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ONSET OF THE GREAT DEPRESSION

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ABSTRACT

Which firms relied on commercial banks for credit and which firms did not at the onset of the Great Depression would seem to be an important question given the vast literature discussing banking distress in the United States during the 1930s. The question, however, has not been answered. This essay addresses that issue by analyzing data from an Internal Revenue Service publication, Statistics of Income. The hitherto unexplored data reveals that small firms in all industries borrowed heavily from commercial banks and relied on them for credit necessary to fund ongoing operations. The largest firms in most sectors deposited more in banks than they borrowed from them. Sectors whose firms depended most on commercial banks for credit were wholesaling, retailing, services, and the processing of agricultural products. In contrast, nearly half of economic activity in mining and construction, the majority of output in manufacturing, and the preponderance of firms in transportation operated independent of commercial banks

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1. Introduction

A century of scholarship discusses how the banking distress of the early 1930s impacted the broader economy. Friedman and Schwartz (1963) argue that banking panics reduced the money supply, deflated prices, raised real wages and interest rates, and suppressed employment, investment, and consumption. Marodin, Mitchener, and Richardson (2024) argue that deflation stemmed primarily from the decline in deposits at banks that remained in operation; Mitchener and Richardson (2019) demonstrate much of the decline came from the contraction in interbank depositing and lending. Bernanke (1983) argues that bank failures raised the cost of credit to their borrowers who had to find new lenders and often could not do so. All this scholarship leaves unanswered a key question: which firms depended upon commercial banks for funds they needed to operate?

This question remains unanswered (and typically unasked) because scholars lack data about which firms borrowed from banks and which firms did not in the 1920s and early 1930s. Almost all businesses, of course, deposited funds in and borrowed funds from commercial banks. Businesses deposited funds because they relied on commercial banks for payment services such as clearing checks, holding cash, posting payments on particular dates, and transmitting payments over long distances. Firms borrowed because they relied on commercial banks to accommodate seasonal, cyclical, and unanticipated needs for funds and to provide working capital, or in other words, banks supplied firms with the funds that they needed day in and day out to pay suppliers and employers and run their business. Since most firms simultaneously deposited at and borrowed from banks, understanding bank-firm relationships entails understanding firms' net positions. Data on the net credit position of firms relative to banks has not, however, been analyzed by scholars and is not readily available.

This essay fills that lacuna in the literature by studying the best extant source on this issue. *Statistics of Income* (SOI) published by the Internal Revenue Service (IRS) details firms' balance sheets aggregated by sector of the economy, branch of manufacturing, profitability, and size. Details vary from year to year. The most useful information appears in 1926, when SOI details firms' deposits in banks; borrowing from banks; liabilities including outstanding common stock, preferred stock, bonded debt, and accounts payable; and assets including inventory, investments, notes receivable, accounts receivable, real estate, buildings, and equipment. Balance sheet data is aggregated for ten different sizes of firms in eight sectors of the economy and ten branches of manufacturing. Data for other years are less detailed, and in particular, often do not clearly distinguish deposits in banks from other liquid assets and borrowing from banks from other short-term liabilities. Data for other years also often do not distinguish borrowing by firms of different sizes. Enough detail exists in the years 1927 to 1929 to confirm that the pattern of borrowing prevalent in 1926 changed little up to the onset of the depression.

SOI data indicates that small firms in all sectors relied on commercial banks for working capital to fund ongoing operations. Sectors whose firms depended most on commercial banks for credit were wholesaling, retailing, services, and the processing of agricultural products. Ninety-eight percent of the firms in those sectors borrowed more from banks than they had on deposit in them. The fraction of firms borrowing from banks was lowest in FIRE (finance, insurance, and real estate) and construction. The largest firms in all sectors deposited more in banks than they borrowed from them. The largest firms in all sectors, in other words, were creditors of banks not borrowers from them.

The size at which firms crossed over from debtor to creditor differed across industries. Only twelve of over 100,000 trading firms were clear net-creditors to banks. These twelve firms

were retail conglomerates like Sears Roebuck and Montgomery Ward with nationwide operations and average assets exceeding \$81 million, more than 420 times the average size of trading firms that submitted tax returns. In contrast, net creditors in other sectors of the economy consisted of firms with assets above \$2.4 million in transportation, \$1.6 million in manufacturing, \$1.1 million in construction, and \$1 million in mining. Differences in thresholds across sectors and average firm sizes indicate the share of total economic activity undertaken by firms that relied on banks for credit. The fraction of economic activity occurring in firms that did not depend upon banks for credit exceeded 80% in transportation and two-thirds in manufacturing. Overall, those sectors were creditors to banks. Firms in those sectors loaned more to banks than banks loaned to them. The construction and mining industries occupied an intermediate point. About half of the economic activity in those sectors occurred in bank-dependent firms, while half occurred in firms that were net creditors to rather than net borrowers from banks. In the remaining sectors (services, trading, and agricultural processing), the preponderance of the economic activity occurred in firms that depended upon banks for credit, in part because those sectors consisted of many small firms and because even large firms in those sectors typically borrowed working capital from banks. Our findings have relevance to many strands of literature on the financial crises of the 1920s and 1930s.

An old but seldom cited literature from the 1940s noted some of the patterns which we observe. Friedrich Lutz, for example, found that in 1929, many large manufacturers had no bank loans on their balance sheets. For large manufacturers with loans outstanding, bank loans totaled less than 2.6 percent of their combined assets, which was less than their holdings of bank liabilities, that is deposits plus notes. Lutz concluded that “during the 1920s, bank credit was of little importance for large manufacturing corporations ... [which] were largely independent of bank credit (Lutz 1945 p. 52).” Albert Koch found that for large corporations, bank loans “were

unimportant as a source of funds ... bank loans [were] small relative to their bank deposits ... [the aggregate of] large manufacturing and trade concerns as a group was the net creditor rather than the net debtor of the banking community (Koch 1943, p. 3-5).” Lauchlin Currie (1931) observed that during the 1920s, large firms substantially reduced borrowing from banks and concluded that firms that borrowed from banks did so due to inability to raise funds in other ways. “For a small company or for a large one whose earnings are receding it is virtually impossible to raise funds either through a bond or stock issue, and banks are the only practicable source of supply (Currie 1931, p. 707).” Jacoby and Saulnier noted that from 1900 to 1940, “small concerns were, relatively speaking, both more heavily and more persistently indebted to banks than were the large concerns (Jacoby and Saulnier 1947, p. 84).” These salient observations seem to have had little impact on subsequent scholarship, possibly because their observations stemmed from small samples of the largest firms. We corroborate and expand their conclusions by systematically examining balance sheets of all firms that filed tax returns in the run up to the Great Depression, providing more precise and detailed information spanning firms of all sizes in all economic sectors, and determining the net credit positions of a substantial share of firms operating in the United States at that time.

Our essay also contributes to research on the causes, nature, and consequences of the banking crises in the United States during the 1930s. One strand of this literature builds on the quasi-experimental approach of Richardson and Troost (2009). Richardson and Troost (2009) exploit the division of the state of Mississippi into the Atlanta and St. Louis Federal Reserve districts to study the impact of monetary policies on bank failures, lending and commercial activity. Ziebarth (2013) and Hansen and Ziebarth (2017) use the same quasi-experimental setting to examine the effect of bank distress on revenue and employment of manufacturing

establishments, and business exit and bankruptcy rate respectively. Our analysis identifies the channel by which bank distress affected businesses in Mississippi, as most bank customers were bank dependent firms and individuals that lacked access to equity markets and other non-bank sources of credit.

Our essay also contributes to the broader literature on the credit crises of the 1930s and in recent times. Almeida, et al. (2011) show that U.S. firms with large fractions of long-term debt maturing during the 2007 credit crisis reduced investment by approximately one third of the pre-crisis investment level. Babina, Garcia and Tate (2023) study inter-firm networks prior to the Great Depression and find that more connected firms had higher survival rates suggesting that inter-firm networks facilitated the flow of capital to small, cash -poor constrained firms. Benmelech, Frydman and Papanikolaou (2019) examine the effect of bank failures on industrial large firms' employment decisions during the Great Depression when public bond markets froze and show that bank failures had a large negative effect on employment, especially for firms with large fractions of maturing debt during the crisis. Cohen, Hachem, and Richardson (2021) develop a new measure of lending relationships and show that bank suspensions had a large effect on economic activity during the Great Depression, and that the effect was larger in more relationship intensive areas. This essay provides evidence that reconciles these varying observations, since we show that firms in different sectors, branches of industry, and regions of the nation raised funds in different ways. Some borrowed from bond markets. Others depended upon banks. Many large firms financed internally. The impact of the financial crisis varied depending upon these patterns of borrowing, particularly how much the firms in each group depended upon banks for credit.

Another related literature examines bank dependence around the world in recent decades. Bertrand, Schoar, and Thesmar (2007) find evidence that bank dependent industries became less

concentrated and relied less on bank debt after the deregulation of the French banking sector in 1985. Hoffmann, Maslov and Sørensen (2022) show that after the 2008 Eurozone crises, domestic banks decreased lending due to a reduction in cross-border interbank credit flows that led to large declines in output in sectors with large numbers of firms that depended upon domestic banks for credit. Khwaja and Mian (2008) examine bank liquidity shocks induced by nuclear tests in Pakistan in 1998 and find that declines in liquidity disproportionately affected lending to small firms. Paravisini (2008) examines shocks to financial positions of local banks induced by changes in an Argentinian government lending program and show these shocks had a large and persistent impact on firms that borrowed from them. Schnabl (2012) uses the 1998 Russian debt default as a negative liquidity shock to Peruvian Banks and finds that the liquidity shock had a negative effect on firms' access to credit, loan repayment and survival. Together, these papers highlight how shocks to banks impact firms that depend upon them for credit. Our essay contributes to this literature by demonstrating the similarity of business lending patterns in the United States in the past, when observers believed that banking shocks contributed to economic volatility, when compared to business lending around the world today, where observers believe shocks to the banking system continue to contribute to economic volatility.

Lastly, our study complements the early essays Del Angel and Richardson (2024) and Del Angel, Gou and Richardson (2024) that we have published. Del Angel and Richardson (2024) examines a Progressive Era policy experiment in which U.S. states shifted decisions regarding when and how to resolve troubled banks from judges to bureaucrats. The essay finds that after the switch, state regulators who worked for governors deferred bank resolutions during gubernatorial election campaigns. The magnitude of the gubernatorial campaign effect from 1902-1929 was on average 56 to 128 times larger than the magnitude from 1976-2012. They also find that declines in

bank resolutions led to declines in business bankruptcy rates. Del Angel, Gou and Richardson (2024) examine the causal relationship between bank failures and business bankruptcies during the Progressive Era and conclude that bank failures triggered bankruptcies of bank-dependent firms, and that bank independent firms did not fail in appreciably larger numbers after banks failed.

