level results. Except where otherwise noted, these data were hand-collected. More detailed information on the construction of this dataset can be found in the data appendix.

[6] The same source compares Bank of America interest rates to unit bank interest rates in a selection of farm towns, and finds that the Bank of America usually charged lower interest rates [71st Congress, 1931].

## 3.1 Banking

To understand cities' banking markets, I aggregate annual balance sheets for every bank in California during this period. Expanding on data originally collected by Carlson and Mitchener [2009], I hand-collected bank-level variables from annual reports of the California Superintendent of Banks and the Office of Comptroller of the Currency, starting with the opening of the Bank of America in 1904 and ending in 1940. These reports record the opening and closing dates of banks and branches in all California cities every year as well as every bank's overall balance sheet as of June 30 every year.[7] I am therefore able to measure cities' exposure to Bank of America in every year. Cities appear to be the correct contemporary banking market definition in this case; Federal Reserve and California bank superintendent comments on Bank of America's branching applications indicate that they considered each city to be its own banking market in this period [Delano, 1945, Wood].[8]

In addition to these standard banking sources, I also digitized branch-level deposit data from a novel source. The Federal Reserve brought anti-trust charges against Transamerica Corporation, the bank holding company associated with the Bank of America in 1946. Lawyers presented city-level biennial deposit market share data as evidence of the Bank of America's monopoly power in archival court records. I transcribed these deposit data for all cities in California from the court proceedings. Deposit share has been used as a measure of bank market presence in the modern banking literature (e.g. Chen et al. [2017]) but this court case provides a unique historical window into city-level banking markets.

Despite the legality of branch banking in California, most banks were small unit banks. Only ten percent of the 400 banks operating in 1929 had any branches at all. No bank other

[7]Although the California Superintendent of Banks recognized that the spread of branch banking made bank-level reports inaccurate for local conditions at the time, they did not rectify the situation. For example, Bank of America operated in over 200 cities but since its headquarters were in San Francisco, all branches' loans and deposits are part of the San Francisco county totals in commonly-used sources.

[8]In both cases, records indicate that regulators would accept or deny branch applications based on banking facilities only within that city. While many studies demarcate banking markets at the county level (e.g. Jaremski and Wheelock [2017]) this does not appear to be accurate in this context, perhaps because California rural populations tended to cluster in populous farm towns [McWilliams, 1999].

than the Bank of America operated more than 60 cities. Table 1 presents a breakdown of cities by whether or not they had access to Bank of America or any other bank office. Of the cities without a Bank of America branch in 1929, 50 had no banks at all, while almost 200 cities had some other type of bank. Just over 15 percent of cities only had Bank of America branches. The remaining 30 percent had both Bank of America and another bank operating at the onset of the Great Depression.

Table 1: California Cities by Type of Banking Offices, 1929

| | No Other Offices | Other Offices | Total |
|---|---|---|---|
| No BofA Branches | 50 | 198 | 248 |
| BofA Branches | 76 | 127 | 203 |
| Total | 126 | 325 | 451 |

Other offices include all non-BofA branches and unit banks in California. This table includes both incorporated and unincorporated places.

In the 1920's, there was not much difference between the average California bank and the Bank of America in terms of lending relative to deposits, as seen in Figure 4d. However, when the nation plunged into financial crisis, several key aspects of the Bank of America balance sheet kept it able to lend. Its scale was vastly larger than its competitors, particularly those banks operating outside of San Francisco and Los Angeles. First, only the Bank of America was geographically diversified across the state. No other bank operated in multiple regions of the state. Its competitors were unable to hedge against bad local demand shocks due to the limited (if any) scope of their branching networks. Second, it was by far the largest bank in the state, so it was more insulated in a tightening market. Table 2 lists profits, loans, deposits, assets, number of cities served, and the ratio of Treasury bonds to other securities for the fifteen largest banks in the state, along with the state average excluding the Bank of America. In 1929, the Bank of America had almost four times the assets of the next largest bank in the state and 200 times the state average. Its larger scope helped mitigate fixed costs, which gave it more breathing space.[9] Even in June 1929, the average California bank reported zero profits. Third, it had less exposure to private securities than other banks due to its Treasury bond holdings. Due to these risk-mitigating factors, the Bank of America cut its lending by 30 percent from 1929 to 1934. In the same period, California unit banks cut lending by 60 percent on average. These banks suffered large deposit losses as customers took their accounts to banks they perceived as safer. On average, Bank of America increased its deposit market share by 10 percent from 1928 to 1933 in each city it operated. Having a Bank of America branch, therefore, granted cities access to a much larger and more-diversified bank than they otherwise would have.

Table 2: The Ten Largest California Banks in 1929

| *Bank* | *Assets* | *Loans* | *Deposits* | *Profits* | *Investment Ratio* | *Cities Served* |
|---|---|---|---|---|---|---|
| Bank of America | 1,198 | 674 | 989 | 3 | 1.684 | 154 |
| Security Trust | 350 | 202 | 308 | 0 | 1.353 | 44 |
| American Trust | 282 | 166 | 226 | 1 | 0.944 | 35 |
| Anglo National | 152 | 87 | 117 | 0 | 0.953 | 1 |
| Wells Fargo | 143 | 86 | 110 | 3 | 0.670 | 1 |
| Citizens National | 141 | 76 | 117 | 0 | 0.871 | 1 |
| San Francisco | 125 | 69 | 119 | 0 | 0.405 | 1 |
| Bank of California | 114 | 73 | 88 | 0 | 0.493 | 1 |
| California Bank | 112 | 71 | 91 | 2 | 0.382 | 18 |
| Crocker First | 90 | 47 | 69 | 0 | 2.944 | 1 |
| Hibernia | 84 | 47 | 76 | 0 | 0.528 | 1 |
| Anglo Californian | 77 | 49 | 67 | 1 | 0.379 | 1 |
| Farmers National | 70 | 45 | 60 | 0 | 5.696 | 1 |
| Oakland | 65 | 41 | 54 | 1 | 0.379 | 1 |
| Central Savings | 37 | 25 | 31 | 1 | 1.700 | 1 |
| State Avg. | 6 | 4 | 5 | 0 | 0.342 | 1.322 |

Sources: Banking reports (various) and author's calculations. Sample includes all state and national banks in California in 1929. Balance sheet totals are in millions of dollars. Investment ratio refers to the ratio of US securities to other securities on each bank's balance sheet. Cities served is defined as the number of cities in which the bank has branches, including the bank's headquarters. State average includes all banks besides Bank of America.

[9] See Carlson and Mitchener [2009] for details on how branching was more cost-effective than unit banking.

## 3.2 Economic Activity

I complement these banking data with other city economic variables. It is important to measure economic outcomes on the city level because all banking was relationship-based at the time, so close proximity was key for credit access.[10] Because I am interested in the dynamic effects of credit supply, I assembled a panel dataset for cities from 1923 to 1940 from archival reports authored by the California Board of Equalization. I digitized nominal property values as of March 1 in each year for all California cities from 1923 to 1940.[11] These property values are the total dollar value of all commercial, agricultural and residential land, buildings, and other assets held by all individuals and non-financial firms in a given city in a given year. The government strove to make these assessments as accurate as possible because they were the basis for school funding in this period. I supplement this information with annual city population estimates from Bleemer [2016] over the same period. In each year, roughly 250 cities, split equally across Bank of America branch status, report property values, but due to the amount of population churn at the time, cities enter and leave the dataset as they get annexed or unincorporate, making it an unbalanced panel. Because I cannot directly observe the effects of these annexations, I divide total property value in a city by its population every year to control for changes in city boundaries. Figure 5 plots the average total property value per capita for cities with and without Bank of America branches in 1929. Both types of cities experienced growth during the 1920's, with a peak in 1929, followed by a decline during the 1930's.

Unlike many other Great Depression-era studies, I measure outcomes for both rural and urban places, allowing for a more complete accounting of the real economic effects of banking crises. Unincorporated communities were sizeable in California, and were home to 40 Bank of America branches in 1929.[12] For rural places, I use the enumeration district, which is the

[10] This was particularly true of the Bank of America. According to the bank's handbook, "character [was] the best basis of all for credit," indicating an organizational emphasis on soft information [Bank of America, 1942].

[11] For more detail on property value sources and definitions, see the data appendix.

[12] According to a survey done by the California State Chamber of Commerce, 56 unincorporated towns

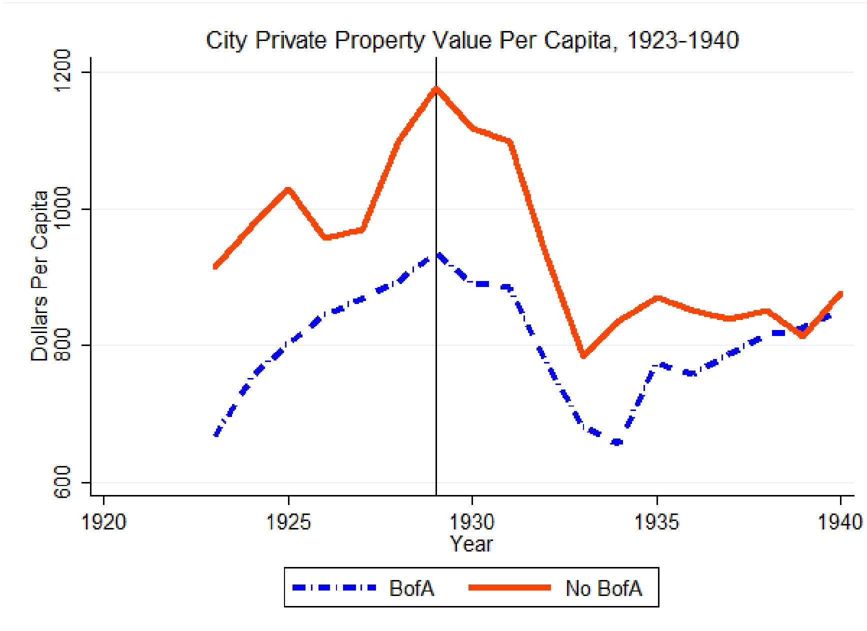



Figure 5

Source: California Board of Equalization [various years] and author's calculations.

historical census decade-specific geographical concept equivalent to a census tract. I convert enumeration districts into a standardized unit of observation across the 1920, 1930, and 1940 censuses using definitions scraped from Morse et al.. With these definitions in hand, I measure non-financial characteristics for the entirety of the state.

Appendix Table 23 and Appendix Table 22 summarize the occupation employment shares and demographics on the city level in 1930. The average city had a population of 3,082 in 1930, with approximately 3 in 8 people employed. The workforce was evenly divided into skilled, agricultural, professional, sales and unskilled work in 1930. Fifteen percent of workers were employed in agriculture, services, and retail trade. Due to its distance from major markets, California also employed about ten percent of its workers in manufacturing.[13]. Smaller sectors included mining and government work. For a discussion of the balance of

had populations of over 1,000 people in 1927. Unincorporated communities ranged in size from 100 to 66,800 people [State Chamber of Commerce, 1928]. To do so, I digitized the "unincorporated town" field of each 1930 census form which was not in an incorporated city. This yielded geocodable cities for 8,439 enumeration sheets out of 30,388 candidates.

[13] [Department of Education, 1937] cites widespread need for canning and packing product and automobile parts manufacturing as key drivers of the state's geographically-distributed manufacturing sector.

these characteristics across Bank of America status, see the appendix.

### 3.3 Labor Markets

In order to measure changes in the labor markets as a response to credit availability, I use employee-reported information from the 1930 and 1940 population censuses digitized by Ruggles et al. [2017]. Due to concerns about compositional changes in labor markets during the 1930's, I use automated machine linking to match individuals living in California in the 1940 census with a 1930 record. Following the same individual across time helps control for endogenous differences in city labor markets. Changes in city employment shares neglect migration flows and shifts in firms' capital-labor ratio due to credit scarcity which may be functions of local lending levels. Structural unobservables, like employment resilience, may also affect responses to macro shocks and bias estimates. Individual-level data instead record how a given worker responded to a shock in the 1930's by observing their labor market choices in 1940.

Each observation is one person, and includes information on city of residence, wage and salary income, industry and occupation, and many demographic variables from both the 1930 census and the 1940 census. I restrict my sample to men living in California aged 26 to 65 in 1940. I count 1930 and 1940 records as matched if they are the only two to report an individual born in the same state with the same spelling-standardized first and last names, and birth years within the same five-year window, as established in Abramitzky et al. [2012].[14] This process results in a panel with one period before the shock and one after.[15] Following research on the granularity of local credit markets, e.g. Petersen and Rajan [2002] and Nguyen [2014], I assign Bank of America branch treatment to all individuals living within a five-mile radius of a city centroid with a pre-Depression Bank of America branch in 1940. I

[14] Further details on the linking process can be found in the data appendix. All following results are robust to a variety of linking procedures, as also covered in the appendix.

[15] I use 1930 census information to measure pre-crisis variables. The 1930 census was taken in April 1930, which as near as possible to the traditional start of the Depression. In 1940, California personal income reached its 1929 level, making that census a useful one for measuring recovery. In addition, the start of World War II and the Pacific front mobilization make later years less comparable with the 1930's decade.

geocode individuals in 1930 and 1940 using city of residence, or the case of rural areas, the enumeration district. Fifty-two percent of the resulting sample of 364,341 men are treated. Using this comprehensive dataset on banking, economic activity, and labor markets in 1930's California, I next provide evidence for my identification assumption.

### 3.4 Identification

To use pre-Great Depression bank locations to identify the effects of loan supply, the expansion of the Bank of America branching network must not be related to town characteristics in the 1920's. If, for example, Bank of America-branched towns were ex ante different than towns without branches, then treatment may reflect these qualities, not Bank of America's lending during the Great Depression. If on the other hand, Bank of America's arrival altered local economic conditions during the 1920's in a way that affected initial Depression severity, then the crisis lending channel would be mis-identified. I evaluate these two concerns in turn.