2. Data

Data from the IRS publication *Statistics of Income* (SOI) provides the clearest depiction of firms' balance sheets and credit positions with banks during the boom in the 1920s and contraction in the 1930s. This section describes the sources' advantages and limitations. The section also describes how data from the SOI can be cross-checked and supplemented with information from Moody's and the Bureau of the Census.

The federal government taxed income of corporations intermittently in the nineteenth century. Congress imposed an excise tax on corporate incomes in 1909. After the passage of the Sixteenth Amendment to the U.S. Constitution in 1913, this excise tax became the corporate component of the federal income tax. The tax code required corporations with positive net income or assets above a threshold to submit annual returns which included a calculation of taxes due, an income statement, and a balance sheet. In 1916, the IRS began publishing summaries of the income statements. In 1926, the IRS began publishing information from balance sheets that revealed corporate borrowing from and depositing within banks (e.g. IRS 1927 p. 105-115).

The balance-sheet data available from 1926 to 1933 is summarized in Table 1. In all of those years, SOI reported balance sheets for firms in eight economic sectors. Firms in three sectors – traders, manufacturers, and financiers – submitted more than three-fourths of all corporate tax returns. Traders include wholesalers and retailers. Traders purchased finished goods which they resold to consumers or other firms. Traders specialized in information, since they had to know the

goods that were available and the preferences of potential purchasers; prediction, since they placed orders today for goods that they would receive and sell in the future; marketing, since they had to convince consumers to purchase the products in their inventory; distribution, since they had to minimize costs of acquiring merchandise and getting it into consumers' hands; and credit, since they often sold goods to retailers and consumers today which their customers paid for in the future. Traders typically bought in bulk and resold in smaller lots. In 1926, 100,395 trading firms submitted tax returns, with 65,748 reporting positive profits. While trading firms submitted more returns than in another other industry, the number of returns is less than a tenth of the number of wholesalers and retailers reported in Moody's credit reference manual or in the Census of Business. The discrepancy arises because most trading firms, particularly retailers, were small. Total assets of most traders fell below the threshold that required submission of a corporate income tax return. Small retailers were often unincorporated and run as sole proprietorships legally indistinguishable from their owners who reported profits from trading as income on their individual rather than a corporate tax return.

Manufacturers transformed raw materials into intermediate and final goods. Manufacturers varied in size, with many small firms producing specific products for local markets or inputs for larger manufacturers and a smaller number of large firms or conglomerates producing popular products for regional and national markets. In 1926, 84,251 manufacturers submitted returns, with 51,850 reporting positive profits. Like retailers, the majority firms in this industry did not submit returns in 1920s because total assets and net profits for those firms fell below submission thresholds.

Finance, insurance, and real estate (FIRE) firms specialized in the production of financial services. Banks, realtors, and brokerages tended to be small due to regulations, such as prohibitions

on branch banking, costs of acquiring information, and incentives to limit personal funds at risk for commercial banks and investment partnerships whose owners and operators had substantial (and in many cases unlimited) liability for investment losses. Commercial banks in financial centers, however, were some of the largest firms in the nation. Insurance conglomerates were even larger. Most insurance was sold by firms that operated nationwide. The largest insurers in the United States had billions of dollars in assets and tens of thousands of employees. The SOI reveals little about the inner workings of institutions in this sector. In the early 1920s, SOI classified most assets of institutions in FIRE as “other” since the nature of their assets had little bearing on taxes paid. More illuminating data on their balance sheets can be found in publications by state and federal regulatory agencies. Unlike manufacturers and traders, the preponderance of FIRE firms submitted tax returns. These industries were among the most heavily regulated in the United States. Firms operating in them had to have corporate charters of specific types, and their capital had to exceed regulatory requirements. These minimum capital requirements ensured that the size of most firms in FIRE exceeded the minimum requiring submission of a tax return.

Firms in the remaining five sectors submitted less than a quarter of all returns. Firms in the service industry performed a wide range of tasks. Doctors, dentists, hospitals, and other health-care providers tended to people’s health care needs. Hotels and motels provided accommodations to travelers. Restaurants and bars sold food and drink. Theaters provided entertainment. The transportation industry included railroads, airlines, shippers, and firms operating streetcars, bridges, tunnels, and other transportation infrastructure. Firms in the construction industry erected infrastructure and housing. Miners extracted ore, coal, and stone from the ground. Firms in the agricultural industry processed agricultural commodities. Examples of these firms include commodity distributors and food processors like meat packers and bottling plants.

The level of aggregation varied across years. In 1926, SOI aggregates balance sheets for firms with net income greater than zero, which in most cases meant that they paid income taxes in that year, and net income equal to or less than zero, which in most cases meant no taxes paid in that year. SOI also reports aggregate balance sheets for firms separated into 10 levels of net income. Levels of net income were correlated with the size of the firm. Firms with low income in dollar terms were typically smaller. Firms with high income in dollar terms were typically larger. In 1927 to 1930, balance sheets were not disaggregated by firm size. In 1931 to 1933, balance sheets were once again disaggregated by size with firms divided into nine groups based on total assets.

The balance-sheet categories reported also varied across years. On the asset side of the balance sheet, *Cash* indicates primarily firms' deposits in banks plus currency or coin that firms kept "in the till," which means kept on their premises for use in daily operations which typically involved making petty-cash payments or providing change to customers who paid for goods or services with large denomination bank notes. Deposits made up the preponderance of this value, since firms kept little cash on hand and deposited most of their receipts into banks at the end of each business day. *Accounts receivable* consisted of trade credit extended to purchasers of firms' goods or services. Payment was typically due in a short span of time, like within 90 days or after the Christmas shopping season. *Notes receivable* consisted largely of accounts receivable that had been converted into promissory notes payable over a longer time frame (but in our era almost certainly within one year) and of credit extended to retailers and consumers at medium term. The exemplar for this receivable was a new car loan extended by the financing arm of an auto manufacturer. *Inventory* consisted of merchandise (and sometimes inputs) that firms kept on hand and ready for sale. *Capital assets* consisted of real estate, buildings, machinery, equipment, and

other fixed but depreciating assets. *Investments* consisted of financial instruments, such as bonds, mortgages, secured loans, and corporate stock of subsidiaries, but did not include loans extended by commercial banks and other depositors. In 1926 and 1927, those loans were categorized in *miscellaneous* or *other* assets. In 1928, those loans were categorized as *receivables*, which consisted of the sum of notes receivable, accounts receivable, and loans extended by depositories. In 1931, those loans were categorized as *cash plus receivables*, which consisted of the sum of *cash* plus *receivables* plus *loans of depositories* plus *interbank deposits*. We should emphasize that the definition of “*receivables*” differs for firms in FIRE than in other industries and changed in 1928. The reclassification of bank loans as receivables was facilitated by merging notes and accounts receivable, which had clear definitions for non-FIRE firms, into a single category along with loans from banks and other depositors, which were the principal asset of FIRE firms, and giving the amalgamation a generic label that did not correspond exactly to the standard accounting lexicon used for business firms or commercial banks.

Categories of liabilities also varied over time. *Notes payable* indicated loans due to banks. *Accounts payable* indicated trade credit due to firms, typically, amounts due to suppliers for inputs or inventory purchased. *Bonded debt and mortgages, preferred stock*, and *common stock* indicate borrowing via those financial instruments. Stock is generally carried at par value. *Surplus* indicates retained earnings at firms whose equity exceeds the outstanding value of their stock. *Deficit* indicates losses carried on the books of firms whose equity falls below the outstanding value of their stock. *Surplus less deficit* is net retained earnings (surplus minus deficit) for all firms in a category. The most significant change in reporting of liabilities is the summation of notes and accounts payable beginning in 1928. This change coincided with the summation of notes and accounts receivable. The rationale for the change was unstated and remains unclear, although it

has the potential to obscure the amount that firms borrowed from banks because it aggregates this information with the amount that firms borrowed from other firms for the years 1928 through 1933.

While data from 1928 and 1933 contains neither information about bank deposits or bank loans, the data that it contains can be transformed into a quick ratio:

$$\text{Quick ratio} = q = \frac{\text{cash} + \text{notes receivable} + \text{accounts receivable}}{\text{notes payable} + \text{accounts payable}} \quad (1)$$

The numerator of the quick ratio sums firms most liquid asset, currency and deposits, plus the trade credit that they extended to wholesalers, retailers, and consumers (notes and accounts receivable). Payment of trade credit was typically due in 60 to 90 days and almost never due in more than 12 months. All these funds should be (or become) available to firms within a few months. The denominator was the sum of notes payable (i.e. loans due to banks) and accounts payable (i.e. trade credit due to other firms, typically suppliers of inputs or inventory). These debts were typically due in short spans of time, usually 60 to 90 days, and never more than a year.

Historically, the quick ratio was correlated with the deposit-loan ratio (i.e. cash / notes payable), which directly reveals firms' net credit positions. Figure 1 demonstrates this correlation with data from 1926. Panel (a) plots quick and deposit-loan ratios for six industries for observations with deposit-loan ratios below 2 (which is all of those clustered around the shift from net creditor to net debtor at a deposit-loan ratio of 1). Regression lines for each industry have similar slopes but distinct intercepts. Panel (b) shows this linear relationship extends to some but not all observations with deposit-loan ratios above 2. These patterns suggest the deposit-loan ratio, d , can be predicted from the quick ratio, q , by regressing the former on the latter and industry-fixed effects, α_i , and an error term, ε_{is} , as in the equation below, which the subscripts i and s indicate industry and size-group respectively.

$$d_{is} = \alpha_i + \beta q_{is} + \varepsilon_{is} \quad (2)$$

Figure 2 plots the actual values in this regression, d_{is} , versus the predicted values, $\hat{d}_{is}$, for observations with $d_{is} < 2$. This simple regression predicts d_{is} accurately and conservatively. In 1926, the deposit-loan ratio was below 1 for 33 observations and above 1 for 19 observations, while the regression predicts 31 above and 21 below. Assuming the relationship between the quick and deposit-loan ratios changed little over time, we can use the coefficients estimated above (i.e. α_i and β) to predict deposit-loan ratios from quick ratios in other years.

3. Aggregate Balance Sheets

The balance sheets of firms reveal their financial positions in the Roaring '20s and on the eve of the Great Depression. Table 2 reports aggregate balance sheets for the year 1926. Sectors of the economy and branches of industry are ordered by total assets. Table 3 reports aggregate balance sheets for 1929 with sectors and branches ordered as in the previous table.