If Bank of America selected banks to acquire as branches based on future growth prospects, then interpreting increases in activity as a consequence of a branch opening would be incorrect. First, I drop the twenty largest cities in California by 1929 population due to concerns that Bank of America did not randomly acquire those branches.[16] Because these cities were so large, they were especially likely to be branching targets. In fact, five of them served as headquarters for the bank during the 1920's, indicating their desirability. To ensure I can measure levels of local loan supply using Bank of America branch locations as of 1929, I first assess the observables on which towns with and without Bank of America branches differ in an extension of the city selection regression in Carlson and Mitchener [2009]. Formally, I regress the probability of a city $c$ in county $\mathcal{C}$ receiving its first Bank of America branch

[16] I drop, in descending order of population, Los Angeles, San Francisco, Oakland, San Diego, Long Beach, Sacramento, Berkeley, Pasadena, Glendale, Fresno, San Jose, Stockton, Santa Monica, San Bernardino, Alameda, Santa Ana, Alhambra, Riverside, Bakersfield, Richmond, and Pomona.

between 1922 and 1929 on both city and county-level characteristics:

$$P(BofA_c) = \beta_0 + \gamma DEMOG_{c,1922} + \alpha BANK_{c,1922} + \delta ECON_{C,1920} + \epsilon_{\mathcal{C}c} \tag{1}$$

City variables include a dummy for having any banks, having a national bank, average capital per bank in the city in 1922, a quadratic in distance to a large city, log 1922 population, banks per 1,000 people in 1922, and the average loan to deposit ratio of existing banks in 1922 . The county controls are growth rate of agricultural output 1910-1920, the agricultural share of income in 1920, whether the county is in northern California, county manufacturing and agricultural income per capita in 1920, and the foreign-born share of the 1920 population.[17] Results are listed in Table 3.[18] The majority of these financial, economic, and demographic variables fail to predict selection into the Bank of America branch network in 1929. While average capital per bank is statistically significant, it indicates that a 1,000 dollar increase in capital per bank would increase the chance of Bank of America opening a branch by .1 percent. The impact of the number of banks per capita in 1922 is similarly small in economic significance. Moving from the 25th to the 75th percentile in number of banks per 1,000 people, the equivalent of 1.4 banks per 1,000 people, would increase the probability of Bank of America branch status in 1929 by 3.5 percent. Clearly, though, population did play a part in Bank of America branching, as moving from the 25th to the 75th percentile in log population, roughly equal to increasing the population by 1,500, is equivalent to a 13 percent increase in the likelihood of Bank of America acquisition. I will control for population in my results, Finally, a city being located north of the Tehachapi Mountains, the informal

[17] Regression results are robust to constructing city-level equivalents in population growth and foreign-born share, but the sample size is greatly reduced. These tables are available upon request.

[18] The lack of predictors of Bank of America branch status precludes the use of an instrumental variable approach. Because available city-level observables are not correlated with Bank of America branch locations, there is no way to construct a first-stage regression. A similar bank-level regression in Carlson and Mitchener [2009] indicates that few bank-level observables predict eventual Bank of America acquisition as well. The only significant predictors are (negative) net worth to asset ratio, having a bank in the town (due to the state's refusal to let Bank of America de novo branch), and having a state bank (negative, because of McFadden Act restrictions). In contrast, other large banks bought banks with a lot of assets, high cash-deposit ratios, high security to interest-bearing asset ratios, high net worth to asset ratios, low city populations and banks per capita (due to their permission to branch denovo).

boundary between southern and northern California at the time, increases its probability of being a Bank of America branch. Despite the fact that the southern California population exploded in the 1920's, regulators were unwilling to allow the San Francisco-headquartered Bank of America too much entry into southern markets. In part, their reluctance stemmed from their strong Los Angeles bank ties. Through loopholes and sheer persistence, Giannini did manage to open branches in many parts of the state. Figure 3a demonstrates that population and city location were not the sole determinants of whether cities received a Bank of America branch.

Although branching status did not vary based on city-level observables in the early 1920's, there is still the possibility that cities' observable quality changed within the decade or that something uncorrelated with the variables in Equation 1 but correlated with economic activity motivated Bank of America's network locations. I test if there is a trend in local economic activity driving the timing and location of branch acquisition in an difference-in-difference approach. The plotted coefficients measure levels of economic activity in each incorporated town which acquired a Bank of America branch relative to the city and year averages.[19] A positive coefficient would indicate that property values per capita were higher in that specific year relative to other cities and the level of economic activity for that city in the year in which the branch was acquired ($\tau = 0$).

$$Y_{ct} = \Sigma_{\tau=-3}^{3} \delta \cdot 1(BofA, t = \tau) + \alpha_c + \gamma_t + \epsilon_{\mathcal{C}ct} \tag{2}$$

Figure 6 plots the $\delta$ coefficients. Once again, standard errors are clustered at the county level. The lack of a postive trend in property value per capita around Bank of America arriving in a given city in Figure 6 suggests that regulators did not permit the bank to open branches in systematically better-performing towns. [20] Furthermore, there is no upward

[19] Because local economic activity is only available for incorporated cities, in the analysis which follows, I am forced to restrict my sample. Previous results are not driven by incorporation status.

[20] Event studies for total property value and population, the numerator and denominator of my measure of local economic activity, also do not show an upward trend.

Table 3: Determinants of Getting BofA from 1922 to 1929

| | 1(Get BofA branch) | 1(Get BofA branch) |
|---|---|---|
| 1922 banks per 1,000 | 0.021*** | 0.023*** |
| | (0.01) | (0.01) |
| Had bank in 1922 | -0.12 | -0.096 |
| | (0.09) | (0.08) |
| Had national bank in 1922 | 0.099* | 0.092* |
| | (0.05) | (0.05) |
| Log 1920 city population | 0.14*** | 0.17*** |
| | (0.03) | (0.02) |
| Distance to large city (miles) | 0.000031 | 0.00037 |
| | (0.00) | (0.00) |
| Distance to large city sq. | -0.0000014 | -0.0000028 |
| | (0.00) | (0.00) |
| 1(County seat) | 0.076 | 0.17 |
| | (0.11) | (0.10) |
| Share county income ag, 1920 | 0.14 | 0.13 |
| | (0.16) | (0.16) |
| Growth county ag income, 1910-20 | -0.00068* | -0.00066* |
| | (0.00) | (0.00) |
| County income per capita, 1920 | 0.00010 | 0.00011 |
| | (0.00) | (0.00) |
| Share county population foreign-born 1920 | 0.0088 | 0.0091 |
| | (0.01) | (0.01) |
| Growth county population, 1910-20 | 0.00082 | 0.00074 |
| | (0.00) | (0.00) |
| 1(County in northern California) | 0.13* | 0.15** |
| | (0.07) | (0.07) |
| Average loan/deposit ratio | -0.060 | |
| | (0.04) | |
| Average capital per bank ($1000s) | 0.0018*** | |
| | (0.00) | |
| Constant | -15.1 | -13.8 |
| | (16.05) | (16.12) |
| Observations | 366 | 366 |

Standard errors clustered at county level in parentheses. County variables from 1910 and 1920 censuses. City variables measured in 1922. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

trend after Bank of America opened in a new town, which indicates first, that branching did not improve local outcomes before 1929, and second, that the timing of branch openings is uncorrelated with a pre-trend in economic growth. For the bank to have chosen a town based on its local economy, these characteristics would have to be uncorrelated with the evolution of property prices in the 1920's, as well as the banking and demographic variables analyzed in Table 3. Also, Figure 3b indicates that Bank of America branches were not systematically located in higher property value per capita cities in 1929, nor were these locations geographically clustered.


Source: California Board of Equalization [various years] and author's calculations. Standard errors clustered at the county level. Coefficients are the $\delta$ estimates from Equation 2.

Figure 6: Event Study Coefficients

Finally, I plot my measure of economic activity, property value per capita, from 1921 to 1940 in Figure 5. These lines plot the average value of property per capita based on 1929 Bank of America branching status. In the 1920's, the two types of cities were on roughly parallel trends. Non-Bank of America cities did decline slightly in 1926 and 1927, as populations in those areas soared, but recovered to trend in 1928. Based on the lack of significant differences in observables, I treat Bank of America branch status as exogenous to Great Depression outcomes conditional on city size. For Bank of America branching locations to proxy for an unobservable driver of 1930's economic growth, this variable would have to be uncorrelated with 1920's economic growth trends and other city-level observables but somehow still correlated with economic activity after 1929. Therefore, I take Bank of America branching locations to be as good as random, conditional on population, in the following analysis. Based on Figure 5, Bank of America-treated towns did recover in the Great Depression much more strongly than their counterparts. In the next section, I investigate the 1930's more closely.

# 4 Aggregate Effects of Credit

First, I compare the change in local economic activity during the 1930's based on 1929 Bank of America branch location. If the availability of credit in a city matters during a financial crisis, then I expect to see that places with Bank of America branches on the eve of the Great Depression had higher growth in local economic activity during the 1930's. I estimate the effect of having smaller declines in local loan supply on property value per capita $y_{ct}$ using a first difference specification as in Equation 3. Because I drop the constant term, these $\beta$ coefficients are the average growth rates, conditional on 1929 city-level characteristics, for cities with a Bank of America branch in 1929 ($\beta_1$) and those without one ($\beta_2$). [21]

$$\log y_{c,1940} - \log y_{c,1929} = \beta_1 BOFA_{c,1929} + \beta_2 NOBOFA_{c,1929} + \gamma X_{c,1929} + \epsilon_{\mathcal{C}c} \tag{3}$$

The $\beta$ coefficients measure the growth rate of real economic activity from 1929 to 1940. Because there is evidence population played a role in Bank of America's location decisions, I control for 1929 population levels in the baseline. Standard errors are clustered at the county level. In unreported results, I also control for lags of the dependent variable, as is

[21]This is equivalent to running a difference-in-difference specification on property value per capita using 1929 as the pre-treatment period and 1940 as the post-treatment period and controlling for 1929 population levels.

standard in the literature [Jordà et al., 2013]. Table 4 shows the results over the entire 1929 to 1940 period in column 1. Similar to evidence from the Great Recession in Huber [2018], I find persistent differences in post-crisis economic activity based on local credit supply. During the Great Depression, smaller contractions in credit, proxied by Bank of America's branch locations in 1929, led to 25 percentage points higher growth. Cities with access to Bank of America at the start of the Great Depression grew during the decade, but those without a branch did not grow at all, even as the overall economy recovered. An F-test, also displayed in Table 4, rejects the hypothesis that economic growth was the same, on average, in Bank of America and non-Bank of America cities. In modern terms, this gap is equivalent to the difference in house price growth from 2006 to 2017 between San Jose, which had a strong recovery on the back of the technology sector, and Phoenix, which had one of the worst-performing metropolitan housing markets during the recession.

Table 4: Cumulative changes in log property value per capita

| | (1)<br>1929-1940 | (2)<br>1929-1933 | (3)<br>1933-1940 | (4)<br>1923-1929 |
|---|---|---|---|---|
| No BofA, 1929 | -0.0199 | -0.223*** | 0.207*** | 0.0707* |
| | (0.0882) | (0.0432) | (0.0691) | (0.0376) |
| BofA, 1929 | 0.253*** | -0.120*** | 0.380*** | 0.116* |
| | (0.0660) | (0.0381) | (0.0525) | (0.0631) |
| BofA, 1929 - No BofA, 1929 | 0.272 | 0.103 | 0.173 | 0.045 |
| F-test | 8.256 | 7.299 | 5.425 | 1.140 |
| p-value | (0.006) | (0.009) | (0.024) | (0.291) |
| N | 244 | 244 | 250 | 225 |

Notes: Standard errors are clustered at the county level. Branch status is of September 1929. F-test and p-value refer to an F-test of equality of BofA and NoBofA coefficients at each horizon. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Columns 2 and 3 of Table 4 separate the 1930's into the financial crisis and recovery periods to investigate if loan supply has different effects based on the health of the economy. Instead of estimating the effect of a credit boom on the size of the subsequent economic contraction, these results measure the effect of recession lending on the magnitude of the bust and the strength of the recovery, respectively. Column 2 regresses the log difference in economic activity between 1929 and 1934 on dummy variables for 1929 Bank of America branch network status and other city-level controls.[22]

As in Calomiris and Mason [2003], cities with Bank of America branches had smaller declines in property value per capita during the banking crises of the early 1930's. Unlike Calomiris and Mason [2003], however, this comes strictly from a change in lending, not bank failures. California suffered a decline in lending without a spate of bank closures, and this change in loan supply had real effects on the contraction. On average, no matter a city's branch status, economic activity declined at a statistically significant rate. While cities with more access to credit from 1929 to 1933 shrank by 12 percent, the decline was smaller than the average contraction in the rest of the state. The 10 percent difference in the magnitude of the contraction is associated with a p-value of 0.009, indicating there is a simultaneous effect of credit on output during a financial crisis.

Much of the divergence during the 1930's came from stronger recoveries during the latter half of the decade. Column 3 replaces the 1929 to 1940 log difference in economic activity in Equation 3 with the 1933 to 1940 equivalent but keeps the right-hand side the same. Cities with larger loan supply declines grew by 21 percent from 1933 to 1934. This recovery, though it offset the prior contraction, was overshadowed by the robust recovery made by cities with Bank of America branches in 1929. Those cities on average doubled the recovery of their non-branched counterparts. The smaller contraction experienced due to smaller loan supply cuts was followed by an accelerated recovery. Both phases of economic activity are statistically different based on crisis lending availability. This asymmetry indicates that the effects of credit are even more state-dependent than previously expected.

However, the growth of Bank of America-branched cities during the Great Depression was not a function of their economic performance in the 1920's. Column 4 presents the effect of Bank of America's presence in 1929 on economic activity from 1923 to 1929. California

[22] I use 1933 as the cutoff because property values were assessed March 1 each year and, conveniently for measurement, the state and national financial crises peaked with the bank holiday instituted after Franklin Delano Roosevelt was inaugurated March 4 [Starr, 1996, Wicker, 2000].

cities in the 1920's boomed regardless of Bank of America's network in 1929. An F-test fails to reject that growth from 1923 to 1929 varied based on 1929 branching locations. This confirms the identification section above; Bank of America did not systematically access better-performing towns in the 1920's.

If Bank of America locations in 1929 were correlated with exposure to other Depression-era shocks, identification would not hold. Therefore, I split the sample based on whether or not a city's share of employment in a given industry was above or below the sample median in 1930. All four of these sectors were hit by demand shocks in the 1930's.[23] Table 5 re-estimates Equation 3 for each of these subgroups. In each classification, I fail to reject that cities with less access to credit in the Depression had zero economic growth during the 1930's. In contrast, Bank of America-branched cities grew during the decade, for the most part. The Bank of America coefficient in 1930's growth is statistically significant for all but agriculture-oriented and less-manufacturing-dependent cities. In the case of farming-heavy cities, the presence of Bank of America still caused significantly higher growth. Despite the variation in exposure to external shocks based on employment, cities with relatively more credit in the Great Depression outperformed other cities. Given the stability of these results to external shocks and pre-1930 growth trends, I next analyze the timing of the effect of credit on recovery.

[23] See Romer [1990] and Olney [1999] on durables, Madsen [2001] on trade, Mishkin [1978] on household spending, and Alston [1983] on farming.

Table 5: 1930's economic growth based on 1930 industry structure

| | Services | Trade | Agriculture | Manufacturing |
|---|---|---|---|---|
| Median Emp. Share, 1930 | 0.177 | 0.143 | 0.084 | 0.061 |
| *A: Above Median* | | | | |
| BofA, 1929 | 0.195*** | 0.189** | 0.154 | 0.391*** |
| | (0.0696) | (0.0753) | (0.105) | (0.0825) |
| No BofA, 1929 | 0.00566 | 0.0722 | -0.135 | 0.0117 |
| | (0.102) | (0.0975) | (0.105) | (0.124) |
| BofA, 1929 - No BofA, 1929 | 0.189 | 0.117 | 0.289 | 0.379 |
| F-test | 2.353 | 1.124 | 6.849 | 8.949 |
| p-value | (0.132) | (0.295) | (0.013) | (0.005) |
| N | 123 | 122 | 121 | 123 |
| *B: Below 1930 Employment Share Median* | | | | |
| BofA, 1929 | 0.318*** | 0.334*** | 0.348*** | 0.114 |
| | (0.0905) | (0.0917) | (0.0903) | (0.0769) |
| No BofA, 1929 | -0.0392 | -0.0765 | 0.101 | -0.0365 |
| | (0.117) | (0.105) | (0.134) | (0.0787) |
| BofA, 1929 - No BofA, 1929 | 0.357 | 0.411 | 0.247 | 0.150 |
| F-test | 7.904 | 13.318 | 3.969 | 2.244 |
| p-value | (0.008) | (0.001) | (0.053) | (0.142) |
| N | 120 | 121 | 122 | 120 |

Standard errors in parentheses

Each regression uses only cities with above median employment in each industry in 1930.

Standard errors are clustered at the county level. Branch status is of September 1929.

F-test and p-value refer to an F-test of equality of BofA and NoBofA coefficients.

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

## 4.1 Dynamic Effects of Local Lending

The results above indicate that loan supply shocks have nonlinear effects on the real economy. Using local projections, I construct empirical impulse responses of local economic activity to local credit shocks [Jordà, 2005]. Specifically, I model the cumulative change in economic activity from 1929 to each year, ending in 1940, as a function of Bank of America branch status in 1929.[24] I estimate, for $h = 1, ..., 10$ the cumulative effect of Bank of America branch status on activity from 1929 to 1940 for a given city $c$ in county $\mathcal{C}$.

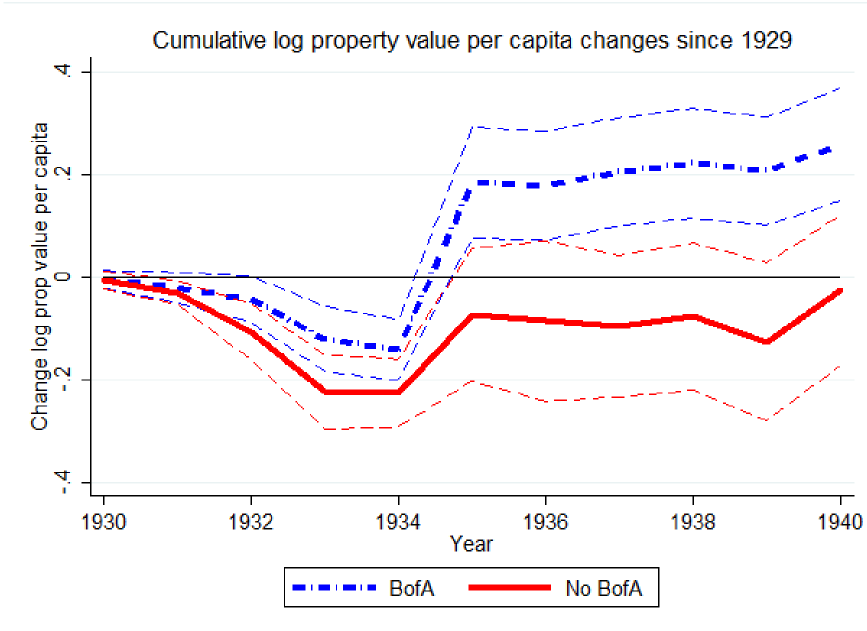
$$\log y_{c,1929+h} - \log y_{c,1929} = \beta_1 BOFA_{c,1929} + \beta_2 NOBOFA_{c,1929} + \gamma X_{c,1929} + \epsilon_{\mathcal{C}c} \tag{4}$$

I plot the $\beta$ coefficients for each year from Equation 4 in Figure 7. $\beta_1$ is the dashed blue line and $\beta_2$ is the solid red line. Standard errors for each horizon are clustered at the county level. As is common in the literature, I plot 90% confidence bands. These coefficients and standard errors, along with an F-test for coefficient equality, are displayed for each year in Table 6. The role of local loan supply was indistinguishable from 0 based on any standard statistical threshold from 1929 until 1932, when non-branched cities shrank by 10 percentage points more than cities in the Bank of America branch network. In 1933, when the California banking crisis was most intense and state per capita personal income reached its trough, cities all over the state contracted.[25].

This initial divergence in economic activity during the financial crisis immediately compounded when higher loan supply cities rebounded more strongly. After the financial environment stabilized in late 1933, local economic activity grew in Bank of America-branched towns by 30 percentage points between 1934 and 1935, 17 percentage points higher than the

[24] This form of impulse response function is agnostic to the data-generating process, unlike vector autoregressions.

[25] California implemented a banking holiday the week before the national holiday. State banking regulators worried that bad weather during the winter would endanger agricultural loans and set off the state's first big bank run of the Depression [Starr, 1996]




Source: Banking reports, California Board of Equalization [various years] and author's calculations. Standard errors clustered at the county level. Thick lines plot the $\beta$ coefficients from Equation 4 and thin lines are 90% confidence intervals.

Figure 7

non-Bank of America-branched average, the single largest annual difference in the decade. As recovery set in, this difference persisted. The 25 percentage point difference in economic growth established by March 1935 lasted until 1940. Although one may not reject that non-Bank of America-branched cities recovered back to 1929 levels, those cities did not match the economc growth of branched places. The data indicate that relatively plentiful credit availability during the financial crisis leads to smaller contractions, a stronger rebound, and a steeper recovery.

Table 6: Economic Growth, 1929 to 1940

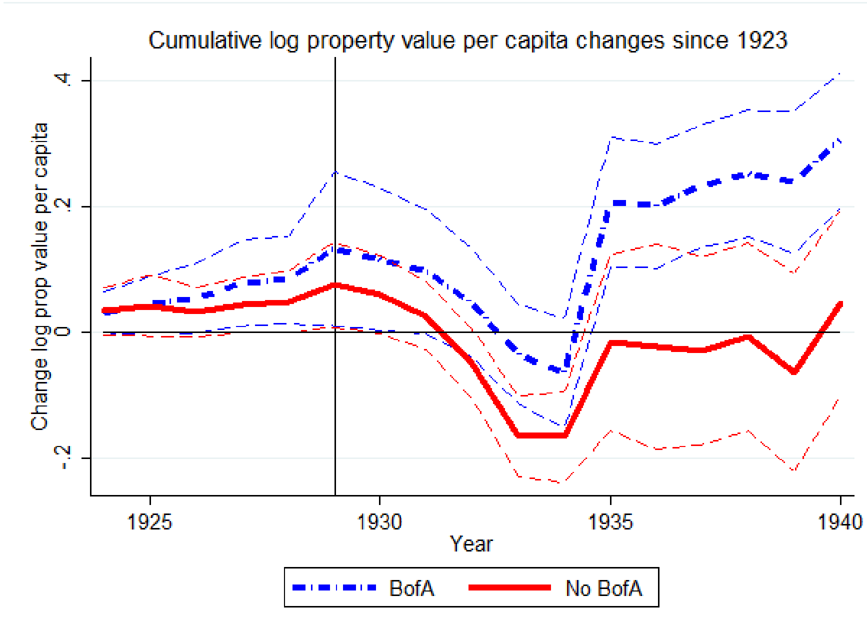
| | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BofA, 1929 | -0.005 | -0.021 | -0.044 | -0.120*** | -0.141*** | 0.178*** | 0.171*** | 0.198*** | 0.215*** | 0.201*** | 0.252*** |
| | (0.010) | (0.018) | (0.027) | (0.038) | (0.035) | (0.064) | (0.064) | (0.063) | (0.064) | (0.063) | (0.066) |
| No BofA, 1929 | -0.005 | -0.030** | -0.109*** | -0.227*** | -0.229*** | -0.074 | -0.086 | -0.096 | -0.077 | -0.129 | -0.026 |
| | (0.011) | (0.015) | (0.034) | (0.044) | (0.040) | (0.081) | (0.097) | (0.086) | (0.089) | (0.097) | (0.091) |
| BofA - No BofA | 0.000 | 0.009 | 0.065 | 0.107 | 0.087 | 0.252 | 0.257 | 0.294 | 0.292 | 0.330 | 0.279 |
| F-test | 0.002 | 0.381 | 3.829 | 7.415 | 3.833 | 7.851 | 5.584 | 8.421 | 8.283 | 9.401 | 8.188 |
| p-value | (0.968) | (0.540) | (0.056) | (0.009) | (0.056) | (0.007) | (0.022) | (0.005) | (0.006) | (0.003) | (0.006) |
| N | 246 | 246 | 246 | 246 | 246 | 246 | 246 | 246 | 246 | 246 | 246 |

Standard errors clustered at county level. F-test and p-value refer to an F-test of equality of BofA and NoBofA coefficients at each horizon.
* p<0.1, ** p<0.05, *** p<0.01

## 4.2 Other Explanations

To ensure these effects are the product of a Bank of America lending shock during the financial crisis, I rule out several competing explanations. In particular, I argue Bank of America's branching network changed cities' economies solely through its willingness to lend from 1929 to 1933, not its pre-Depression policies, location selection criteria, or correlated city characteristics. First, I show that the divergence in economic activity started after the onset of the Great Depression in Figure 8 by starting the estimation of Equation 4 in 1923 but using 1929 branching locations. From 1923, when the Bank of America started its expansion, until 1929, 1929 Bank of America locations are indistinguishable from cities without Bank of America branches, ruling out a pre-1929 trend in economic activity which could have affected 1930's development. F-tests, displayed in Appendix Table 11, fail to reject that the effect of having a Bank of America branch is different from not having a branch until after the start of the Great Depression. In addition to overall growth in the 1920's indistinguishable based on 1929 branch locations, as seen in column 4 of Table 4, the year-by-year contour of that growth did not vary depending on Bank of America's network. The bank did not systematically access cities based on either stronger-than-average booms or weaker-than-average busts, indicating that local business cycles before the Depression were not correlated with my measure of credit stability in the 1930's.

I next assess whether these results are driven by long-run financial development or local credit supply during the Great Depression. Bank of America implemented several programs to increase access to finance for the community, so the difference in Great Depression outcomes may be a function of financial development, instead of credit supply during the 1930's. Jayaratne and Strahan [1997] demonstrate that states with looser bank branching restrictions had higher growth rates. I estimate Equation 5 from 1923 to 1940 but measure Bank of America branch status based on the year the bank first opened a branch in that city. For example, Bank of America acquired First National Bank of Red Bluff in 1927 and opened it as a branch that same year, so Bank of America status is set to 0 before 1927 and 1



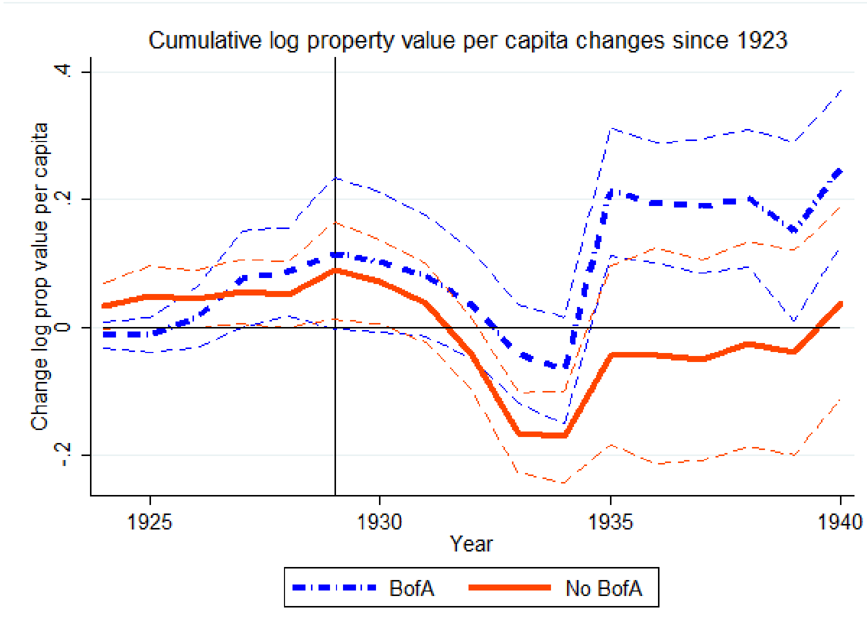

Source: Banking reports, California Board of Equalization [various years] and author's calculations. Standard errors clustered at the county level. Thick lines plot the $\beta$ coefficients from Equation 5 and thin lines are 90% confidence intervals.