The largest sector in terms of total assets was FIRE. Over half of all FIRE assets were held by depositories including commercial and savings banks. About 20% was held by insurance companies (principally life insurers). The remainder was held by an array of intermediaries including joint stock land banks, national farm loan associations, brokerages, investment banks, and real estate partnerships.¹ The large increase in receivables in FIRE between 1926 and 1929 was, as mentioned in the previous section, due to changes in the categorization of bank lending. The large change in total assets, however, reflects the boom in financial services during the Roaring '20s, when the financial services sector grew at an unprecedented rate. Total assets in FIRE rose 61% from 1926 to 1929. Its growth exceeded the growth of 8.6% in manufacturing,

¹ For details on assets held by different types of intermediaries, see the Statistical Abstract of the United States 1930 pp. 248, 261, 272, 276, 278, 280, 281, 283, 300, 304, and 311.

14.1% in trade, 4.4% in agricultural processing, -2.8% in mining, and over 30% in transportation and construction, the latter reflecting the building boom of the late 1920s.

FIRE's growth dismayed observers – particularly leaders of the Fed – who wanted America's central banking system to expand the availability and reduce the cost of what they deemed to be productive credit that financed manufacturing, distribution, and agriculture while discouraging what they deemed to be speculative investment. Concerns about FIRE's rapid growth led the Fed to attempt to restrict credit to investment and commercial banking, first with the “direct action” campaign and later by raising discount rates (Richardson et. al. 2013). These actions contributed to the onset of the Great Depression.

Manufacturing was the second largest industry in terms of assets. Manufacturers' assets consisted of 41% fixed capital, 19% inventories, 5.5% cash, and 13.2% receivables in 1926. Proportions were similar in 1929. Manufacturers held nearly a third of all the capital assets (buildings, machines, real estate, etc.) held by non-FIRE firms. It is worth noting that manufacturers held large inventories in both years. These figures were measured at the end of December, which is after the Christmas shopping season, when inventories are typically at their lowest level, but they were measured in the early months of recessions – contractions began in 1926 in October and 1929 in August – when post-Christmas inventories typically exceed normal size since at the beginning of recessions consumption falls below expected and manufactures are left with excess inventory. Manufacturers also held lots of receivables, which were debts that wholesalers, retailers, and consumers owed to them for merchandise delivered but not yet paid for. Manufacturers, in other words, were substantial creditors. In 1929, for example, they had loaned over \$9.5 billion to consumers and other firms (principally wholesalers and retailers).

Manufacturers' substantial inventories and receivables reflected two phenomena that made the economy of the Roaring '20s susceptible to shifts in expectations and uncertainty. One was the expansion of sales of consumer durables like autos, appliances, radios, pianos, and furniture. Consumers typically purchased durables on credit. Most consumer credit was provided by manufacturers; a smaller share was funded by retailers. The timing of these sales was susceptible to swings in moods, expectations, and uncertainty. Bad or unclear news about the economy induced consumers to delay acquiring durables since if they could not make payments on their loans they would lose the merchandise that they purchased, their downpayments, and any other payments that they had made on the products. Penalties for default were particularly harsh in the legal landscape of the 1920s before the creation of modern bankruptcy laws that allowed debtors to file for protection from creditors (Olney 1999). Two was manufacturers' fears of inventory accumulation particularly after the recessions of 1921, 1923, and 1926. Manufacturers piled up huge inventories in the early months of those downturns. Fears of repeating this costly process led them to cut production and employment rapidly in the wake of the Stock Market Crash in the fall of 1929 at the onset of the Great Depressions (Richardson et al. 2013, Romer 1990).

Manufacturers' principal source of funds was owners' equity. Preferred stock, common stock, and retained earnings comprised over 70% of their liabilities in 1926 and over 75% in 1929. The rise reflects the stock market boom in the late 1920s which induced manufacturers to raise additional funds from equity markets. Manufacturers also borrowed heavily from commercial banks, owing them over \$4 billion, which was 43% of all bank borrowing by non-FIRE firms.²

² Manufacturers occupied a middle ground. They borrowed via bonds, banks, and suppliers. They extended substantial trade credit towards purchasers of their merchandise. They carried large inventories and could pay their debts either by selling their inventory at current book values or by collecting debts due to them for past sales.

The relative magnitudes of long-term equity borrowing and short-term bank borrowing on firms balance sheets on December 31 may not reflect the relative flows of these funds. The average maturity of short-term borrowing was under 180 and probably closer to 90 days (Richardson and Troost 2009). That meant that each dollar of bank loans on the balance sheet on a specific date reflected roughly \$4 of loans extended throughout the year ($\$4 \approx \$1 * (365 \text{ days per year} / 90 \text{ days per loan})$). The date of the measurement should also be noted. December 31 was the end of the accounting year and followed the Christmas shopping season. Firms paid down much of their bank borrowing at the end of the year to look healthier in their annual financial statements which could reduce the cost of credit and maximize the value of their firm in the next year. The end-of-year figures for bank borrowing, in other words, may understate the importance of bank credit for manufacturing firms, particularly small manufacturers.

Transportation was the next largest industry in terms of assets. Capital assets – principally infrastructure and vehicles – comprised the preponderance (>70%) of transporters assets. Transporters' capital assets amounted to nearly half (48%) of all capital assets owned by non-FIRE firms in 1926 and over half (53%) in 1929. Transporters borrowed little from banks but heavily by bonds. Transporters' bonds outstanding amounted to more than 60% of all bonds issued by non-FIRE firms.

Trading was the next largest sector in terms of assets. Trading firms' assets consisted of much more inventory and far fewer capital assets than firms in other sectors. Their balance sheets reflected the common industry practice of renting a shop, purchasing merchandise from manufacturers or wholesalers, and selling that inventory to the public. Trading firms were substantially lenders with more than \$6 billion in receivables outstanding in 1929, an amount second only to manufacturing firms. Receivables as a fraction of assets were higher for trading

firms than for any other sector. Some of these loans represented debts that retailers owed to wholesalers; the majority consisted of consumer credit, where retailers provided goods to consumers who paid for them over time plus interest. In addition to lending large sums, trading firms were substantial borrowers. Twenty-six percent of their liabilities were payables; a little over half of that consisted of loans from banks; a little under half consisted of trade credit from manufacturers and wholesalers.³

The next four sectors can be characterized quickly. Mining firms financed themselves primarily with equity. A large share of their assets consisted of real estate, structures, and equipment. Construction firms borrowed substantial amounts short term; payables (bank loans plus trade credit) comprised a quarter of their liabilities. Construction firms also loaned substantial sums, more than a quarter of their assets were receivables. Agricultural processors raised substantial sums via equity, with stock outstanding exceeding 60% of liabilities, an amount similar to fixed assets as a share of all assets. Agricultural processors, however, also borrowed substantial sums short term, with loans due to banks exceeding 14% of all liabilities. Service firms' balance sheets looked similar, although they borrowed less from banks and more via bonds.⁴

Overall, balance sheets in the SOI reveal that contours of credit in the economy were complicated. All sectors and branches of manufacturing borrowed and lent substantial sums. The

³ Traders (both wholesalers and retailers) borrowed heavily from banks and via trade credit. They also extended substantial sums of trade credit. Wholesalers borrowed from manufacturers when they promised to pay them in the future for merchandise delivered today and extended credit to retailers when they agreed to accept payment in the future. Retailers borrowed from wholesalers and manufacturers and extended credit to consumers. Traders held \$4 to \$5 in cash for every dollar that they owed and needed to pay within the year. They could only make these payments by selling substantial amounts of inventory near book value or by collecting debts due from past sales.

⁴ The construction industry had a similar credit profile. Builders owned substantial sums that needed to be paid in the near future. They had also extended substantial credit to past purchasers. To pay their debts to banks and firms, they needed to collect the funds due to them from past projects or complete and sell their projects currently under construction. The transport, service, mining, and agricultural processing industries were also substantial borrowers. Agricultural processors borrowed heavily from banks. The transport and mining industries mostly borrowed through bond markets. The service industry borrowed every way possible: via bonds, banks, and firms. These firms extended little credit and held little physical inventory. Customers for all of these industries typically paid in cash, but the firms kept little cash on hand. To keep paying their debts, they had to continue selling their wares.

trading and manufacturing sectors extended the largest quantities of trade credit. Manufacturers and traders also borrowed the most from banks, with borrowing particularly prevalent for small manufacturing firms and all except the very largest trading firms. Borrowing from banks and firms was correlated; the percentage of a sector's liabilities owed to banks was similar to the percentage owed to firms. Only agricultural processors owed a much larger share of their liabilities to banks (14.2%) than to suppliers (5.6%), probably because most of their suppliers were farmers who could not afford to wait for payments and required processors to pay cash for crops. The transportation sector borrowed the smallest share from banks (2%) and the largest share by issuing bonds (17.3%). The service sector borrowed a similar share via bonds (17.3%) but borrowed much less from banks.

4. Bank Borrowing and Firm Size

Balance sheets varied not only across industries but also within industries. Balance sheets of smaller firms differed substantially from balance sheets of larger firms. Differences were particularly pronounced in the use of short-term credit.

Prominent patterns appear in Figure 3. Panel (a) shows that in every sector of the economy smaller firms borrowed more as a percentage of assets from banks and larger firms borrowed less. Panel (b) shows that smaller firms also borrowed more from their suppliers (i.e. used more trade credit) and larger firms borrowed less. Panel (c) shows that cash holdings – which were almost entirely deposits in banks – as a share of assets rose as the size of firms increased. Panel (d) combines information from panels (a) and (c) to depict the deposit to loan ratio, which rose steeply as the size of firms increased. Note the y-scale of this graph is logarithmic.

The deposit-to-loan ratio reveals firms' net credit positions vis-à-vis the banking system. Firms that deposited funds in banks lent those funds to their financial institution, while notes payable of firms' balance sheets represented debts that firms owed to banks. Firms – like households – often simultaneously loaned funds to while also borrowing funds from banks. The deposit-to-loan ratio reveals their net position. Ratios above one indicate that banks owed to firms more than firms owed to banks, or in other words, that firms were net creditors to banks. Ratios below one indicated that firms deposited less in banks than banks borrowed from firms, or in other words, that firms were net debtors to banks.