Figure 8

afterwards for that city.

$$\log y_{c,1923+h} - \log y_{c,1923} = \beta_1 BOFA_{c,1923+h} + \beta_2 NOBOFA_{c,1923+h} \gamma X_{c,1923} + \epsilon_{\mathcal{C}c} \qquad (5)$$

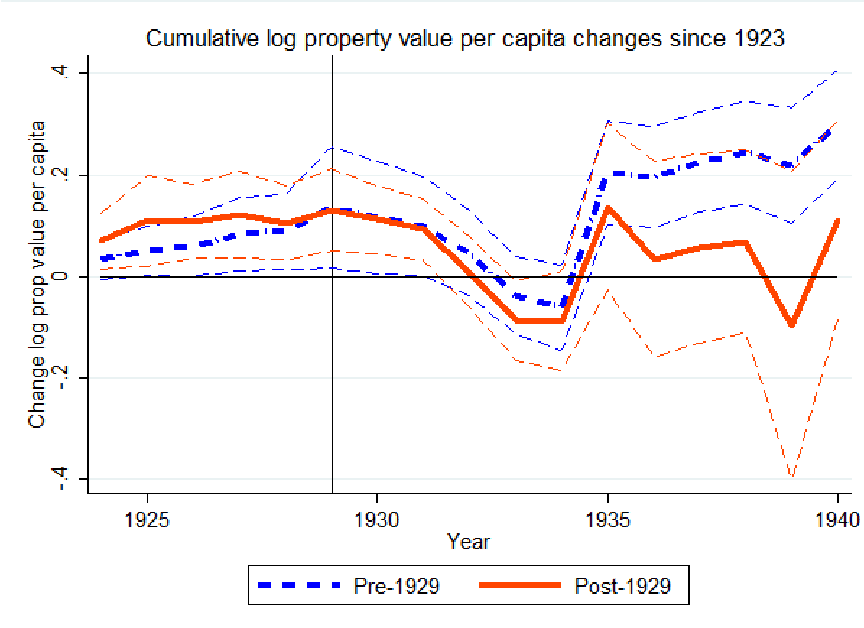
Figure 9 plots the $\beta$ coefficients from 1923 to 1940 with 90% confidence intervals based on county-clustered standard errors. F-test statistics for the null hypothesis of $\beta_1 = \beta_2$ are not significant at any standard significance level until the mid-1930's, as presented in Appendix Table 13. Cities with and without Bank of America branches had grown the same amount during the 1920's. Both peak in 1929, but cities with a Bank of America branch have a smaller contraction followed by an immediate recovery, as in the baseline results. I find that divergence in outcomes does not occur until the Great Depression, suggesting that local loan supply, not prior financial development, drove differences in local economic activity during the 1930's.




Source: Banking reports, California Board of Equalization [various years] and author's calculations. Standard errors clustered at the county level. Thick lines plot the $\beta$ coefficients from Equation 5 and thin lines are 90% confidence intervals. Bank treatment assigned based on whether Bank of America was present in that specific year.

Figure 9

Although Bank of America's lending remained elevated relative to other California banks' policies throughout the Depression, it was credit during the financial crisis that mattered. After 1933, the Bank of America resumed its expansion across the state, entering 40 new cities between 1933 and 1940. Using branch location records collected from Transamerica Corporation vs Federal Reserve Board [1953], I compare cities which had Bank of America branches in 1929 with those which entered the branching network after 1929. I estimate Equation 4 starting in 1923 solely for cities which had Bank of America branches in 1940 and plot the $\beta$ coefficients in Figure 10. Despite similar economic growth in these locations before 1930, places which had Bank of America branches in 1929 had much stronger recoveries from the Depression than those which received branches after 1933. Between 1929 and 1940, cities in which Bank of America operated throughout the banking crisis grew by 18 more percentage points, a statistically significant difference, as listed in Appendix Table 14. Because these cities looked the same at the onset of the Depression, and were exposed to the same lending policies after 1933, it must be the presence of Bank of America during the financial crisis which affected economic growth throughout the decade.




Source: Banking reports, California Board of Equalization [various years] and author's calculations. Standard errors clustered at the county level. Thick lines plot the $\beta$ coefficients from Equation 5 using only cities in which Bank of America opened a branch between 1904 and 1940. Thin lines are 90% confidence intervals. Treatment assigned based on whether Bank of America was present before or after September 1929.

Figure 10

Due to the lack of detailed loan data, I cannot directly test whether Bank of America issued more loans in each of these cities than unit banks. I can however, use an approach common in the banking literature to proxy for crisis period loans with pre-crisis deposit market share [Chen et al., 2017]. This definition of loan supply clarifies the mechanism through which Bank of America's presence improved economic activity. The higher the pre-crisis deposit market share, the higher the loan supply during the Great Depression. For every city in California, I calculate the percentage of deposits held by Bank of America in 1928 with records collected by the Federal Reserve for its anti-monopoly case against the Bank of America during the 1940's and 1950's [Transamerica Corporation vs Federal Reserve Board, 1953].[26]. Then, I calculate the z-score for each city's Bank of America market share

[26]These deposit data are the first branch-level records from this time period, to my knowledge. At the

so that $BOFASHARE = 1$ represents a market share one standard deviation, roughly 35 percentage points, above the mean, approximately 35 percent, in 1928. Cities with no Bank of America branches have a deposit market share of 0. I use this measure to estimate Equation 6.

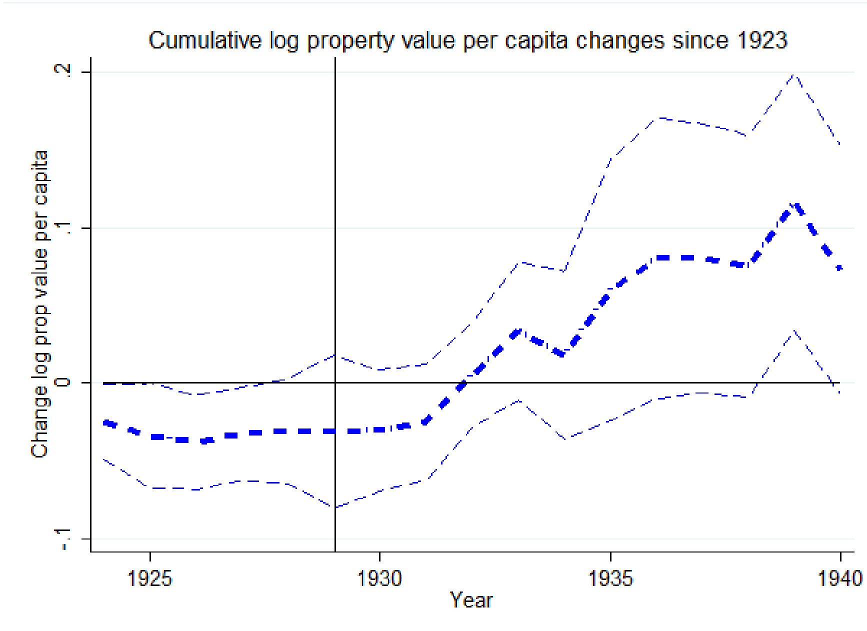
$$\log y_{c,1929+h} - \log y_{c,1929} = \gamma_0 + \gamma_2 BOFASHARE_{c,1928} + \gamma X_{c,1929} + \epsilon_{\mathcal{C}c} \tag{6}$$

This local projections are plotted in Figure 11 and reported in Appendix Table 15. If Bank of America held thirty percentage points more of a city's deposits in 1928, then that city grew by 11 percentage points more over the course of the 1930's. A two-standard deviation increase, roughly equal to having no other banks besides Bank of America yields the difference between places with and without Bank of America branches found using the binary measure. Taken with the above results, this suggests that Bank of America's presence in a city in 1929 is a good indicator of heightened levels of lending specifically from 1929 to 1933. Access to more credit, as proxied by Bank of America's presence during the 1929 to 1933 crisis, led to a smaller contraction and a faster, steeper recovery.

To address concerns about branch location selection on unobservables, I also leverage banking regulators' branch permit approval criteria at the time of Bank of America's expansion. If cities which received Bank of America branches had economic and financial environments which were systematically pre-disposed to weather the Great Depression before Bank of America arrived, then the presence of a branch would not represent the causal effect of loan supply. Therefore, I estimate the probability of receiving a Bank of America branch as a function of the regulatory hurdles facing a bank wishing to open a new branch.

Starting in 1918, banks were prohibited from opening de novo branches outside their home market, defined as the city in which its headquarters were located. Instead, branch expansion occurred through purchases of existing banks, once the state banking department's "public

time, all balance sheet information collected by regulators was done at the bank level, which was not a problem until the Bank of America began to have a significant presence beyond its flagship bank location in San Francisco.




Source: Banking reports, California Board of Equalization [various years] and author's calculations. Standard errors clustered at the county level. Thick lines plot the $\beta$ coefficients from Equation 5 and thin lines are 90% confidence intervals. Bank treatment assigned based on Bank of America's deposit market share in each city in 1928.

Figure 11

convenience and advantage" criterion and capital requirements were satisfied. Branching capital requirements were increasing in town size. Cities should have had similar probabilities of Bank of America branch acquisition based on the cities' 1922 population, the average capital and total resources of the cities' banks in 1922, and the total number of banks in 1922 in 1922 due to these branch opening requirements. [27]

With this intuition in mind, I supplement my original local projection approach with a matching estimator. First, I use quartics in the above banking and population information to estimate each city's propensity of receiving a Bank of America branch in a logit regression. Then, I match each city treated(untreated) to the city in the untreated(treated) group with the closest probability of having a Bank of America branch in 1929, and use this as the counterfactual economic growth outcome for each city.[28] I calculate the treatment effect in

[27] I use 1922 as a reference point because it marks the beginning of Bank of America's statewide expansion, so that the branch acquisition occurs after the measurement of observables, to avoid the simultaneity problem. This also represents the information set of both regulators and bankers at the start of the expansion.

[28] See the appendix for further details on the matching estimator.

each year as the mean difference in outcomes between having a Bank of America branch in 1929 and not having one, denoted $\alpha$ in Equation 7.

$$\log y_{c,1929+h} - \log y_{c,1929} = \gamma_0 + \alpha P(BOF\hat{A}_{c,1929} = 1) + \gamma X_{c,1929} + \epsilon_{\mathcal{C}c} \tag{7}$$

Figure 12b plots the results for cumulative local economic activity growth from 1929 to each horizon $h$ with 90% confidence intervals based on Abadie-Imbens standard errors [Abadie and Imbens, 2016]. Coefficients are displayed in Appendix Table 12. While the results are noisier than my baseline estimates, the differences in cumulative log real estate per capita growth from 1929 to 1940 are similar to the results reported in Table 4. In both cases, the difference in economic activity increases substantially between 1934 and 1935. The overall effect of Bank of America branches is slightly smaller than the baseline specification but still statistically significant. For a factor to confound the identification of 1930's loan supply using 1929 Bank of America branch locations, it would have to be uncorrelated with the pre-expansion financial environment, 1920's economic growth, and 1930 industrial structure but correlated with the bank's network starting in 1929. Therefore, I interpret the lending effects of Bank of America's presence on cities' economic activity as causal. Access to a Bank of America branch during the early 1930's softened the blow of the financial crisis and led to a stronger recovery. Next, I test potential explanations for the persistent effect of loan supply during the Great Depression.

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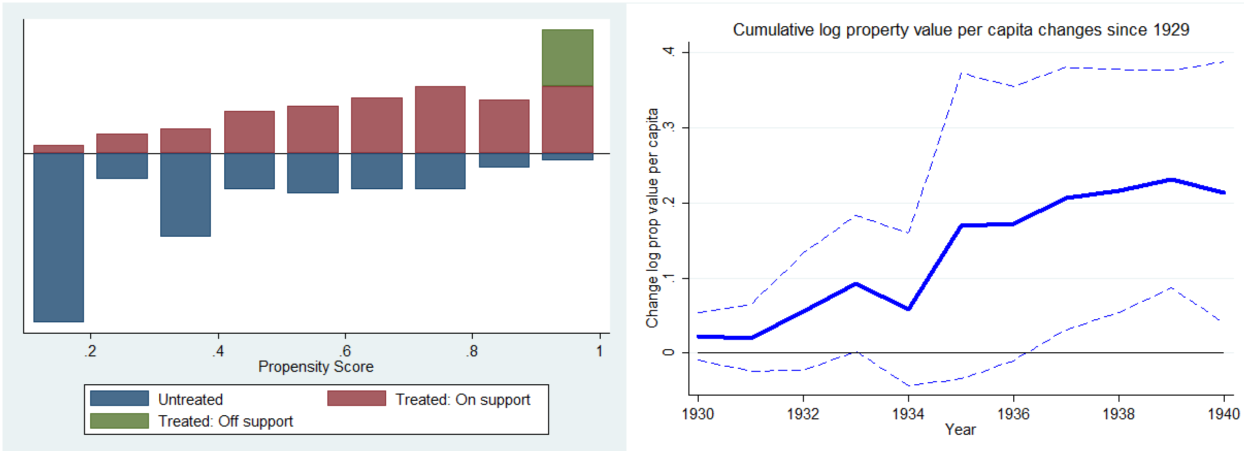
# 5 Labor Market Changes

By 1940, California state personal income had surpassed its 1929 level. However, recovery from the Great Depression was not equally distributed across the state. Cities without Bank of America branches during the Great Depression still had markedly lower levels of economic activity than those cities with branches in 1929. In this section, I examine the labor market




(a) Propensity Score Overlap (b) Matching Estimator Results

Source: Banking reports, California Board of Equalization [various years], and author's calculations. Standard errors clustered at the county level. The thick plots the $\alpha$ coefficients from Equation 7 and thin lines are 90% confidence intervals.