Table 4 details deposits, loans, and deposit-loan ratios for firms of different sizes in eight economic sectors. Sectors are ordered by the number of firms submitting returns. The smallest firms in every sector were net borrowers from banks. In trading, manufacturing, services, and mining, the smallest firms owed to banks about 3 times what banks owed to them. In agriculture, the smallest firms owed more, and in transportation, the smallest firms owed less. Larger firms in every industry had more deposits relative to loans. In each sector, the largest firms deposited far more in banks than they borrowed from those institutions. In trading, for example, the twelve largest firms deposited \$121 million in banks while borrowing only about \$6 million from them. The size at which firms ceased to be net borrowers from banks and began to be net creditors to banks varied across sectors. Thousands of manufacturers, for example, were net creditors to the banking system, while only about a dozen trading firms deposited substantially more in banks than they borrowed from banks.

Data in Table 4 facilitates the calculation of the number and percentage of firms in each sector which depended upon banks for credit to continue ongoing operations and those that did not. Firms could clearly operate without borrowing from banks if they were able to pay off their

loans on demand and continue in operations, or in other words, if their deposits in banks exceeded borrowing from banks. Firms depended upon banks for working funds if their debts to banks exceeded their cash holdings. These firms would be forced into bankruptcy if their banks called their loans or if their banks failed and were placed in the hands of a receiver, who as a matter of course, would call their loans or refuse to refinance them upon maturity. Table 5 and Figure 4 display the results of our calculations.

Table 5 and Figure 4 highlight several important aspects of bank-firm relations in the 1920s. First, most firms were small, and most small firms relied on banks for credit. So, most firms in most sectors were dependent on banks for operating funds. The only sectors with substantial numbers above bank-independent firms were construction, manufacturing, and to a lesser extent, transportation. Second, larger firms held most of the assets and produced most of the output (as measured by value added) in most sectors. So, a large share of economic output was produced by firms that did not depend upon banks for credit, and in many cases, borrowed little from banks. The share of output produced by bank-independent firms, for example, was 82% in transportation, 65% in manufacturing, over 40% in construction and mining, and 25% in services.

When sectors are examined as a whole, only the transportation sector deposited more in than they borrowed from banks, with \$1.19 on deposit for each dollar borrowed. Mining, manufacturing, and construction were not far behind with \$0.92, \$0.88, and \$0.73 on deposit for each dollar borrowed respectively. Other sectors deposited less cash relative to their loans. Agricultural processing held the least with \$0.19 on deposit for each dollar borrowed.

Within sectors, the deposit/loan ratio differed between profitable and unprofitable firms. In every sector, deposit levels were higher and loan levels were lower for profitable firms. This pattern had several potential causes. Firms with profits could accumulate cash and pay off loans,

while firms without profits could not. In this case, profitability generated differences in deposit to loan ratios. Causality could run the other direction. Firms that borrowed had to pay interest on loans, which may have made them less profitable. Firms may also have borrowed as a strategy for minimizing taxes since interest on debt could be written off as a business expense. Another possibility is that firms without profits had to borrow from banks to pay workers and suppliers. In this case, unprofitability engendered borrowing.

While profitable firms held more deposits relative to loans than unprofitable firms, patterns varied across industries. Profitable firms in four sectors, mining, transportation, manufacturing, and construction, deposited more in banks than they borrowed from them. For profitable firms in the three other sectors, services, trading, and agricultural processing, however, borrowing exceeded depositing. Common business models explain these patterns. Traders, agricultural processors, and many service firms operated with little cash on hand and few fixed assets. They held large inventories and strove to turn over their wares with regularity. They paid for their inputs and inventories with funds borrowed from banks. The short-term of the assets and liabilities on their balance sheets, in other words, were well matched.

The net credit position appears more complicated when considering sectors' entire set of short-term assets and liabilities. The quick ratios in Table 5 reveal that profitable firms in every sector had more liquid assets than short-term debts. They had sold a lot of merchandise. Large cash sales resulted in large deposits in banks. Large credit sales resulted in substantial accounts and notes receivable. Sales of merchandise, in other words, raised the numerator of the quick ratio. Lower borrowing reduced the denominator of the quick ratio. It also meant that firms had lower costs, since they did not need to pay interest on borrowed funds, which increased profits.

5. Trends Preceding 1929

While data from 1926 and 1929 highlight patterns of borrowing across sectors, branches of industry, and firms of different sizes, trends for each of these detailed categories cannot be tracked over time. The bigger picture can best be observed with IRS data aggregated annually and used in conjunction with complementary sources.

The available aggregate information is summarized in Figure 5. The vertical axis indicates the ratio of firms' deposits to loans. Firms with more deposits than loans (i.e. above the horizontal dotted line) were net creditors to the banking system. The horizontal axis indicates the year of the information. The IRS began publishing aggregate information on firms' net credit positions in manufacturing and trading in 1924. At that date, the IRS indicated that the 81,748 manufacturers which submitted balance sheets held on aggregate \$0.57 of bank notes and deposits for each dollar that they borrowed from banks (IRS data denoted by triangles). That figure rose to \$0.73 for the 86,268 manufacturers that submitted balance sheets in 1925 and to \$0.88 for the 84,251 manufacturers that submitted balance sheets in 1926. In that year, as we noted earlier in the paper, the IRS distinguished between large manufacturers, which were net creditors of banks, and small manufacturers, which were net borrowers from banks. IRS data, in other words, shows manufacturers' aggregate balance sheets moving gradually toward the net-creditor position. It also shows that large manufacturers were substantial net creditors of banks by 1926.

IRS data indicates that trading firms on average were net borrowers of banks throughout the 1920s. In 1924, the IRS indicated that the 19,175 wholesalers which submitted balance sheets held on aggregate \$0.35 of bank notes and deposits for each dollar that they borrowed from banks (plotted as hollow triangle); 40,259 retailers held on average \$0.36 in bank notes and deposits for each dollar that they borrowed (plots for retailers are indistinguishable from plots for wholesalers).

In 1925, the figure for 20,844 wholesalers fell to \$0.20 and for 42,593 retailers to \$0.21. In 1926, the IRS ceased distinguishing wholesalers and retailers. Instead, the IRS lumped wholesalers and retailers together with department stores, mail order houses, and an array of other trading firms, and reported balance sheets for all of these institutions in tiers by size of profits. The 42,881 trading firms which earned profits less than \$5,000, in contrast, held \$0.34 in bank notes and deposits for each \$1 that they borrowed from banks. Trading firms were, in other words, typically borrowers from banks.

Figure 5 also depicts information from the NBER's study of the balance sheets of nations' 84 largest manufacturing firms, which began in 1921. The data shows that these large manufacturers were on creditors of banks throughout the decade. In 1922, the average large manufacturer deposited \$2.5 in banks for each dollar that they borrowed. In 1925, large manufacturers had over \$5 on deposit for each dollar that they borrowed. While individual firms' balance sheets inevitably varied from this average, the tremendous collective excess of deposits over loans suggests that most large manufacturers were net creditors of banks for most of the 1920s.

While data from the IRS and NBER covers tens of thousands of firms, it only covers those large or profitable enough to file a tax return. Data on smaller firms comes from the Censuses of Manufacturing and Distribution, which began collecting information about relationships with banks in 1929. This information demonstrated that small wholesalers, retailers, and small manufactures were substantial users of commercial bank credit. Over 86% of small manufacturing firms depended upon banks for working capital (Department of Commerce 1935, p. 65-6). The majority (51%) of retail firms reported commercial banks as the source of the credit that financed their businesses. Another 22% reported wholesalers as their primary source of working capital.

Wholesalers in turn borrowed most of their working funds from commercial banks (La Crosse 1935 p. 22). Wholesalers and retailers borrowed heavily from banks to finance acquisitions of inventory and sales to consumers. Wholesalers reported that sales on credit constituted over 56% percent of net sales (Census 1935 v.1 p.8 and Census 1937 Table 4 p. A-27).⁵ Retailers reported that sales on credit amounted to over one-third of net sales (Plummer 1930, Census 1937, p.26-27).

We can combine data from all these sources along with several assumptions to generate a back-of-the-envelope depiction of relationships between banks and firms in manufacturing and trading in the years immediately preceding the Great Depression. The calculation begins with the detailed IRS data from 1929 (in Table 1). Then, we assume that the roughly 100,000 manufacturing firms and 1,500,000 trading firms that did not file tax returns because they fell below both the profit and capital thresholds had, on average, the same balance sheets as firms above the capital threshold reporting no net income.⁶ Finally, we group firms by their line of business (i.e. manufacturing or trading) and net position vis-à-vis banks. We deem firms with more than \$1.1 in deposits for each dollar in loans as bank independent, because they could pay off all of their loans and retain some cash with which they could conduct routine operations. We deem firms with less

⁵ This figure for 1929 may be a lower bound for credit sales as a fraction of wholesale transactions. For wholesalers only, the amount of credit sales amounted to 62.19% of total sales. Automotive wholesales (including sales arms of manufacturers) reported an extremely low percentage of credit sales. This may have been due to the phrasing of the question and the method for financing automotive distribution. The Census of Distribution for 1933 found that only 67.9 percent of wholesale establishments reported their credit business. For establishments reporting their credit business, sales on credit constituted 82.4 percent of net sales. Manufacturers' sales branches reported that 92.0 % of their sales were on credit (Census, 1935, p. 62).

⁶ The censuses of Distribution and Manufacturing for 1929 show that approximately 100,000 manufacturing and 1,500,000 trading firms did not file tax returns due to their small size or lack of profits. The Census of Distribution (Census 1930a, p.8) indicates that 1,680,309 establishments exceeded their threshold of \$5,000 annual production required to be included in the census. The Census of Manufacturers (Census 1930b, p.12) indicates that 210,959 establishments exceeded their threshold of \$5,000 annual production required to be included in the census. The Statistics of Income for 1929 (IRS 1930, p. 18) indicates that 96,525 manufacturing and 132,660 trading firms filed tax returns. We round the difference in these numbers down to the nearest hundred thousand to reflect differences in methods of counting firms and to highlight that they are estimates based upon imperfect data.

than \$0.90 in deposits for each dollar in loans as bank dependent since they could not repay their loans and might struggle to operate if banks discontinued credit. Then, we calculate aggregate statistics for each group.⁷

The results appear in Table 6. While the fraction of manufacturing corporations that could operate independent of banks was small (1.2% of all manufacturing firms), these firms were large (on average \$17.7 million in assets). Almost all of them operated multiple plants spread across many counties. Their assets comprised 37.6% of all assets in the manufacturing. If we could calculate the fraction of manufacturing establishments or employment in firms that could operate without bank credit, the value would probably be near the value for assets, or roughly one-third. On net, these large, multi-plant manufacturers deposited \$2 in banks for each dollar that they borrowed. Most manufacturing firms (97.4%) relied on banks for credit. These small manufacturers (average assets \$328,000), which held a little over half of the assets in the industry, had an average of \$0.25 on deposit in banks for each dollar that they borrowed.

Statistics for trading firms seem more extreme. Almost all (99.97%) of trading firms relied on banks for credit. The size of these firms ranged from small to large, with assets averaging about \$1.1 million per firm. They owed lots of money to banks, with the average firm owing \$46 for each dollar that they had on deposit. The average debts to banks exceeded 20% of their assets. The fraction of trading firms that operated without bank credit was extremely small, approximately 0.0007% of all trading firms. While these firms were large and prominent retailers like Sears,

⁷ Our assumptions admit ambiguity about firms whose tax returns indicated their deposit-to-loan ratio (D/L) fell in the range $0.9 < D/L < 1.1$. Some of these firms may have been able to pay off their loans and operate without borrowing from commercial banks. Others might have struggled if forced to pay their loans. For this reason, we assume firms with $D/L > 1.1$ could operate without loans from banks. Firms with $D/L < 0.9$ could not operate unless they borrowed from banks. We exclude firms with D/L ratios around 1 from our calculations. We note, however, that our arguments and analysis are robust to this assumption. If we raised or lowered these thresholds by 0.1 in either direction, our results would remain essentially the same.

Roebuck and Montgomery Ward, they comprised only a small number (12) and small fraction (0.5%) of the assets of trading firms nationwide.⁸

6. Discussion

The collapse of commercial banking in the early 1930s cut off millions of firms from their typical source of working capital. These firms, like everyone else, suffered “the most desperate scramble for liquidity that we have ever experienced (Currie 1934, p. 124)” and “the most extreme and prolonged period of bank credit liquidation in the history of the United States (Kimmel 1939, p. 1).” From June 29, 1929 to June 30, 1933, total loans from Fed member banks decline from \$25.7 billion to \$12.9 billion (50%). Total loans from non-member banks declined from \$9.8 billion to \$3.5 billion (64%) (Mitchener and Richardson 2024).

The data presented in this paper helps to identify the types of firms that would have been impacted by the banking distress in the early years of the Great Depression. Banks struggling to pay depositors needed to acquire cash. Banks did this, in part, by borrowing from lenders of last resort and in part selling secondary reserves (usually bonds). Banks also called outstanding loans and refused to roll over maturing credit. These actions, in turned, forced their business that borrowed heavily from banks to raise cash and prevented those firms from borrowing to finance their next round of production or distribution.

Bank failures would have a direct and rapid impact on these bank-dependent businesses. The affairs of failed banks were wound up by court or regulator appointed officers known as receivers. Receivers as a matter of course called outstanding lines of credit and could not renew

⁸ In Table 2, we calculate percentages for two types of firms. Firms could operate without borrowing from banks, we presume, if they had a deposit-to-loan ratio above 1.1. Firms could not function without borrowing from banks if they had a deposit-to-loan ratio below 0.9. We do not calculate percentages for a third group of firms, those with $0.9 < D/L < 1.1$, since we are unsure what fraction of those needed to borrow from banks and what fraction did not. For this reason, the percentages in the table do not sum to 100%.

term loans. They typically froze depositors' accounts, allowing them to withdraw funds only in an orderly process that allowed all depositors to withdraw the same portion of their frozen deposits. Bank-dependent firms typically lost access to all deposits permanently, since their deposits would be held to offset against the money that they owed the bank. This situation ensured that bank resolutions triggered a contraction of commercial credit. This retrenchment, in turn, could trigger bankruptcies of businesses struggling to pay their debts, since receivers would as matter of course file suit against borrowers that could not repay their debts.

The short-term nature of commercial lending meant that banks' failures should have impacted the operations of bank dependent businesses rapidly. A struggling bank would begin the process by requesting or demanding repayment from its commercial customers. A receiver would accelerate the process. Immediately upon appointment, receivers would freeze firms' deposits, call all callable debts, and request repayment of outstanding loans. No loans would be rolled over. The average commercial term loan would come due about 90 days after the receivers' appointment. Almost all commercial loans would come due with 180 days. Receivers would sue firms that did not repay their debts, since filing suit in bankruptcy court would prevent firms from dissipating assets and accelerate repayment. Rapidly filing these suits was one of receivers' fiduciary duties. Together, short-term lending and rapid resolution procedures meant that failures of commercial banks could trigger failures of bank-dependent businesses quickly. Bankruptcies might begin within a few weeks of a bank's failure and continue for up to six months. Since almost all loans would have come to term within six months, most of these suits should have been filed by that time or within a few months after.

Bank-independent firms would have been less impacted by failures of banks. These firms – typically large manufacturers – borrowed little from banks. On average, they had \$2 on deposit

for each \$1 dollar that they borrowed. This hypothesis is confirmed by Del Angel, Gou and Richardson (2024) that find that bank independent firms did not fail in appreciably larger numbers after banks failed. They could easily repay their loans upon demand. They had substantial assets, which they could use to collateralize loans from new lenders if the need should arise, and they probably had access to alternative sources of funds, such as issuing bonds or equity. Their deposits were at risk and might be trapped for a period of time while a receiver wound up a failed bank. Firms, however, were large and sophisticated; they had the ability and incentive to monitor the health of their depository, unlike typical individuals. This is why the Fed's study of deposit losses before suspension finds that large firms typically pulled their deposits from weak banks before they failed; their withdrawals typically preceded the long lines of panicky depositors hoping to withdraw funds from banks near the day of their demise.

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Table 1: Information on Firm Balance Sheets in *Statistics of Income*

Balance Sheet Categories	1926	1927	1928	1929	1930	1931	1932	1933
Assets								
Cash (in till and deposits in banks)	Y	Y	Y	Y	Y			
Notes receivable	Y	Y	Y	Y	Y	Y	Y	Y
Accounts receivable (less reserve for bad debts)	Y	Y						
Inventory	Y	Y	Y	Y	Y		Y	Y
Investments – tax exempt – state and local bonds	Y	Y						
Investments – tax exempt – federal farm bonds	Y	Y	Y	Y	Y			
Investments – tax exempt – US govt. bonds	Y							
Investments – taxable - stocks, bonds, mortgages, loans	Y	Y	Y	Y	Y			
Capital assets - real estate, buildings, and equipment				Y	Y	Y	Y	Y
Miscellaneous items not distributed by nature of assets	Y	Y	Y	Y	Y			
Total	Y	Y	Y	Y	Y	Y	Y	Y
Liabilities								
Notes payable (i.e. borrowing from banks)	Y	Y	Y	Y	Y	Y	Y	Y
Accounts payable (i.e. borrowing on from firms)	Y	Y						
Bonded debt and mortgages	Y	Y	Y	Y	Y	Y	Y	Y
Miscellaneous items not distributed by nature of liability	Y	Y	Y	Y	Y			
Capital stock – preferred	Y	Y	Y	Y	Y	Y	Y	Y
Capital stock – common	Y	Y	Y	Y	Y	Y	Y	Y
Surplus	Y	Y	Y	Y	Y			
Surplus less deficit	Y	Y	Y	Y	Y	Y	Y	Y
Total	Y	Y	Y	Y	Y	Y	Y	Y
Assets and Liabilities reported by ...								
Industry and size (10 net income groups)	Y							
Industry and size (9 asset groups)						Y	Y	Y
Industry and net income > 0 or ≤ 0	Y	Y	Y	Y	Y	Y	Y	Y

Source: Internal Revenue Service (1927-34).

Notes: Y indicates yes the type of information exists in the *Statistics of Income* reporting balance sheets for the indicated tax year. Bold faced **Y** preceded by a vertical line | indicates that the type of information reported in the *Statistics of Income* in that year is the sum of the indicated balance-sheet categories reported in previous years. The rows under “Assets and Liabilities reported by ...” indicate the level of aggregation of the data reported in *Statistics of Income* for each year.

Table 2: Balance Sheets of Firms Filing Tax Returns in 1926 (\$ Million)

	# Return	# Return Inc>0	Assets						Total	Liabilities						
			Cash	Receivables		Other	Inventory	Capital		Payables		Bonds	Stock		Retain Earnings	Other
				Notes	Acct.					Notes	Acct.		Pref.	Comm.		
Sectors of the Economy																
FIRE	98,417	63,029	9,777	3,479	2,312	57,533	924	13,429	87,452	3,900	2,782	4,740	54,862	1,956	11,777	7,436
Manufacturing	84,251	51,850	3,528	1,689	6,878	13,730	12,284	26,619	64,727	4,024	3,192	4,340	6,898	7,431	23,980	14,862
Transport	18,297	12,117	1,358	297	1,231	12,719	942	40,699	57,246	1,139	1,198	9,932	18,466	4,855	15,611	6,045
Trade	100,395	65,748	1,164	835	4,797	2,696	5,569	4,079	19,140	2,574	2,422	584	1,501	1,722	6,836	3,502
Mining	11,641	4,820	409	152	610	2,397	636	7,967	12,172	443	459	1,008	1,910	538	6,176	1,638
Services	23,264	13,957	300	94	290	1,222	184	2,783	4,873	523	298	842	652	447	1,516	596
Construction	13,981	8,926	213	99	570	549	273	654	2,358	291	354	233	525	85	554	317
Agriculture	7,681	3,663	47	70	122	450	118	1,242	2,050	292	115	114	247	97	974	210
All Sectors	357,927	224,110	16,795	6,715	16,810	91,297	20,928	97,472	250,019	13,186	10,821	21,791	85,059	17,130	67,426	34,605
Branches of Industry																
Metal	18,499	11,480	1,478	822	2,123	3,593	4,051	9,155	21,223	1,102	916	1,578	1,971	2,476	7,463	5,715
Chemical	6,439	3,793	492	291	772	3,485	1,847	5,371	12,258	391	489	800	1,488	1,132	5,191	2,767
Food & Tobacco	13,509	8,374	454	129	869	2,402	1,709	3,322	8,884	704	389	722	1,012	1,275	3,193	1,590
Textiles	12,588	7,412	375	76	980	799	1,762	2,269	6,260	624	454	194	591	798	2,381	1,218
Wood	7,244	4,382	142	127	483	648	770	1,854	4,023	441	251	160	462	285	1,378	1,047
Other	7,647	4,432	130	94	439	639	593	863	2,759	197	162	101	289	302	1,076	631
Printing	9,201	6,258	120	46	326	905	204	782	2,384	183	158	175	359	184	756	570
Stone, Clay, Glass	4,234	2,690	108	39	211	411	311	1,157	2,237	107	91	99	258	259	907	517
Paper & Pulp	1,925	1,341	84	31	228	457	298	999	2,097	94	96	253	211	223	757	464
Rubber	610	317	67	16	205	195	342	551	1,376	61	98	240	125	279	386	187
Leather	2,355	1,371	76	20	242	195	398	296	1,227	121	89	18	132	219	491	158
Total Manuf.	84,251	51,850	3,528	1,689	6,878	13,730	12,284	26,619	64,727	4,024	3,192	4,340	6,898	7,431	23,980	14,862

Notes: # Return indicates total number of tax returns filed in 1926. # Returns Inc>0 indicates number of returns from profitable firms. Acct indicates accounts receivable or accounts payable. Pref indicates preferred stock. Comm indicates common stock. Total indicates total assets and total liabilities.