Figure 12: Propensity Score Matching Results

mechanisms for these persistent differences in economic activity. Using worker-level data measured before and after the banking crisis, I track shifts in labor market outcomes as a function of cities' relative credit availability. I account for 1930 characteristics which may have affected individuals' labor market outcomes. Identification rests on the assumption that Bank of America proximity in 1940 was as good as random, conditioning on these city and individual-level controls measured in 1930. With this assumption in mind, I analyze men's labor market outcomes in 1940 as a function of whether or not the city they lived in 1940 was part of the Bank of America network in 1929. For individual $i$ in city $c$ in 1940, I estimate the following regression for labor outcome $Y$.

$$Y_{i,c} = \gamma_0 + \beta_1 BOFA_c + \gamma_1 X_i + \gamma_2 X_c + \lambda_{\mathcal{C}} + \lambda_{j,1930} + \lambda_{o,1930} + \epsilon_{\mathcal{C}c} \tag{8}$$

To control for differences in the broader labor market within the state, I employ 1940 county of residence $\mathcal{C}$) fixed effects and cluster my standard errors at that level. I also include fixed effects for each individual's occupation ($o$) and industry ($j$) group in 1930.[29] In several

[29] Sample categories include farmer, farm laborer, manager, and sales worker for occupation. For industry group, groups include mining, durable manufacturing, and personal services.

specifications, I relax the identification assumption further, and conduct my analysis in first differences, which subtract out individual-level unobservables. The explanatory variables in $\gamma_1$ and $\gamma_2$, along with the fixed effects, control for the incidence of other Great Depression shocks and other determinants of labor market outcomes. The coefficient of interest is $\beta_1$, which measures the difference in income, for example, between otherwise identical men in Bank of America-branched and non-branched cities in 1940.

## 5.1 General Characteristics in 1940

The results in Table 7 confirm the results of the previous section. Employment, like economic activity, recovered to its pre-Depression level independent of crisis credit availability. There is no statistically significant difference in labor force participation or unemployment rate based on 1929 Bank of America branch locations. Workers were no more likely to have changed occupation group without a Bank of America branch either. However, there is a large, statistically significant lending stability premium for income. Wage and salary income was 13.7 percent higher in Bank of America-branched cities in 1940. The 1940 Census was the first to ask about income, so I cannot construct a longitudinal measure of income from 1930 to 1940.[30] Instead, I report the percent change in occscore, a commonly-used alternative which ranks occupations based on the median income associated with that occupation in 1950. Increases in occscore signify moving up the occupational ladder. Living near a 1929 Bank of America branch is associated with a 13.4 percent increase in occscore from 1930 to 1940, which is roughly equivalent to moving from working on an oil derrick to being a real estate broker. Cities with smaller lending cuts during the 1930's had both higher wages and workers who acquired more skills during the decade. The equilibrium level of employment was no higher, but workers were more skilled and better-paid. To understand better how employment changed based on credit availability, I turn next to changes in the composition of labor.

[30] It also only asked about wage and salary income, so business owners reported no income. Therefore, I restrict the estimation of the income coefficient to men reporting a nonzero income.

Table 7: 1940 Labor Market Based on 1929 BofA Locations

| | P(In LF) | P(Unemp) | Log W+S Inc | P(Change Occ) | Pct Ch Occscore |
|---|---|---|---|---|---|
| bofacl40 | 0.0110 | 0.00162 | 0.137*** | 0.00678 | 0.134*** |
| | (0.014) | (0.006) | (0.022) | (0.009) | (0.028) |
| Observations | 364341 | 304553 | 228139 | 364341 | 315738 |

Standard errors clustered at 1940 county level. Other explanatory variables in these regressions are 1(white), a quadratic in age, dummies for having an eighth grade education, 1930 marital and rural status, 1930 city of residence population, and fixed effects for 1940 county and 1930 industry and occupation groups. Only men over the age of 16 in 1930 living in California in 1940 included Bofacl40 is 1 if in BofA location in 1940. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$

The differences in the labor market, like the differences in overall economic activity, are a function of access to Bank of America during the 1929 to 1933 period. Column 1 in Table 10 restricts the sample to labor markets within five miles of a Bank of America branch opened by 1940. Incomes are still significantly higher in areas close to a 1929 Bank of America branch. Because these cities were otherwise quite similar at the start of the Depression and had equal exposure to Bank of America after 1933, the differences in their labor markets in 1940 must be due to Bank of America's presence during the financial crisis, not its presence during the recovery.

If cities with higher access to credit simply had higher-ability workers, then it is not possible to attribute the differences in economic activity, wages, and unemployment to loan supply. I address this concern about the correlation between labor market unobservables and credit in several ways. First, I use the longitudinal aspect of my worker-level dataset to estimate the effect of Bank of America proximity on first differences in occupational standing in Table 7, and find large, significant effects of credit stability. Workers near Bank of America branches move up the occupational ladder at higher rates than other workers, even when differencing out individual unobservables. Second, I can estimate the effects on wages in 1940 using more detailed industry and occupation fixed effects. In the final coulmn of Table 10, I use the most disaggregated possible occupation and individual fixed effects in a specification otherwise identical to Equation 8. These fixed effects differentiate between an auto mechanic and radio mechanic, in the occupation case, and fabricated steel production and other fabricated metal production for industries, for example. Including these measures for workers' 1930 status narrows down the comparison group substantially. Nonetheless, I still find a significant credit stability premium for wages of 13.2 percent, indicating worker quality cannot explain the effects above.

## 5.2 Industry and Occupation Changes

Using the occupation and industry information reported for each person in both censuses, I measure the marginal effect of credit stability on the composition of employment. In the following results, the dependent variable is a dummy for working in a given job type in 1940, conditional on a variety of 1930 and 1940 characteristics, as in Equation 8. Table 8 reports the results for each industry, as well as the employment share by sector in the sample. Panel A estimates the overall probability of an individual working in a given industry in 1940 while Panels B and C split the sample based on whether or not a given worker was employed in that industry in 1930. Cities with more stable credit levels had smaller farm and mining sectors due to more workers exiting the sector and fewer workers entering the industry during the 1930's. These effects are large: on average, workers in Bank of America-branched cities had a 10.5 percent lower probability of working in the commodity sector, which is one third of the sample. Differential entry and exit cannot be explained by overall changes in the size of the labor force or the number of workers employed. Instead, workers in cities with more stable lending shifted into the retail and service industries at rates roughly one fourth of the sample sector employment share.The effects on transportation and manufacturing employment are small and insignificant. Evidence across sectors in Panel C also suggest that workers were more likely to remain in the same industry if they lived in a credit-stable environment. Credit, however, had a stronger effect on net entry into specific sectors, as demonstrated in Panel B. On average, workers in Bank of America-branched cities were three percent more likely to enter service and retail employment. Industiral employment was weighted towards nontradable sectors and away from commodity production as a function of credit availability.

Table 8: Industrial Employment Shares, 1940

| | Ag/Mining | Mfg/Cons. | Trans + Util | Retail/Wholesale | Gov. | Services |
|---|---|---|---|---|---|---|
| Sample Sector Emp. Share | 0.291 | 0.283 | 0.070 | 0.168 | 0.038 | 0.136 |
| *A: Overall Effect* | | | | | | |
| bofacl40 | -0.105*** | 0.00925 | 0.00861 | 0.0407*** | 0.00853*** | 0.0305*** |
| | (0.0271) | (0.00892) | (0.00527) | (0.00961) | (0.00311) | (0.00514) |
| R-sq | 0.22 | 0.10 | 0.07 | 0.09 | 0.07 | 0.09 |
| N | 364341 | 364341 | 364341 | 364341 | 364341 | 364341 |
| *B: Not In Sector, 1930* | | | | | | |
| bofacl40 | -0.0825*** | 0.00580 | 0.00530 | 0.0320*** | 0.00698** | 0.0224*** |
| | (0.0261) | (0.00708) | (0.00396) | (0.00804) | (0.00267) | (0.00428) |
| R-sq | 0.13 | 0.06 | 0.01 | 0.04 | 0.02 | 0.02 |
| N | 264168 | 297557 | 341235 | 324670 | 356822 | 323213 |
| *C: In Sector, 1930* | | | | | | |
| bofacl40 | -0.158*** | 0.0257 | 0.0508** | 0.107*** | 0.0878*** | 0.0935*** |
| | (0.0269) | (0.0178) | (0.0227) | (0.0241) | (0.0251) | (0.0161) |
| R-sq | 0.14 | 0.09 | 0.10 | 0.07 | 0.19 | 0.08 |
| N | 100173 | 66784 | 23105 | 39671 | 7518 | 41128 |

Standard errors clustered at 1940 county level. Other explanatory variables in these regressions are 1(white), a quadratic in age, dummies for having an eighth grade education, 1930 marital and rural status, 1930 city of residence population, and fixed effects for 1940 county and 1930 industry and occupation groups. Only men over the age of 16 in 1930 living in California in 1940 included. Bofacl40 is 1 if in BofA location in 1940. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Occupational employment shares, displayed in Table 9, tell the same story. Overwhelmingly, workers in cities which had Bank of America branches during the Great Depression reallocated away from farming. The 11.5 percent reduction in farm employment is statistically significant at the one percent level. Professional and managerial occupational employment was 6 percent higher and sales and clerical work was 3.35 percent higher in Bank of America-branched cities. Laborer and craftworker employment did not vary based on crisis credit availability. These changes in occupational composition hold true regardless of whether or not workers were already in those occupation groups in 1930. Overall, composition of labor in Bank of America-branched cities shifted towards higher-skilled, less agricultural occupations in the 1930's.

These employment and income results are not driven by particular pre-crisis city industrial or occupational structures either. I split the sample based on whether or not the

Table 9: Occupational Employment Shares, 1940

| Sample Occ Group Emp. Share | Prof/Mgr. 0.187 | Farming 0.219 | Nonfarm Lab. 0.104 | Sales/Cler. 0.103 | Craft/Op. 0.335 | Service 0.053 |
|---|---|---|---|---|---|---|
| *A: Overall Effect* | | | | | | |
| bofacl40 | 0.0602*** | -0.115*** | -0.00142 | 0.0335*** | 0.0181 | 0.0151*** |
| | (0.00685) | (0.0323) | (0.00509) | (0.00632) | (0.0182) | (0.00372) |
| R-sq | 0.08 | 0.18 | 0.03 | 0.05 | 0.08 | 0.01 |
| N | 422022 | 422022 | 422022 | 422022 | 422022 | 422022 |
| *B: Not In Occ Group, 1930* | | | | | | |
| bofacl40 | 0.0470*** | -0.0867*** | -0.00245 | 0.0268*** | 0.0114 | 0.0125*** |
| | (0.00494) | (0.0274) | (0.00423) | (0.00449) | (0.0141) | (0.00295) |
| R-sq | 0.06 | 0.13 | 0.03 | 0.04 | 0.08 | 0.00 |
| N | 377606 | 334891 | 383454 | 383268 | 326056 | 409552 |
| *C: In Occ Group, 1930* | | | | | | |
| bofacl40 | 0.118*** | -0.187*** | 0.0129 | 0.0793*** | 0.0449* | 0.0853*** |
| | (0.0194) | (0.0276) | (0.0139) | (0.0227) | (0.0260) | (0.0219) |
| R-sq | 0.11 | 0.16 | 0.06 | 0.06 | 0.08 | 0.07 |
| N | 44416 | 87131 | 38568 | 38754 | 95966 | 12470 |

Standard errors clustered at 1940 county level. Other explanatory variables in these regressions are 1(white), a quadratic in age, dummies for having an eighth grade education, 1930 marital and rural status, 1930 city of residence population, and fixed effects for 1940 county and 1930 industry and occupation groups. Only men over the age of 16 in 1930 living in California in 1940 included. Bofacl40 is 1 if in BofA location in 1940. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

worker's 1940 labor market was above or below the state median employment share in that occupation or industry in 1930 and re-estimate the wage and employment share results for those subgroups. Overall, the pattern of Bank of America-branched places having higher and statistically significant levels of income holds for both occupational shares in Appendix Table 16 and industrial employment shares in Appendix Table 17. Skilled and nontradable employment are larger in cities with higher levels of local loan supply, regardless of pre-crisis employment shares as well, as seen in Appendix Tables 18 and 19, respectively. Any explanation for how credit availability during a financial crisis leads to large, persistent differences in economic activity must reflect these skill and labor allocations.

## 5.3 Potential Mechanisms

Differences in relative credit availability translated into different levels of recovery during the 1930's. Cities with Bank of America branches transitioned towards nontradable, higher-skilled, and higher-paid employment in the same period. Any explanation for the shifts in employment must also be consistent with the small contraction followed by a large and persistent rebound at the city level. In this section, I examine a variety of economic mechanisms consistent with this evidence.