Table 3: Balance Sheets of Firms Filing Tax Returns in 1929 (\$ Million)

	# Return	# Return Inc>0	Assets						Total	Liabilities					
			Cash	Receive.	Misc.	Invest.	Inventory	Capital		Payables	Bonds	Stock		Retain Earnings	Other
												Pref.	Comm.		
Sectors of the Economy															
FIRE	113,463	69,113	14,471	44,129	21,984	41,401	921	17,819	140,724	8,654	10,135	3,770	24,512	15,108	78,544
Manufacturing	86,112	52,509	3,847	9,572	6,859	9,154	12,614	28,235	70,282	7,418	5,450	7,009	26,220	19,466	4,720
Transport	17,258	10,981	1,634	3,974	9,247	9,614	1,119	52,205	77,792	4,449	26,619	5,655	22,476	10,955	7,638
Trade	117,583	72,810	1,283	6,305	1,661	1,764	5,862	4,967	21,842	5,730	1,252	1,851	7,466	4,204	1,339
Mining	10,219	4,357	421	837	1,005	1,611	694	7,264	11,832	975	1,037	537	5,715	2,567	1,000
Services	28,710	28,710	440	833	667	1,876	191	3,814	7,820	954	1,563	616	1,903	1,982	802
Construction	16,355	9,426	208	876	373	476	305	857	3,095	846	350	152	732	510	504
Agriculture	7,443	3,510	60	218	202	230	198	1,231	2,140	376	222	116	935	341	150
All Sectors	397,143	251,416	22,364	66,745	41,996	66,125	21,904	116,391	335,526	29,404	46,628	19,705	89,958	55,132	94,699
Branches of Industry															
Metal	19,268	12,492	1,565	3,244	1,419	3,314	4,198	9,339	23,079	1,853	1,543	1,560	2,387	7,799	7,937
Chemical	6,519	3,794	560	1,254	2,066	2,232	1,847	6,073	14,031	1,012	1,161	981	630	6,570	3,677
Food & Tobacco	13,413	9,288	530	1,239	1,131	1,245	1,943	3,712	9,800	1,262	977	565	1,378	3,514	2,103
Textiles	13,662	7,815	378	1,209	355	442	1,799	2,440	6,623	1,153	261	350	858	2,436	1,566
Wood	7,094	4,026	122	620	184	318	705	1,723	3,672	595	238	231	217	1,279	1,113
Other	6,871	3,742	166	478	413	291	559	747	2,654	387	127	195	276	1,022	647
Printing	10,067	6,717	149	453	689	421	223	903	2,838	374	300	351	214	828	771
Stone, Clay, Glass	4,264	2,434	107	251	180	206	331	1,317	2,393	201	206	117	313	973	583
Paper & Pulp	2,020	1,378	96	321	167	442	322	1,225	2,573	197	351	242	245	868	671
Rubber	587	301	94	233	173	147	284	492	1,422	183	251	61	291	484	152
Leather	2,347	1,324	81	270	82	95	403	265	1,198	202	36	68	199	446	246
Total Manuf.	86,112	53,311	3,847	9,572	6,859	9,154	12,614	28,235	70,282	7,418	5,450	4,720	7,009	26,220	19,466

Notes: # Return indicates total number of tax returns with balance sheets filed in 1929. # Returns Inc>0 indicates number of returns from profitable firms. Receive indicates accounts plus notes receivable. Invest indicates investments in bonds, stocks, and other financial instruments. Pref indicates preferred stock. Comm indicates common stock. Total indicates total assets and total liabilities.

Table 4. Firms' Relationships with Banks in 1926

Net Income \$ thousand	#	Avg. Assets \$ thou.	Total Assets \$ mil.	Total Deposit \$ mil.	Total Loans \$ mil.	Ratio D/L	#	Avg. Assets \$ thou.	Total Assets \$ mil.	Total Deposit \$ mil.	Total Loans \$ mil.	Ratio D/L
Trading							Manufacturing					
Income < 0	34,647	118	4,093	172	890	0.19	32,401	365	11,813	319	1,543	0.21
\$0 to \$5	42,881	64	2,731	145	428	0.34	26,042	81	2,115	98	287	0.34
\$5 to \$10	8,543	129	1,103	66	167	0.40	6,112	180	1,099	55	126	0.44
\$10 to \$50	10,912	297	3,239	198	445	0.44	11,723	381	4,466	237	416	0.57
\$50 to \$100	1,878	802	1,507	93	188	0.50	3,228	893	2,884	153	210	0.73
\$100 to \$250	1,014	1,736	1,760	122	197	0.62	2,595	1,674	4,343	267	260	1.03
\$250 to \$500	298	3,477	1,036	70	78	0.90	1,039	3,672	3,815	217	174	1.25
\$500 to \$1,000	119	7,311	870	52	55	0.95	569	7,668	4,363	248	157	1.58
\$1,000 to \$5,000	91	20,011	1,821	124	122	1.02	439	23,510	10,321	584	311	1.88
Over \$5,000	12	81,750	981	121	6	21.63	103	189,427	19,511	1,347	541	2.49
Income > 0	65,748	229	15,048	991	1,684	0.59	51,850	1,021	52,914	3,208	2,481	1.29
All Firms	100,395	191	19,140	1,164	2,574	0.45	84,251	768	64,727	3,527	4,024	0.88
Finance, Insurance, Real Estate							Services					
Income < 0	35,388	554	19,611	1,820	1,751	1.04	9,307	174	1,622	105	283	0.37
\$0 to \$5	41,057	229	9,382	826	585	1.41	9,298	51	471	22	73	0.31
\$5 to \$10	7,368	559	4,118	439	173	2.53	1,593	135	214	12	18	0.65
\$10 to \$50	10,834	1,035	11,215	1,667	561	2.97	2,240	280	627	38	53	0.70
\$50 to \$100	1,917	3,138	6,016	758	225	3.37	423	676	286	22	17	1.31
\$100 to \$250	1,201	5,795	6,960	933	230	4.06	269	1,604	432	23	28	0.83
\$250 to \$500	366	14,616	5,350	945	160	5.89	70	4,121	288	14	15	0.89
\$500 to \$1,000	163	37,997	6,194	868	87	9.99	37	5,527	204	20	10	1.93
\$1,000 to \$5,000	106	89,053	9,440	736	120	6.14	25	22,219	555	29	24	1.20
Over \$5,000	17	539,200	9,166	784	8	103.5	2	86,700	173	16	1	30.08
Income > 0	63,029	1,076	67,841	7,957	2,149	3.70	13,957	233	3,251	195	240	0.81
All Firms	98,417	889	87,452	9,777	3,900	2.51	23,264	209	4,873	300	523	0.57
Transportation							Construction					
Income < 0	6,180	903	5,583	116	334	0.35	5,055	126	635	27	117	0.23
\$0 to \$5	8,028	85	680	29	57	0.51	5,763	73	419	85	53	1.62
\$5 to \$10	1,133	316	358	10	20	0.50	1,060	123	130	8	16	0.47
\$10 to \$50	1,743	615	1,071	37	62	0.59	1,535	256	394	30	43	0.71
\$50 to \$100	396	2,407	953	30	26	1.17	293	548	160	15	14	1.07
\$100 to \$250	325	8,529	2,772	67	88	0.76	194	1,087	211	20	14	1.43
\$250 to \$500	159	15,077	2,397	71	64	1.11	51	2,497	127	12	12	1.01
\$500 to \$1,000	125	23,150	2,894	66	41	1.59	18	4,191	75	6	3	1.96
\$1,000 to \$5,000	148	79,795	11,810	301	173	1.73	10	13,547	135	6	8	0.76
Over \$5,000	60	478,792	28,728	631	273	2.31	2	35,158	70	4	11	0.38
Income > 0	12,117	4,264	51,663	1,242	806	1.54	8,926	193	1,723	187	173	1.08
All Firms	18,297	3,129	57,245	1,358	1,139	1.19	13,981	169	2,358	213	291	0.73
Mining							Agriculture					
Income < 0	6,821	735	5,010	95	270	0.35	4,018	268	1,075	13	183	0.07
\$0 to \$5	2,449	220	538	12	32	0.39	2,519	108	273	6	50	0.11
\$5 to \$10	459	297	136	4	10	0.41	430	159	68	2	12	0.19
\$10 to \$50	1,089	538	586	23	33	0.71	542	439	238	8	26	0.31
\$50 to \$100	328	1,045	343	18	16	1.15	94	1,028	97	4	11	0.37
\$100 to \$250	264	2,488	657	27	32	0.86	47	2,717	128	5	6	0.87
\$250 to \$500	114	5,592	637	27	18	1.51	19	3,653	69	3	2	1.47
\$500 to \$1,000	49	13,876	680	37	12	3.07	9	6,456	58	3	1	3.41
\$1,000 to \$5,000	55	35,320	1,943	98	15	6.49	3	14,702	44	3	0	200+
Over \$5,000	13	126,275	1,642	67	6	11.72						
Income > 0	4,820	1,486	7,162	314	173	1.82	3,663	266	975	35	108	0.32
All Firms	11,641	1,046	12,172	409	443	0.92	7,681	267	2,050	47	292	0.16

Source: IRS (1926) Table 18, p. 366-7 (manufacturing), p 394-5 (trading). Notes: Columns for deposits indicate the sum of firms' holdings of bank deposits and notes. Loans indicates firms' notes payable to commercial banks. Assets indicates firms' total assets. Ratio D/L indicates deposits divided by loans. Ratios below 1 indicate firms that were net borrowers from banks. Ratios above 1 indicate firms which were net creditors of banks.

Table 5: Bank Dependence by Industry

	Percent Independent		Percent Dependent		Deposit/ Loans		Quick Ratio	
	by Total Assets	by # of Firms	by Total Assets	by # of Firms	Net Income > 0	Net Income ≤ 0	Net Income > 0	Net Income ≤ 0
Transportation	81.7	4.9	18.3	95.1	1.54	0.35	1.41	0.67
FIRE	77.6	64.0	22.4	36.0	3.7	1.04	3.20	1.32
Manufacturing	65.4	5.6	34.6	94.4	1.29	0.21	2.14	0.73
Construction	42.1	45.2	57.9	54.8	1.08	0.23	1.68	0.77
Mining	40.3	2.0	59.7	98.0	1.82	0.35	2.00	0.71
Services	25.0	2.1	75.0	97.9	0.81	0.37	1.18	0.48
Trade	14.6	0.1	85.4	99.9	0.59	0.19	1.57	0.89
Agriculture	8.4	0.4	91.6	99.6	0.32	0.07	0.94	0.37

Source: Authors' calculations.

Table 6. Characteristics of Bank Dependent and Independent Firms

	Bank Independent		Bank Dependent	
	% of all firms	\$,1000 per firm	% of all firms	\$,1000 per firm
Manufacturing				
Assets	37.6%	17,679	58.1%	328
Deposits	53.1%	1,114	40.9%	10
Loans	13.5%	550	83.6%	41
Deposits/Loans		2.03		0.25
#	1.2%		97.4%	
Trading				
Assets	0.5%	81,750	97.6%	1,068
Deposits	1.4%	10,083	95.7%	5
Loans	0.01%	500	99.4%	228
Deposits/Loans		20.17		0.02
#	0.0007%		99.97%	

Notes: \$,1000 indicates thousands of dollars on average per firm. Bank dependence and independence defined in text. The row Deposits/Loans indicates the ratio of deposits divided by loans. The row # indicates the percentage of firms in each category (i.e. bank-independent manufacturing firms, bank-dependent manufacturing firms, bank-independent trading firms, bank-dependent trading firms). The percentages do not sum to 100% because the calculation excludes firms with D/L ratios between 0.9 and 1.1 whose dependence on banks is unclear.

Source: IRS (1933), Gou and Richardson (2011), Bureau of the Census (1935, 1937)

Figure 1: Deposit Loan Ratios and Quick Ratios for Eight Industries in 1926

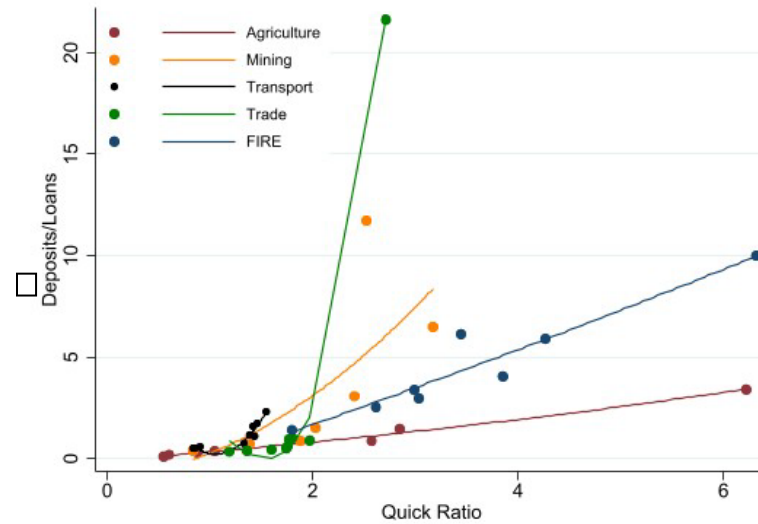
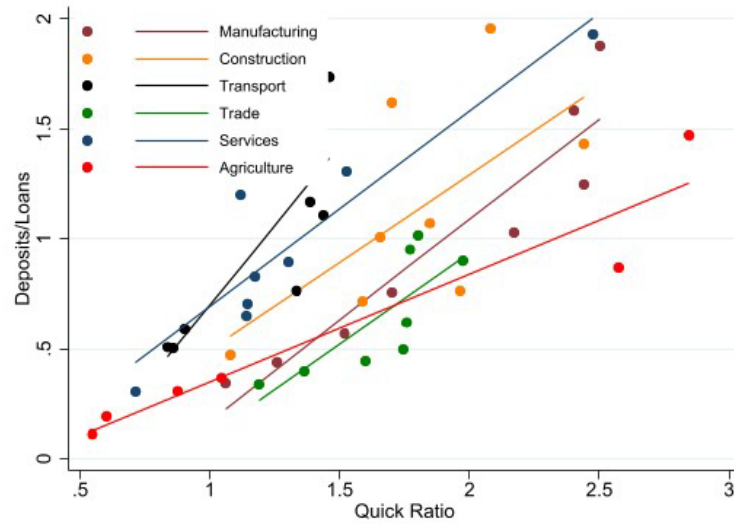


Figure 2: Predicted vs. Actual Deposit-Loan Ratios in 1926

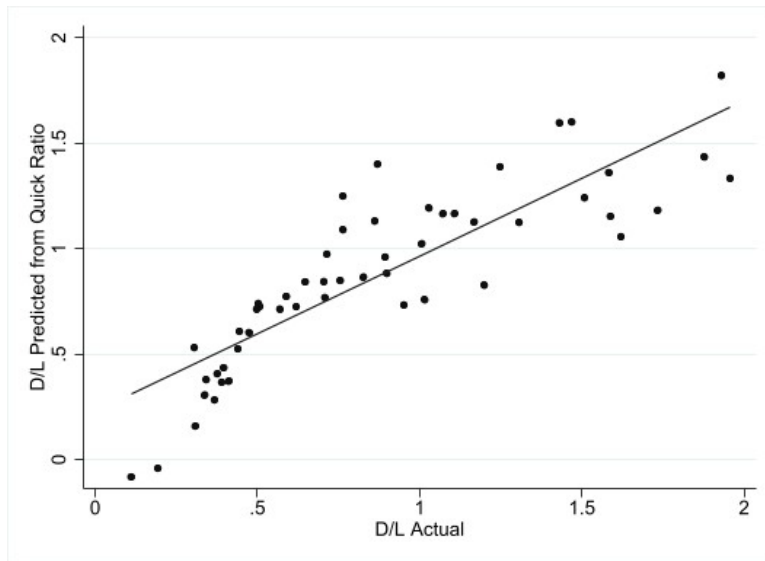


Figure 3: Cash, Trade Credit, Loans, and the Deposit to Loan Ratio by Firm Size in 1926