Table 8 and Table 9 both indicate that workers in cities with Bank of America branches were more likely to be in the same industry and occupation type in 1930 and 1940, respectively. If credit reduced pressure to cut employment, then job-specific human capital losses would be lower in places with more stable credit during the 1930's. Workers who stayed in the same occupation or industry group in Bank of America-branched cities would have particularly high incomes in this case. To test this assumption, I interact the dummy variable for Bank of America proximity with a dummy for staying in the same occupation group in a difference-in-difference specification of the form:

$$Y_{i,c,j} = \gamma_0 + \beta_1 BofA_c + \beta_2 SAME_i + \beta_3 BofA_c \cdot SAME_i \gamma_1 X_i + \gamma_2 X_c + \lambda_{\mathcal{C}} + \lambda_{j,1930} + \lambda_{o,1930} + \epsilon_{\mathcal{C}c} \tag{9}$$

The results of this regression, and the analogous specification for staying in the same industry, are displayed in Table 10. In both cases, the interaction term is insignificant, suggesting that the wage premium and persistently strong recovery in Bank of America places was not due to credit ensuring employment stability.

Table 10: Testing Explanations For Persistence

| | 1929 vs 1940 BofA | Stay Occ | Stay Ind | Big Occ | Big Ind | Detailed 1930 FE |
|---|---|---|---|---|---|---|
| bofacl40 | 0.0535** | 0.138*** | 0.133*** | 0.131*** | 0.110*** | 0.132*** |
| | (0.0247) | (0.0237) | (0.0232) | (0.0242) | (0.0208) | (0.0224) |
| Ind/Occ Variable | | 0.139*** | 0.0916*** | -0.0478* | -0.184*** | |
| | | (0.0126) | (0.0111) | (0.0259) | (0.0271) | |
| Bofacl40 · Ind/Occ | | -0.00407 | 0.0175 | 0.0158 | 0.0548 | |
| | | (0.0127) | (0.0109) | (0.0364) | (0.0345) | |
| R-sq | 0.22 | 0.21 | 0.21 | 0.21 | 0.22 | 0.22 |
| N | 112456 | 228139 | 228139 | 228139 | 228139 | 207364 |

Standard errors clustered at 1940 county level. Other explanatory variables in these regressions are 1(white), a quadratic in age, dummies for having an eighth grade education, 1930 marital and rural status, 1930 city of residence population, and fixed effects for 1940 county and 1930 industry and occupation groups. Only men over the age of 16 in 1930 living in California in 1940 included. Bofacl40 is 1 if in BofA location in 1940. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Similarly, the degree of industrial concentration may have magnified the effects of Bank of America's presence. If the availability of credit in a given city made it easier for firms to operate during the financial crisis, then agglomeration effects in particularly concentrated industries should have created a wage premium for workers in that industry. Using a difference-in-difference specification like Equation 9 with a dummy for workers operating in a city's largest industry by employment in 1930, I find no evidence of a wage premium for workers in a high-employment share industry in a Bank of America-branched city. Table 10 presents wage results for industrial and occupational concentration difference-in-difference estimation. Additionally, if agglomeration drew workers into nontradable production, then the effects of credit should be limited to nontradable-oriented cities. However, Bank of America-branched cities with below-median retail and service employment in 1930 also saw increases in nontradable employment relative to cities without branches, as displayed in Appendix Table 19. Credit availability could not have operated through the agglomeration channel to create these differences in economic activity and labor markets.

Firms without access to credit may have reduced capital and innovation expenditures, as suggested in Huber [2018]. Under this hypothesis, lower levels of economic activity persist because firms facing lending instability cannot replace depreciating capital or invest in more productive technologies. However, I find no differences in the employment of craftsmen and operatives, who were the capital-complementary manufacturing workers of the time, as seen in Table 9.[31] The size of the manufacturing sector, as well as the composition of manufacturing-relevant skilled and unskilled occupations, did not change as a result of Bank of America proximity, suggesting that this channel was not at work in the California context.

Instead, areas with more stable credit during the early 1930's had larger nontradable sectors. Bernanke [1983] cites contractions in local demand as particularly dangerous symptoms of financial distress. The results presented above are consistent with local demand responses to loan supply driving the pace and strength of the recovery from a financial crisis as well. Cities with access to Bank of America from 1929 to 1933 had smaller contractions in economic activity, suggesting local demand remained relatively strong. Global declines in demand for tradables limited the extent to which agriculture could compete with nontradable labor demand in the worst of the Depression. As a result, employment shifted towards retail and services in Bank of America-branched cities. As the larger economy recovered, demand for tradable labor production increased in credit-rich and credit-scarce locations,

[31] At the heart of this difference is the nature of California manufacturing at the time. During the 1930's, California manufacturing was either agriculture-complementary (e.g. canning materials for peach processing) for shipping outside of the state or derived from the state's isolation from the nation's manufacturing centers. For example, the state made a lot of tires because it was far enough from Detroit to make anything less valuable than the car itself worthwhile to produce in the state. Therefore, unlike modern-day Germany, California manufacturing was either tied to commodity demand or state-level demand.

leading to recovery in the latter half of the 1930's regardless of lending stability. Local demand, and therefore nontradable production remained high in Bank of America-branched places, leading to persistent differences in the level of local economic activity.

Credit's effect on local demand during the financial crisis is also consistent with the labor market results above. Nontradable labor demand would have increased competition for labor in credit-rich areas, driving up wages, as in Table 7. The sectoral shift out of farming and into managerial and sales positions also reallocated labor towards higher-status jobs like bookkeeping and shop-keeping, which are particularly concentrated in the service and retail sectors. By 1940, economic activity across California had recovered to 1929 levels, confirming the equal levels of employment and labor force participation in 1940. Together, the city and individual-level results indicate that credit during the early 1930's softened the blow of the financial crisis, and through the local demand channel, led to a strong recovery.

# 6 Conclusion

According to A.P. Giannini, loans were intended to "aid all the functions of business" [Dana, 1947]. His bank, the Bank of America, continued to make those loans during the Great Depression even when other banks balked. As a result, towns all over California had access to credit during the banking crisis of the early 1930's. These cities, despite their similarity to those without access to Bank of America during the 1920's, contracted by eight percent less from 1929 to 1933 and grew by 20 percent more in the rest of the decade compared to their counterparts. Areas with Bank of America branches grew by twenty percent during the Great Depression while those without branches did not grow at all. The spillovers from the lending channel to the real economy persisted even after California returned to its pre-crisis levels of per capita personal income, which warrants an investigation into how financial frictions translated into lasting local economic differences. Using individual-level longitudinal data, I confirm that cities in with Bank of America branches had significantly higher wages but similar levels of unemployment relative to their non-branched counterparts. In response to credit availability, workers overwhelmingly left agriculture for nontradable employment. Together, these results indicate that credit has large effects on both the size of the economic contraction and the strength of the recovery during a financial crisis through the local demand channel. Even without bank failures, specifically, lending has large effects on the economy.

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# 7 Tables

Table 11: Economic Growth, 1923 to 1940

| | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BofA, 1929 | 0.029 | 0.044 | 0.054 | 0.077* | 0.083** | 0.131* | 0.114* | 0.094 | 0.044 | -0.036 | -0.065 | 0.200*** | 0.193*** | 0.225*** | 0.244*** | 0.232*** | 0.298*** |
| | (0.020) | (0.027) | (0.033) | (0.041) | (0.041) | (0.073) | (0.067) | (0.059) | (0.051) | (0.047) | (0.052) | (0.062) | (0.059) | (0.059) | (0.061) | (0.068) | (0.065) |
| No BofA, 1929 | 0.034 | 0.043 | 0.032 | 0.044 | 0.049 | 0.076* | 0.061 | 0.027 | -0.051 | -0.169*** | -0.169*** | -0.015 | -0.022 | -0.028 | -0.007 | -0.065 | 0.047 |
| | (0.023) | (0.030) | (0.025) | (0.027) | (0.030) | (0.042) | (0.038) | (0.033) | (0.034) | (0.039) | (0.044) | (0.088) | (0.102) | (0.094) | (0.093) | (0.099) | (0.092) |
| BofA-No BofA | -0.005 | 0.001 | 0.022 | 0.033 | 0.034 | 0.054 | 0.053 | 0.067 | 0.095 | 0.133 | 0.104 | 0.215 | 0.215 | 0.253 | 0.251 | 0.297 | 0.252 |
| F-test | 0.144 | 0.004 | 1.085 | 1.657 | 1.480 | 1.387 | 1.445 | 2.339 | 4.092 | 6.580 | 3.729 | 4.888 | 3.626 | 5.864 | 5.993 | 7.316 | 6.742 |
| p-value | (0.706) | (0.950) | (0.303) | (0.204) | (0.229) | (0.245) | (0.235) | (0.132) | (0.048) | (0.013) | (0.059) | (0.032) | (0.063) | (0.019) | (0.018) | (0.009) | (0.012) |
| N | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 |

Standard errors clustered at county level. F-test and p-value refer to an F-test of equality of BofA and No BofA coefficients at each horizon.

* p<0.1, ** p<0.05, *** p<0.01

Table 12: Economic Growth Using Propensity Score Matching, 1929 to 1940

| | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ATE | | | | | | | | | | | |
| BofA - No BofA, 1929 | 0.023 | 0.020 | 0.055 | 0.093* | 0.058 | 0.169 | 0.172 | 0.206* | 0.216** | 0.232*** | 0.214** |
| | (0.019) | (0.027) | (0.047) | (0.055) | (0.062) | (0.124) | (0.111) | (0.106) | (0.098) | (0.088) | (0.106) |
| N | 244 | 244 | 244 | 244 | 244 | 244 | 244 | 244 | 244 | 244 | 244 |

Abadie-Imben standard errors in parentheses. Bank treatment based on 1929 branch locations.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Economic Growth, 1923 to 1940 Using Year Branch Opened

| | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BofA in given year | -0.012 | -0.011 | 0.016 | 0.076 | 0.088** | 0.116 | 0.103 | 0.081 | 0.035 | -0.040 | -0.067 | 0.213*** | 0.195*** | 0.191*** | 0.203*** | 0.150* | 0.249*** |
| | (0.012) | (0.017) | (0.029) | (0.046) | (0.042) | (0.072) | (0.067) | (0.057) | (0.052) | (0.047) | (0.051) | (0.061) | (0.057) | (0.064) | (0.066) | (0.085) | (0.074) |
| No BofA in given year | 0.035 | 0.049 | 0.045 | 0.057* | 0.052 | 0.090* | 0.072* | 0.038 | -0.043 | -0.165*** | -0.170*** | -0.043 | -0.044 | -0.051 | -0.026 | -0.039 | 0.039 |
| | (0.022) | (0.029) | (0.027) | (0.030) | (0.031) | (0.046) | (0.040) | (0.037) | (0.034) | (0.038) | (0.043) | (0.085) | (0.102) | (0.095) | (0.098) | (0.097) | (0.091) |
| BofA-No BofA | -0.046 | -0.060 | -0.030 | 0.020 | 0.036 | 0.027 | 0.031 | 0.043 | 0.078 | 0.124 | 0.103 | 0.256 | 0.239 | 0.241 | 0.229 | 0.189 | 0.210 |
| F-test | 4.111 | 3.312 | 2.434 | 0.350 | 1.540 | 0.288 | 0.492 | 0.873 | 2.809 | 6.021 | 4.140 | 7.844 | 5.008 | 6.497 | 5.863 | 2.631 | 5.646 |
| p-value | (0.048) | (0.075) | (0.125) | (0.557) | (0.220) | (0.594) | (0.486) | (0.355) | (0.100) | (0.018) | (0.047) | (0.007) | (0.030) | (0.014) | (0.019) | (0.111) | (0.021) |
| N | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 |

Standard errors clustered at county level. F-test and p-value refer to an F-test of equality of BofA and NoBofA coefficients at each horizon.
* p¡0.1, ** p¡0.05, *** p¡0.01

## Table 14: Economic growth 1923-1940 based on Bank of America branch opening timing

| | 1924 / | 1925 / | 1926 / | 1927 / | 1928 / | 1929 / | 1930 / | 1931 / | 1932 / | 1933 / | 1934 / | 1935 / | 1936 / | 1937 / | 1938 / | 1939 / | 1940 / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BofA, 1929 | 0.035 | 0.050* | 0.060* | 0.083* | 0.089* | 0.136* | 0.117* | 0.099 | 0.046 | -0.036 | -0.061 | 0.205*** | 0.196*** | 0.226*** | 0.244*** | 0.220*** | 0.300*** |
| | (0.024) | (0.029) | (0.036) | (0.044) | (0.045) | (0.073) | (0.067) | (0.060) | (0.051) | (0.046) | (0.051) | (0.062) | (0.061) | (0.060) | (0.061) | (0.069) | (0.065) |
| ifbofa_post29 | 0.070** | 0.110** | 0.109** | 0.123** | 0.107** | 0.132*** | 0.113*** | 0.093** | 0.009 | -0.086* | -0.088 | 0.138 | 0.035 | 0.056 | 0.070 | -0.096 | 0.112 |
| | (0.034) | (0.054) | (0.045) | (0.052) | (0.045) | (0.049) | (0.041) | (0.036) | (0.042) | (0.047) | (0.060) | (0.100) | (0.117) | (0.113) | (0.110) | (0.185) | (0.119) |
| Pre 1929 - Post 1929 | -0.035 | -0.060 | -0.049 | -0.039 | -0.017 | 0.004 | 0.004 | 0.007 | 0.037 | 0.050 | 0.027 | 0.068 | 0.161 | 0.169 | 0.174 | 0.316 | 0.188 |
| F-test | 4.465 | 2.745 | 2.889 | 1.220 | 0.204 | 0.005 | 0.006 | 0.017 | 0.397 | 0.624 | 0.137 | 0.425 | 1.792 | 2.083 | 2.295 | 3.178 | 2.445 |
| p-value | (0.040) | (0.104) | (0.096) | (0.275) | (0.654) | (0.945) | (0.938) | (0.898) | (0.531) | (0.433) | (0.713) | (0.518) | (0.187) | (0.155) | (0.136) | (0.081) | (0.124) |
| N | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 |

Standard errors clustered at county level. F-test and p-value refer to an F-test of equality of pre-1929 and post-1929 coefficients at each horizon.
* p<0.1, ** p<0.05, *** p<0.01