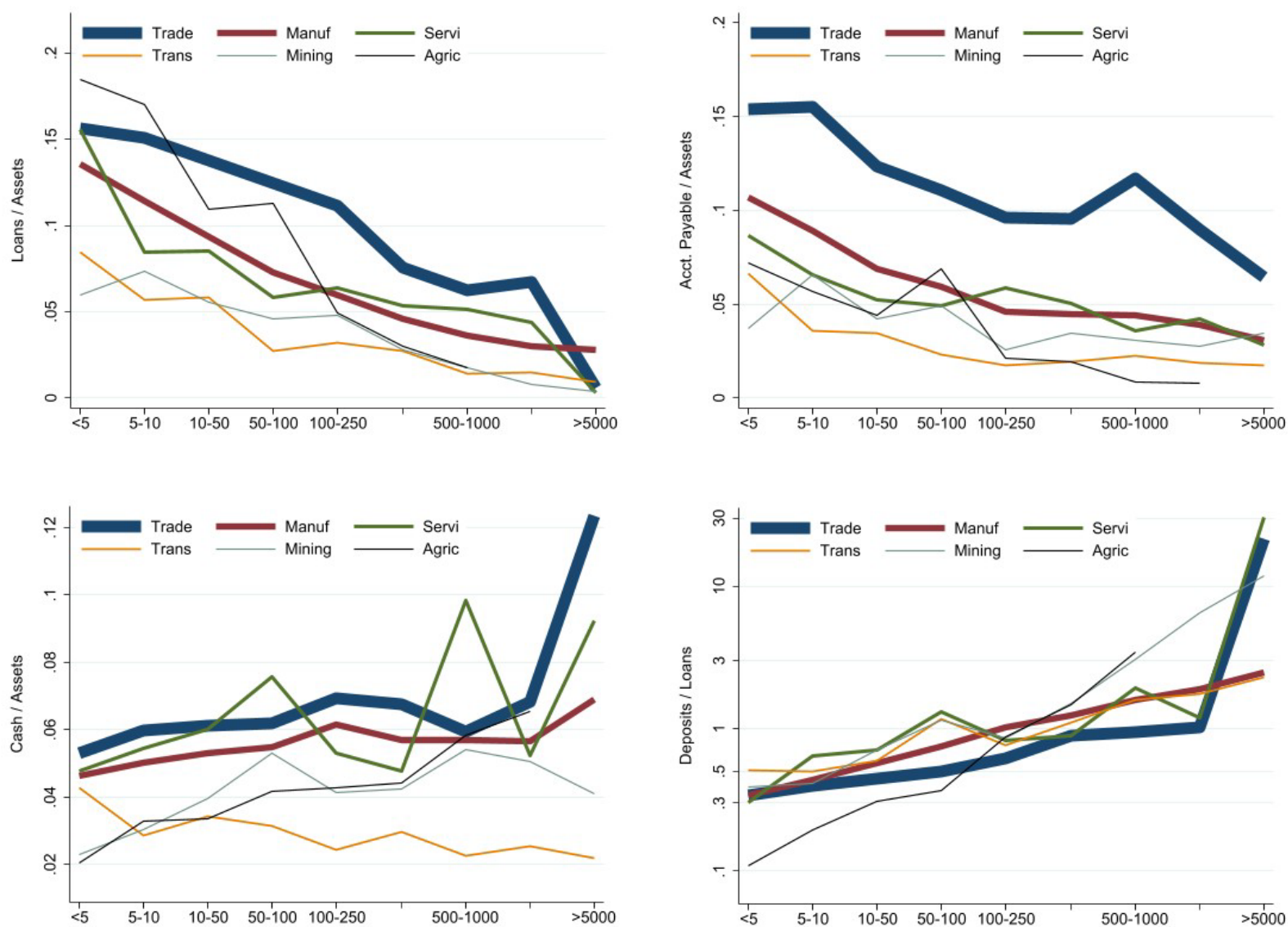


Figure 4: Bank Dependence and Independence by Industry

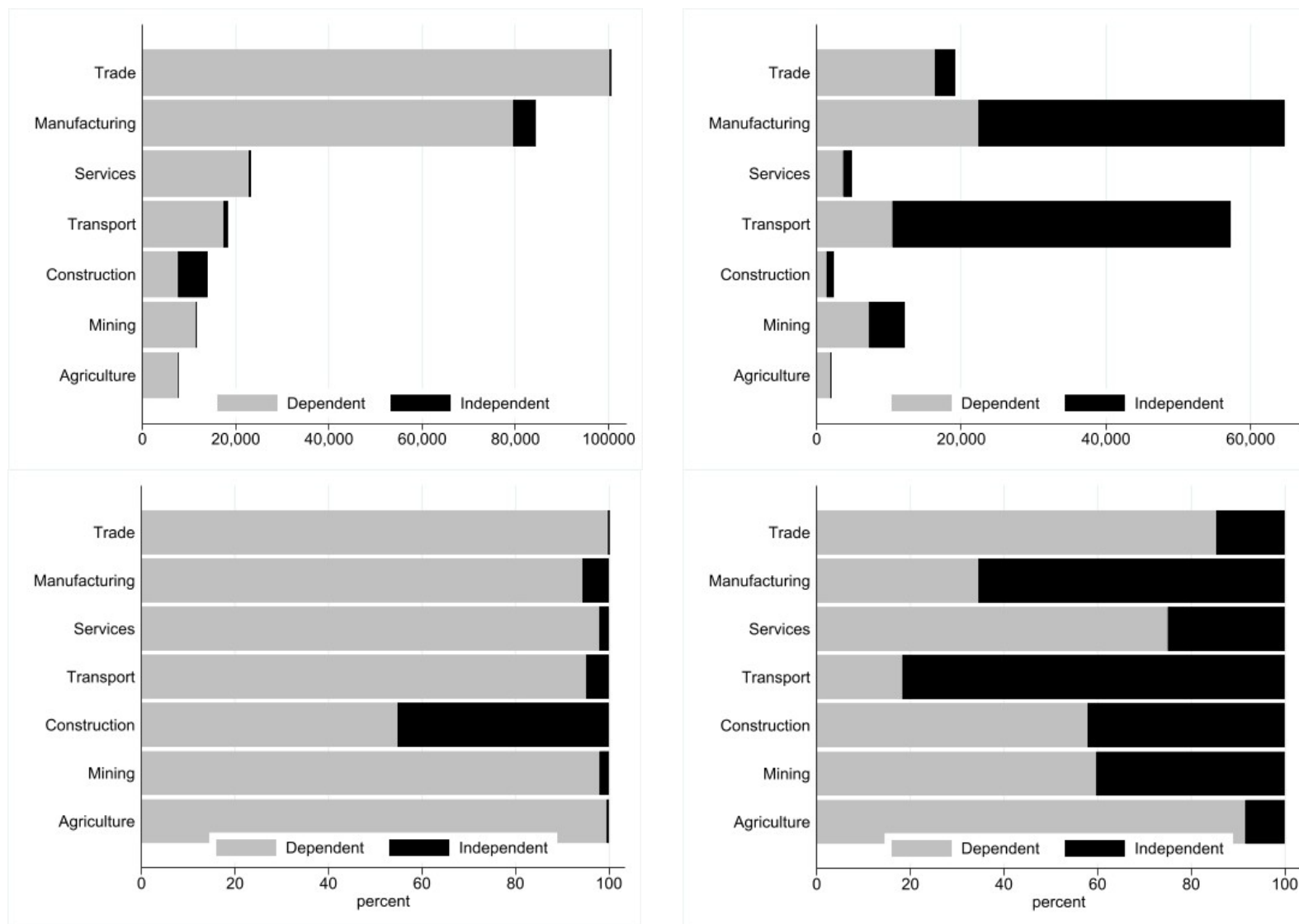
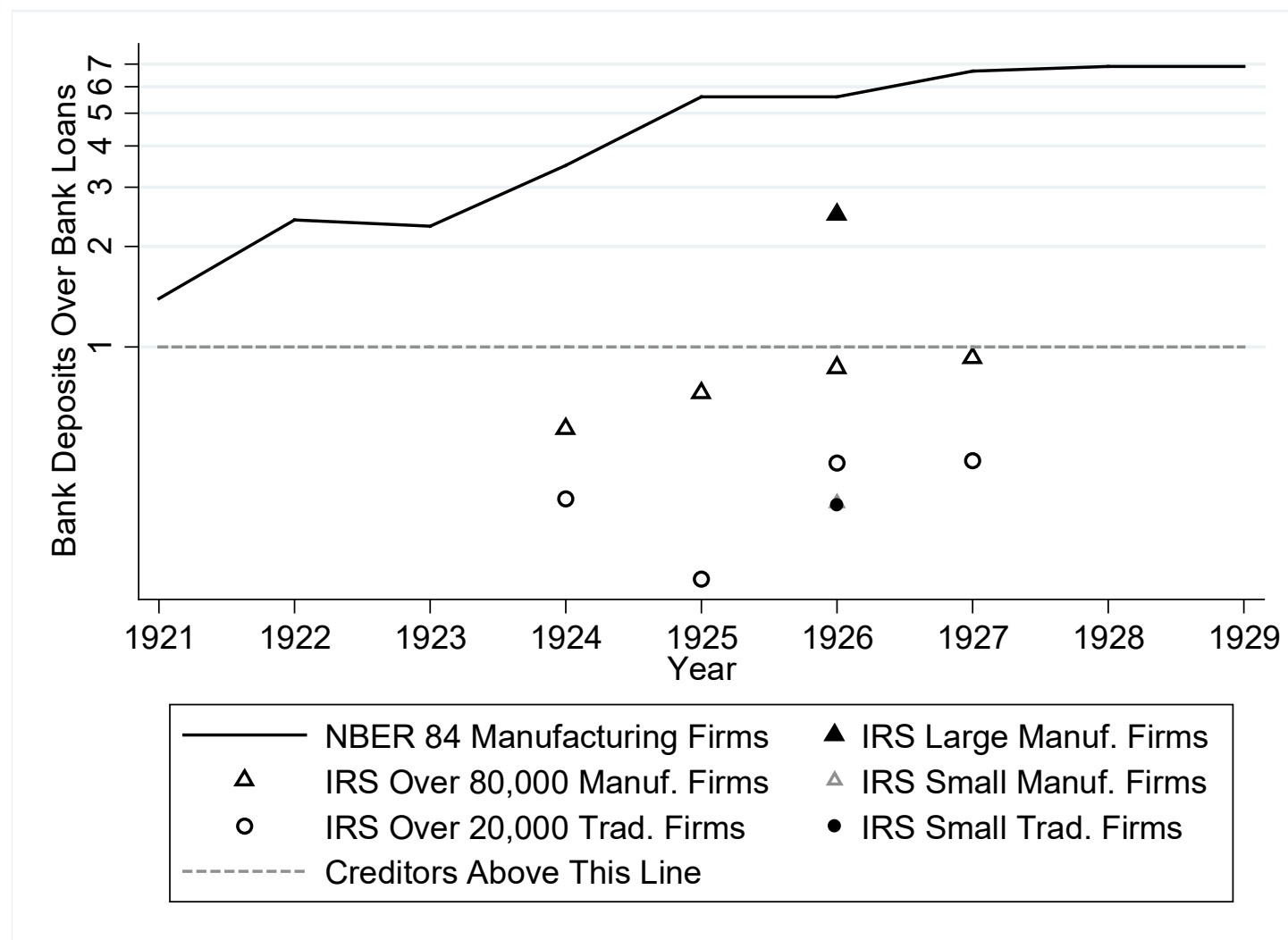


Figure 5: Manufacturing and Trading Firms as Bank Creditors and Debtors



Appendix on Data Sources

Statistics of Income

Year	Table	Pages	Title	Notes
1926	13	315-326	Income statement showing analysis of receipts and disbursements, by major industrial groups. All corporations, corporations reporting net income, and corporations reporting no net income.	Data by industry and tax/no tax
	18	360-401	Assets and Liabilities – Statement showing, by major industrial divisions and by size of net income, the number of balance sheets and the major times of assets and liabilities, as of December 31, 1926, or at close of fiscal year nearest thereto.	Data by industry and size
1927	19	371-379	Assets and liabilities—Statement prepared from income-tax returns of corporations submitting balance sheets, showing major items of assets and liabilities as of December 31, 1927, or at close of fiscal year nearest thereto, by major industrial divisions; also the number having par value common stock and no par value common stock	Table 19 contains data on assets with notes payable. Size indicated only by income > 0 and income =0.
1928	19	380-385	Assets and liabilities—Statement prepared from income-tax returns of corporations submitting balance sheets, showing major items of assets and liabilities as of December 31, 1928 or at close of fiscal year nearest thereto, by major industrial divisions; also the number having par value common stock	Table 19 contains data on assets but sums notes and accounts payable.
1928	20	386-387	Assets and liabilities—Statement showing, by size of net income and deficit, the number of balance sheets tabulated and the major items of assets and liabilities as of December 31, 1928, or at the close of the fiscal year nearest thereto	Table 20 contains data on assets but sums notes and accounts payable.
1929	19	332-337	Assets and liabilities—Statement prepared from income-tax returns of corporations submitting balance sheets, showing major items of assets and liabilities as of December 31, 1929, or at close of fiscal year nearest thereto, by major industrial divisions; also the number having par value common stock	Table 19 and Table 20, with assets and liabilities by industry and size, does not separate notes and accounts payable.
	20	338-339	Assets and liabilities—Statement showing, by net income and deficit classes, the number of balance sheets tabulated and the major items of assets and liabilities as of December 31, 1929, or at the close of the fiscal year nearest thereto	
1930	19	266-271	Assets and liabilities of corporations submitting balance sheets for 1930, by major industrial groups, showing the number of balance sheets and major items of assets and liabilities as of December 31, 1930, or at close of fiscal year nearest thereto; also grand totals for all returns for prior years	Table 19 and Table 20, with assets and liabilities by industry and size, does not separate notes and accounts payable.
	20	272-275	Assets and liabilities of corporations submitting balance sheets for 1930, by net income and deficit classes, showing the number of balance sheets and the major items of assets and liabilities as of December 31, 1930, or at close of fiscal year nearest thereto	

1931	17	160-177	Corporation returns for 1931 with balance sheets by major industrial groups and by total assets classes, showing selected items of assets and liabilities as of Dec. 31, 1931, or at close of fiscal year nearest thereto, selected items of receipts, compiled net profit or deficit, statutory net income or deficit, and cash dividends paid	Table 17, with assets and liabilities by industry and size, does not separate notes and accounts payable.
1932	17	166-182	Corporation returns for 1932 with balance sheets, by major industrial groups and by total assets classes, showing certain items of assets and liabilities as of December 31, 1932, or at close of fiscal year nearest thereto, certain items of receipts, compiled net profit or deficit, statutory net income or deficit, and cash dividends paid	
1933	17	172-189	Corporation returns for 1933 with balance sheets, by major industrial groups and by total assets classes, showing certain items of assets and liabilities as of Dec. 31, 1933, or at close of fiscal year nearest thereto, certain items of receipts, compiled net profit or deficit, statutory net income or deficit, and cash dividends paid	

Sources: Statistics of Income (various issues)

Notes: Data on corporate balance sheets first appeared in Statistics of Income in 1926.