## Table 15: Economic Growth Based on BofA Deposit Market Share, 1929 to 1940

| | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BofA Market Share | -0.001 | 0.001 | 0.025 | 0.044 | 0.027 | 0.096 | 0.115* | 0.120* | 0.117* | 0.150** | 0.109* |
| | (0.008) | (0.012) | (0.026) | (0.035) | (0.040) | (0.059) | (0.062) | (0.061) | (0.060) | (0.061) | (0.059) |
| N | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 |

Standard errors clustered at county level. Market share is standardized.
* p<0.1, ** p<0.05, *** p<0.01

Table 16: 1940 wages based on 1930 occupation structure

| | Prof/Mgr. | Farming | Nonfarm Lab. | Sales/Cler. | Craft/Op. | Service |
|---|---|---|---|---|---|---|
| *A: Above 1930 Median Employment Share* | | | | | | |
| bofacl40 | 0.125*** | 0.132*** | 0.138*** | 0.103*** | 0.145*** | 0.106*** |
| | (0.0377) | (0.0246) | (0.0275) | (0.0247) | (0.0309) | (0.0380) |
| R-sq | 0.20 | 0.20 | 0.20 | 0.17 | 0.18 | 0.19 |
| N | 126233 | 154203 | 121240 | 103127 | 135614 | 89861 |
| *B: Below 1930 Median Employment Share* | | | | | | |
| bofacl40 | 0.0320 | 0.125*** | 0.146*** | 0.0624*** | 0.0756** | 0.117*** |
| | (0.0293) | (0.0273) | (0.0366) | (0.0214) | (0.0310) | (0.0208) |
| R-sq | 0.19 | 0.18 | 0.23 | 0.19 | 0.22 | 0.21 |
| N | 101906 | 73933 | 106897 | 125012 | 92525 | 138278 |

Standard errors clustered at 1940 county level. Other explanatory variables in these regressions are 1(white), a quadratic in age, dummies for having an eighth grade education, 1930 marital and rural status, 1930 city of residence population, and fixed effects for 1940 county and 1930 industry and occupation groups. Only men over the age of 16 in 1930 living in California in 1940 included. Bofacl40 is 1 if in BofA location in 1940. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$

Table 17: 1940 wages based on 1930 industry structure

| | Ag/Mining | Mfg/Cons. | Trans + Util | Retail/Wholesale | Gov. | Services |
|---|---|---|---|---|---|---|
| *A: Above 1930 Median Employment Share* | | | | | | |
| bofacl40 | 0.140*** | 0.132*** | 0.138*** | 0.102*** | 0.109*** | 0.120*** |
| | (0.0213) | (0.0276) | (0.0294) | (0.0180) | (0.0301) | (0.0243) |
| R-sq | 0.21 | 0.20 | 0.20 | 0.20 | 0.19 | 0.20 |
| N | 191670 | 157645 | 165023 | 126255 | 95463 | 167807 |
| *B: Below 1930 Median Employment Share* | | | | | | |
| bofacl40 | 0.100* | 0.104*** | 0.118*** | 0.0946*** | 0.120*** | 0.0248 |
| | (0.0558) | (0.0292) | (0.0382) | (0.0307) | (0.0255) | (0.0410) |
| R-sq | 0.22 | 0.21 | 0.22 | 0.20 | 0.21 | 0.18 |
| N | 36466 | 70493 | 63115 | 101884 | 121027 | 60332 |

Standard errors clustered at 1940 county level. Other explanatory variables in these regressions are 1(white), a quadratic in age, dummies for having an eighth grade education, 1930 marital and rural status, 1930 city of residence population, and fixed effects for 1940 county and 1930 industry and occupation groups. Only men over the age of 16 in 1930 living in California in 1940 included. Bofacl40 is 1 if in BofA location in 1940. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$

Table 18: 1940 employment based on 1930 occupation structure

| | Prof/Mgr. | Farming | Nonfarm Lab. | Sales/Cler. | Craft/Op. | Service |
|---|---|---|---|---|---|---|
| *A: Above 1930 Median Employment Share* | | | | | | |
| bofacl40 | 0.0317*** | -0.133*** | -0.00353 | 0.0176*** | 0.0135 | 0.00642*** |
| | (0.00566) | (0.0267) | (0.00530) | (0.00579) | (0.0108) | (0.00221) |
| R-sq | 0.16 | 0.23 | 0.06 | 0.11 | 0.15 | 0.06 |
| N | 197636 | 253321 | 188391 | 156324 | 200264 | 143326 |
| *B: Below 1930 Median Employment Share* | | | | | | |
| bofacl40 | 0.0141** | -0.0307 | -0.000806 | 0.0192*** | -0.00384 | 0.00998*** |
| | (0.00600) | (0.0191) | (0.00622) | (0.00262) | (0.0154) | (0.00274) |
| R-sq | 0.09 | 0.27 | 0.03 | 0.08 | 0.12 | 0.04 |
| N | 166705 | 111017 | 175948 | 208017 | 164077 | 221015 |

Standard errors clustered at 1940 county level. Other explanatory variables in these regressions are 1(white), a quadratic in age, dummies for having an eighth grade education, 1930 marital and rural status, 1930 city of residence population, and fixed effects for 1940 county and 1930 industry and occupation groups. Only men over the age of 16 in 1930 living in California in 1940 included. Bofacl40 is 1 if in BofA location in 1940. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 19: 1940 employment based on 1930 industry structure

| | Ag/Mining | Mfg/Cons. | Trans + Util | Retail/Wholesale | Gov. | Services |
|---|---|---|---|---|---|---|
| *A: Above 1930 Median Employment Share* | | | | | | |
| bofacl40 | -0.112*** | -0.0116 | 0.00343 | 0.0222*** | 0.0102* | 0.0225*** |
| | (0.0307) | (0.00790) | (0.00596) | (0.00694) | (0.00573) | (0.00448) |
| R-sq | 0.22 | 0.10 | 0.08 | 0.10 | 0.10 | 0.09 |
| N | 307880 | 240859 | 253970 | 192406 | 146266 | 261896 |
| *B: Below 1930 Median Employment Share* | | | | | | |
| bofacl40 | -0.0120 | 0.00154 | 0.00637* | 0.0204*** | -0.00150 | 0.00796* |
| | (0.0186) | (0.00848) | (0.00376) | (0.00576) | (0.00483) | (0.00448) |
| R-sq | 0.31 | 0.07 | 0.04 | 0.07 | 0.05 | 0.06 |
| N | 56458 | 123481 | 110370 | 171935 | 198624 | 102445 |

Standard errors clustered at 1940 county level. Other explanatory variables in these regressions are 1(white), a quadratic in age, dummies for having an eighth grade education, 1930 marital and rural status, 1930 city of residence population, and fixed effects for 1940 county and 1930 industry and occupation groups. Only men over the age of 16 in 1930 living in California in 1940 included. Bofacl40 is 1 if in BofA location in 1940. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

# 8 Property Values

## 8.1 Background

Starting in 1910, California split tax bases for state and local governments.[32] The state assessed and taxed public utilities, personal property of banks and insurance companies, corporation franchise value, and large vessels. County governments assessed and taxed everything else held by households and firms, including land, improvements, money and other personal tangible property, and intangible assets like stocks and bonds. Each county hired between 500 and 1,800 employees every year to visit each property at least once between March and July (California Board of Equalization [various years], 1929 p123). Assessed property value included personal ownership of stocks and bonds as well as all land and structures owned by households and businesses, aside from utilities and railroads.

Each year, the county appraiser's office was responsible for revising its assessments of each parcel of land within the county. Every property in the county was visited each year in order to fix its value for taxation by the county as of the first Monday in March (California Board of Equalization [various years], 1922 p76). Using zoning restrictions, property use, neighborhood meetings, lease and mortgage contracts, sales and rental prices, economic geography concepts like access to commerce and transportation, lot size and shape, topography, and visits to each parcel, the appraisal office would ascertain the value of each parcel. Preliminary values were often modifications of sales prices of similar properties in that year based on these characteristics. The county appraiser would go over each parcel himself before finalizing the assessment for each parcel in each year (appraisal handbook p149).[33].

## 8.2 Assessment Quality

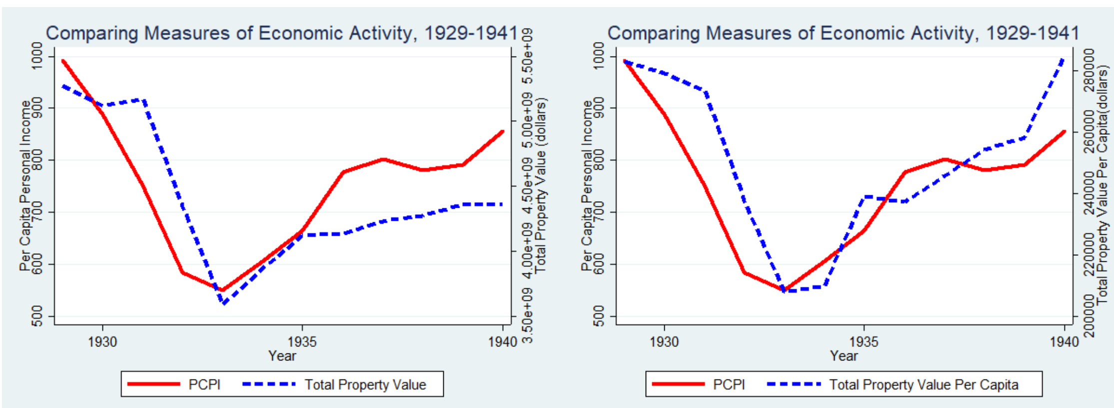
Due to political wrangling over the quality of county assessments in the early 1920's, the California Board of Equalization supervised county assessors closely. The state sent its own assessors to a different sample of properties in each county every year, starting in 1922 (California Board of Equalization [various years], 1930 p15). Starting in 1924 the state started equalizing values between and within counties. The state would compare the assessed value of selected properties all over the state, in incorporated and unincorporated areas, to state employee appraisals, probate values, and sales prices in every biennial report, and publish equalization values for each city, county, and year. In the 1920's and 1930's, the average ratio of assessed to market value hovered between 40 and 50 percent. In addition, these property valuations formed the basis for county expenses, including all school funding until 1934 (California Board of Equalization [various years], 1930 p8). County assessment offices were therefore under substantial local and state pressure to measure property values fairly and precisely.

The high premium placed on assessment accuracy makes it a good measure of local

[32] This split occurred because county assessors struggled to assign the value of railroads to individual localities.

[33] In the 1921-1922 Board of Equalization report, it states that a deputy assessor listed and valued each property in his district of the county but was still subject to the chief assessor's approval. (California Board of Equalization [various years], 1922 p75)

economic activity. More specifically, assessor's handbooks mention that business income should be part of the property's assessed value (appraisal handbook p15). In the case of residential parcels, market value was the focus. To check whether these assessments add up to a coherent measure of economic activity, I compare the annual total incorporated property value in California each yearto the state per capita personal income for each year from 1929 to 1940.[34] plots both series. The correlation between total property value and per capita personal income is 0.74. These series appear to move together fairly well during the 1930's. Per capita property value moves even more closely with per capita personal income. These series, plotted in 13b, have a correlation of 0.86. Together, these pieces of evidence suggest that property value is a natural analogue in this period to personal income per capita, but is instead available at the city level.




(a) Total Property Value (b) Property Value Per Capita

Figure 13: Total California Economic Activity Variables Compared to Per Capita Personal Icnome
Source: Banking reports, BEA, California Board of Equalization [various years], and author's calculations.

## 8.3 Annual Series Construction

Two city-level annual series constitute the components for my measure of local economic activity: population and total property value. In order to control for changes in city borders, I use total property value per capita in my preferred specifications. Unreported regressions demonstrate that property value, not population, drives these results. There are roughly 250 incorporated cities included in my dataset in every year. I exclude the largest cities in California due to identification concerns.

City-level annual population data come from California Board of Equalization reports digitized by Bleemer [2016]. Decennial values are from the census, and in other years, the state wrote letters to county assessment boards to solicit estimates. In order to correct for city population estimate error, Bleemer [2016] fits a high-order polynomial to the data he

[34] Per capita personal income is the only state-level income measure available in this period. It is available from 1929 to 1940. Property values were not consulted in the construction of personal income figures, according to Bureau of Economic Analysis documentation [Schwartz and Graham, 1956]. Figure 13a

collected, weighting census years more heavily. Total property value includes all structures and landholdings by households and nonfinancial, non-utility companies in incorporated cities until 1934. Then I use total property value, which can include stock and bond holdings, due to a change in what was reported, and continue to exclude property helpd by utilities and banks. To ensure continuity, I constructed a ratio in 1933 and 1934 of real estate to total property value for each city and multiply all pre-1933 years by this ratio.[35] Given more time, I could also input the total property value for each city in years prior to 1933. Finally, I define local economic activity in a town for a given year as the total property value divided by the population of that city.

## 8.4 City Balancing Tables

For the identification strategy used in this paper to be valid, cities' characteristics cannot vary based on Bank of America's branch locations. Table 3 demonstrates that in 1922 demographic, financial, and economic variables fail to predict whether or not Bank of America would open a branch in a given location. The following tables present balancing tests for a variety of 1920 and 1930 traits based on Bank of America's branching network in 1929. For example, Table 22 uses t- tests to compare the similarity of demographics in 1930 between the treated and control samples. Each row of each table represents the mean of a given variable in the full-count population census for that year. All standard errors are clustered at the county level. In particular, the 1920 balancing tables indicate that there was minimal selection of cities into the Bank of America branch network during the 1920's based on 1920 observables, confirming that treatment assignment was quasi-random. The 1930 balancing tables demonstrate that even after the spread of Bank of America, at the start of the Great Depression, treatment is uncorrelated with economic and demographic characteristics. Altogether, these balancing tables complement the evidence presented in the main body of the paper.

Due to the paucity of annual city-level variables in this time period, balancing tests across 1920 Census variables are the closest possible analog to traditional pre-trends analysis for a wide range of observables. To measure the effect of Bank of America branch status on economic growth, there cannot be a latent variable connected to later economic growth which drove Bank of America to open a branch in a given town. This theoretical latent variable would have to be uncorrelated with any observable variable which is balanced across treatment status. The more observable characteristics for which means are balanced, the less likely that this confounder exists. Thus, a balanced panel of 1920 characteristics confirms the assumption that Bank of America branch assignment was as good as random. Although almost all of the t-tests in Table 20 are statistically significant at the one percent level, most are not economically significant. As in the regression results, cities which have a Bank of America branch by 1929 are more populous than their non-branched counterparts. The population is larger, but four percentage point fewer workers are self-employed. Those who do work appear to be in marginally higher-status professions, as indicated by occscore. Results in Table 21 indicate this divergence is largely due to a smaller share of the labor force

[35] In effect, this fixes the ratio of real estate to total property value, which includes stocks nad bonds, at a two-year average for each city.

working as farmers or laborers.[36] Instead of working in laborer or agricultural occupations, workers in cities with Bank of America branches in 1929 worked in other fields. Overall, these tables indicate that very few characteristics differ in 1920 based on 1929 treatment status, providing additional support for the selection assumption maintained in the paper.

Identification also requires that until 1929, Bank of America towns were indistinguishable from non-branched towns. If the presence of a bank branch affected the city before the onset of the financial crisis, then the effects of Bank of America's presence during the Great Depression are a mixture of pre-1929 financial development and loan supply post-1929. Another concern would be that something else occurred during the 1920's which affected growth in the 1930's. Other evidence in this paper suggests that 1920's property values evolved similarly regardless of branch status. In this section, I present additional evidence of balance in observable characteristics. Therefore, any violation of the identification assumption based on selection on unobservables would require the unobservable variable which drives economic growth in the 1930's be uncorrelated with the observables in these tables. In 1930, cities with Bank of America branches are still larger, but are otherwise similar to other cities in California, as demonstrated in Table 22. As in the case of property values for the entire city, t-tests cannot reject that average home prices and rents are the same in treated and control places. Occscores are again marginally larger in cities with Bank of America branches, though by 1930, few workers name farming as their main occupation. In fact, in 1930, differences in the occupational distribution are still statistically significant but smaller than in 1920. Because population may reflect the size of aggregate demand, I also present results on the industrial structure of California cities based on employment shares in Table 24. At the onset of the Great Depression, the size of the agricultural sector varied based on Bank of America branch status, but even for the average Bank of America-branched town, at least ten percent of employment was in the agricultural sector. Other sectors were similarly sized regardless of the financial environment, indicating the validity of the identification strategy.

[36]Due to the wage compression of the 1940's and 1950's, farmer occscores are not a consistent reflection of social status over time. For a discussion of these problems, see Olivetti and Paserman [2015].

Table 20: 1920 Demographics Balancing Table

| Variable | (1) BofA, 1929 N/[Clusters] | (1) BofA, 1929 Mean/SE | (2) No BofA, 1929 N/[Clusters] | (2) No BofA, 1929 Mean/SE | (3) All Cities N/[Clusters] | (3) All Cities Mean/SE | T-test Difference (1)-(2) |
|---|---|---|---|---|---|---|---|
| White | 134 | 0.973 | 235 | 0.947 | 369 | 0.956 | 0.026*** |
| | [44] | (0.002) | [51] | (0.006) | [56] | (0.004) | |
| Employed | 134 | 0.310 | 235 | 0.330 | 369 | 0.323 | -0.020** |
| | [44] | (0.006) | [51] | (0.009) | [56] | (0.007) | |
| Occscore | 134 | 7.476 | 235 | 6.411 | 369 | 6.798 | 1.064*** |
| | [44] | (0.197) | [51] | (0.177) | [56] | (0.156) | |
| Pct Female | 134 | 1.480 | 235 | 1.434 | 369 | 1.450 | 0.047*** |
| | [44] | (0.004) | [51] | (0.006) | [56] | (0.004) | |
| Pct 16 yo in School | 134 | 0.010 | 235 | 0.009 | 369 | 0.010 | 0.001 |
| | [44] | (0.000) | [51] | (0.000) | [56] | (0.000) | |
| Population | 134 | 3388.142 | 235 | 1759.783 | 369 | 2351.111 | 1628.359*** |
| | [44] | (219.083) | [51] | (164.109) | [56] | (138.129) | |
| Self-employed | 134 | 0.072 | 235 | 0.113 | 369 | 0.098 | -0.041*** |
| | [44] | (0.002) | [51] | (0.006) | [56] | (0.005) | |
| In Labor Force | 134 | 0.400 | 235 | 0.404 | 369 | 0.403 | -0.005 |
| | [44] | (0.006) | [51] | (0.009) | [56] | (0.006) | |
| Literate | 134 | 0.789 | 235 | 0.766 | 369 | 0.774 | 0.023*** |
| | [44] | (0.005) | [51] | (0.005) | [56] | (0.005) | |

*Notes*: Sample includes all towns with populations above 400 in this census except those mentioned in the body of the paper. The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at variable countycode. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 21: 1920 Occupation Employment Balancing Table

| | (1) BofA, 1929 | | (2) No BofA, 1929 | | (3) All Cities | | T-test Difference |
|---|---|---|---|---|---|---|---|
| Variable | N/[Clusters] | Mean/SE | N/[Clusters] | Mean/SE | N/[Clusters] | Mean/SE | (1)-(2) |
| Craftsmen/Apprentices | 134 | 0.185 | 230 | 0.114 | 364 | 0.140 | 0.071*** |
| | [44] | (0.007) | [51] | (0.008) | [56] | (0.007) | |
| Farmer | 134 | 0.070 | 230 | 0.262 | 364 | 0.192 | -0.192*** |
| | [44] | (0.008) | [51] | (0.020) | [56] | (0.016) | |
| Laborer | 134 | 0.230 | 230 | 0.315 | 364 | 0.284 | -0.084*** |
| | [44] | (0.011) | [51] | (0.014) | [56] | (0.011) | |
| Professionals | 134 | 0.188 | 230 | 0.102 | 364 | 0.133 | 0.087*** |
| | [44] | (0.005) | [51] | (0.006) | [56] | (0.006) | |
| Sales | 134 | 0.137 | 230 | 0.060 | 364 | 0.088 | 0.077*** |
| | [44] | (0.005) | [51] | (0.004) | [56] | (0.004) | |
| Semi-skilled | 134 | 0.189 | 230 | 0.147 | 364 | 0.163 | 0.042*** |
| | [44] | (0.007) | [51] | (0.014) | [56] | (0.010) | |
| Occ HHI, 1920 | 134 | 0.219 | 235 | 0.308 | 369 | 0.275 | -0.089*** |
| | [44] | (0.005) | [51] | (0.011) | [56] | (0.008) | |

*Notes*: Sample includes all towns with populations above 400 in this census except those mentioned in the body of the paper. The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at variable countycode. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 22: 1930 Demographics Balancing Table

| | (1) BofA, 1929 | | (2) No BofA, 1929 | | (3) All Cities | | T-test Difference |
|---|---|---|---|---|---|---|---|
| Variable | N/[Clusters] | Mean/SE | N/[Clusters] | Mean/SE | N/[Clusters] | Mean/SE | (1)-(2) |
| White | 157 | 0.904 | 256 | 0.861 | 413 | 0.877 | 0.043*** |
| | [49] | (0.011) | [50] | (0.015) | [54] | (0.013) | |
| Employed | 157 | 0.378 | 256 | 0.373 | 413 | 0.375 | 0.005 |
| | [49] | (0.005) | [50] | (0.008) | [54] | (0.006) | |
| Occscore | 157 | 9.264 | 256 | 8.332 | 413 | 8.686 | 0.933*** |
| | [49] | (0.147) | [50] | (0.166) | [54] | (0.133) | |
| Pct Female | 157 | 1.479 | 256 | 1.459 | 413 | 1.467 | 0.021*** |
| | [49] | (0.003) | [50] | (0.005) | [54] | (0.004) | |
| Pct 16 yo in School | 157 | 0.013 | 256 | 0.013 | 413 | 0.013 | 0.000 |
| | [49] | (0.000) | [50] | (0.000) | [54] | (0.000) | |
| Population | 157 | 5207.261 | 256 | 1779.988 | 413 | 3082.850 | 3427.273*** |
| | [49] | (642.049) | [50] | (385.622) | [54] | (447.419) | |
| Self-employed | 157 | 0.062 | 256 | 0.066 | 413 | 0.065 | -0.004 |
| | [49] | (0.002) | [50] | (0.003) | [54] | (0.003) | |
| Unemployed | 157 | 0.040 | 256 | 0.040 | 413 | 0.040 | 0.000 |
| | [49] | (0.002) | [50] | (0.004) | [54] | (0.003) | |
| Home Value | 156 | 4918.342 | 245 | 4467.936 | 401 | 4643.156 | 450.407 |
| | [48] | (413.189) | [50] | (497.703) | [54] | (418.312) | |
| Percent Own Homes | 157 | 0.501 | 256 | 0.494 | 413 | 0.497 | 0.007 |
| | [49] | (0.011) | [50] | (0.016) | [54] | (0.011) | |
| Rent | 157 | 36.251 | 252 | 34.751 | 409 | 35.327 | 1.500 |
| | [49] | (2.756) | [49] | (4.534) | [54] | (3.568) | |

*Notes*: Sample includes all towns with populations above 400 in this census except those mentioned in the body of the paper. The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at variable countycode. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 23: 1930 Occupation Employment Balancing Table

| | (1) BofA, 1929 | | (2) No BofA, 1929 | | (3) All Cities | | T-test Difference |
|---|---|---|---|---|---|---|---|
| Variable | N/[Clusters] | Mean/SE | N/[Clusters] | Mean/SE | N/[Clusters] | Mean/SE | (1)-(2) |
| Craftsmen/Apprentices | 157 | 0.124 | 256 | 0.113 | 413 | 0.117 | 0.010* |
| | [49] | (0.004) | [50] | (0.004) | [54] | (0.003) | |
| Farmer | 157 | 0.032 | 256 | 0.074 | 413 | 0.058 | -0.042*** |
| | [49] | (0.004) | [50] | (0.007) | [54] | (0.004) | |
| Laborer | 157 | 0.175 | 256 | 0.233 | 413 | 0.211 | -0.058*** |
| | [49] | (0.010) | [50] | (0.013) | [54] | (0.010) | |
| Professionals | 157 | 0.191 | 256 | 0.153 | 413 | 0.167 | 0.038*** |
| | [49] | (0.004) | [50] | (0.005) | [54] | (0.004) | |
| Sales | 157 | 0.139 | 256 | 0.097 | 413 | 0.113 | 0.042*** |
| | [49] | (0.005) | [50] | (0.006) | [54] | (0.005) | |
| Semi-skilled | 157 | 0.182 | 256 | 0.175 | 413 | 0.178 | 0.007 |
| | [49] | (0.005) | [50] | (0.009) | [54] | (0.007) | |
| Occ HHI, 1930 | 157 | 0.157 | 256 | 0.191 | 413 | 0.178 | -0.034*** |
| | [49] | (0.003) | [50] | (0.007) | [54] | (0.005) | |

*Notes*: Sample includes all towns with populations above 400 in this census except those mentioned in the body of the paper. The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at variable countycode. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 24: 1930 Industry Employment Balancing Table

| Variable | (1) BofA, 1929 N/[Clusters] | Mean/SE | (2) No BofA, 1929 N/[Clusters] | Mean/SE | (3) All Cities N/[Clusters] | Mean/SE | T-test Difference (1)-(2) |
|---|---|---|---|---|---|---|---|
| Agriculture | 157 | 0.110 | 256 | 0.197 | 413 | 0.164 | -0.086*** |
| | [49] | (0.012) | [50] | (0.015) | [54] | (0.011) | |
| Construction | 157 | 0.059 | 256 | 0.052 | 413 | 0.055 | 0.007** |
| | [49] | (0.002) | [50] | (0.003) | [54] | (0.002) | |
| Manufacturing | 157 | 0.091 | 256 | 0.093 | 413 | 0.092 | -0.002 |
| | [49] | (0.010) | [50] | (0.013) | [54] | (0.010) | |
| Trans and Util | 157 | 0.066 | 256 | 0.067 | 413 | 0.066 | -0.001 |
| | [49] | (0.005) | [50] | (0.006) | [54] | (0.005) | |
| Trade | 157 | 0.151 | 256 | 0.111 | 413 | 0.126 | 0.040*** |
| | [49] | (0.005) | [50] | (0.004) | [54] | (0.003) | |
| Finance | 157 | 0.030 | 256 | 0.022 | 413 | 0.025 | 0.008*** |
| | [49] | (0.002) | [50] | (0.003) | [54] | (0.002) | |
| Government | 157 | 0.019 | 256 | 0.015 | 413 | 0.017 | 0.004 |
| | [49] | (0.002) | [50] | (0.003) | [54] | (0.002) | |
| Mining | 157 | 0.020 | 256 | 0.038 | 413 | 0.031 | -0.018** |
| | [49] | (0.006) | [50] | (0.012) | [54] | (0.009) | |
| Services | 157 | 0.182 | 256 | 0.151 | 413 | 0.163 | 0.032*** |
| | [49] | (0.005) | [50] | (0.007) | [54] | (0.005) | |
| Ind HHI, 1930 | 157 | 0.082 | 256 | 0.149 | 413 | 0.123 | -0.067*** |
| | [49] | (0.006) | [50] | (0.010) | [54] | (0.008) | |

*Notes*: Sample includes all towns with populations above 400 in this census except those mentioned in the body of the paper. The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at variable countycode. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.