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Credit Availability and the Collapse of the Banking Sector in the 1930s

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Abstract

This paper examines the mechanism through which banking sector distress affects the availability of credit. We use the experience of the United States during the Great Depression, a period of intense bank distress, to conduct our analysis. We utilize previously neglected data from a 1934 survey conducted by the Federal Reserve System of both banks and Chambers of Commerce regarding the availability of credit, and examine which aspects of the banking system collapse affected credit availability as indicated by the survey. A number of scholars have posited different ways that bank distress constrained credit availability and impacted economic activity during the 1930s; however, the empirical evidence regarding these channels is modest. In this study, we find that bank failures had the most dominant impact, but there is also some evidence for the importance of funding constraints from deposit outflows and of protracted deposit liquidation.

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Section 1. Introduction

This paper examines the mechanism through which banking sector distress disrupts credit intermediation. We conduct our analysis using the experience of the United States during the Great Depression, a period when banking sector distress was exceptionally acute. Based on a previously neglected survey of banks and Chambers of Commerce regarding credit availability that was conducted in early 1934, we determine whether reports that credit needs were not being met in local areas are related to various aspects of banking sector distress. We find that bank failures are the most dominant predictor of unmet credit needs, but there is also some evidence for the importance of funding constraints from deposit outflows and of protracted deposit liquidation.

This analysis contributes to a rapidly increasing volume of literature that has found that banking crises, both modern and historical, are detrimental to growth, with much of this work indicating that the deleterious effects are substantial (Hogart, Reis, and Saporta 2002; Dell'Ariccia, Detragiache, and Rajan 2008, Kupiec and Ramirez 2010). This literature has largely focused on demonstrating that such connections exist and has generally abstracted from the mechanism underlying those connections. In contrast, this paper focuses on those underlying mechanisms, using the Great Depression as the setting for the analysis. This experience has been commonly cited as an instance in which a banking crisis is thought to have worsened and prolonged the economic collapse (Friedman and Schwartz 1963; Bernanke 1983).[1] The severity of the banking distress during this period, in conjunction with a banking system that was highly localized due to the regulatory environment, offers a unique environment to examine the impact of banking distress.[2]

We focus on credit intermediation and the ways that banking sector distress might disrupt credit intermediation. We construct five measures reflecting different aspects of banking sector distress using county level developments between 1929 and 1933, including bank failures, solvency concerns at surviving banks, the process of liquidating failed banks, declines in

[1] Other scholars, such as Cole and Ohanion 2001, argue that troubles in the banking system did not have a substantial impact on economic activity during the 1930s.

[2] In the wake of the recent financial crisis, there has been a rapid growth in the literature modeling the relationship between financial sector health and financial frictions and the real economy (see for example Brunnermeier and Sannikov 2009; Chrisiano, Motto, and Rostagno 2010; and Gertler and Kiyotaki 2010). The findings in this paper regarding the importance of different channels through which banking distress affects credit availability provides information that will be useful as these models are developed further.

deposits either through failure or withdrawals, and shifts in bank balance sheets away from loans. We then test whether these measures are associated with credit rationing in early 1934, as indicated by a survey of banks and Chambers of Commerce.

The survey was conducted about one year after the banking holiday, and was motivated by a persistent national concern about the ability of small businesses to access credit. The Federal Reserve System asked both banks and Chambers of Commerce about the availability of financing for creditworthy businesses. We consider these two groups as representing the views of supply side and demand side participants in the bank credit market; receiving data from both groups provides a valuable check against biases that may be present in either group when considered individually.

The data used in the analysis are drawn from five states—New York, North Carolina, Ohio, Texas, and, Wisconsin—that have good survey coverage and available banking data, yielding 1231 survey responses from banks in 406 counties, and 276 responses from the Chambers of Commerce of 223 counties. Distress in the banking system is apparent in each of the five measures, as the banking system was characterized with significant amounts of failures and near failures, deposit outflows, prolonged liquidations, and shifts in assets away from loans.

The five bank distress measures are related, non-exclusively and to varying degrees, to different economic theories. That bank failures should reduce credit availability is associated with the idea put forth by Bernanke (1983) in which the loss of bank lending relationships and knowledge about borrowers increases asymmetric information and leads to disintermediation. Anari, Kolari, and Mason (2005) argued that the extended process of liquidating banks reduced the pool of resources available to be invested. The decline in deposits is linked, to some degree, to the ideas of Friedman and Schwartz (1963) who argued that deposit outflows reduced credit availability, but is also discussed by Bernanke (1983) as a factor that would increase intermediation costs, or might reflect something else such as general concern about the economic environment.[3] Similarly, shifts in bank balance sheets away from loans might reflect tighter lending standards by bank managers, raising the cost of intermediation as in Bernanke (1983), or reflect a flight to liquidity as in Friedman and Schwartz (1963).

[3] Friedman and Schwartz (1963) discuss the impact of a decline in deposits on the money supply and the broader economy on a nationwide scale. We argue below that there are reasons to think that during the Depression these same ideas may have had more regional implications. Regardless, we freely admit that our findings regarding the change in deposits only capture a portion of the portion of the broad argument advanced by Friedman and Schwartz.

Our use of cross sectional analysis is advantageous. Much of the previous work on the effects of the banking collapse has relied on macroeconomic data in a time series analysis. However, as illustrated by Rockoff (1993), movements in the many macroeconomic time series were extremely violent in early 1933. Using time-series analysis to distinguish between different measures of banking distress is challenging given that they generally exhibit time series patterns with similarly extraordinary movements. In using cross sectional estimation, our analysis builds on the work of Calomiris and Mason (2003), who find a relationship between deposit growth for 1930-1932, instrumented by indicators of bank health in 1929, and the value of building permit growth over the same period for a cross-section of large counties.[4] They argue that their finding supports the connection between the supply of bank credit and economic activity. This paper significantly furthers the literature by offering direct evidence on credit availability from the newly recovered survey data, and by distinguishing between five distinct aspects of bank distress that have somewhat different implications for theory and for crisis response.

In a logit framework, we predict the individual survey responses with county level measures of the five bank distress variables. When these variables are entered individually into logit estimations, we find support for the importance of bank failures, depositor withdrawals, and complications from bank liquidations in explaining reports of insufficient credit. Shifts away from loans and toward securities and cash appear to have limited impact on credit availability. In a horse-race type analysis in which the survey responses are predicted by a combination of two of the variables in a logit framework, generally the failures variable retains significance. The baseline results suggest, roughly, that an increase of 10 percentage points in the share of loans held by banks that failed between 1929 and 1933 would result in a 4-5 percentage point rise in the probability of credit needs not being met in early 1934. We interpret this as consistent with the importance of bank relationships in credit intermediation and the role of asymmetric information in constraining new relationships. The other channels of credit disintermediation may also have played a role, but our results suggest that their effects may not have been as pervasive or systematic as the impact of the bank failures.

Bank distress is at least partly a function of local economic activity and thus may be correlated with credit demand, but it is important to note that the 1934 survey is not a measure of

[4] Calomiris and Mason (2003) also find a link between loan and deposit growth for 1930-1932, again instrumented, and state income growth other that period.

credit demand; rather, the survey captures the gap between supply and demand. In terms of credit demand itself, the presence of a weak local economy may cause creditworthy borrowers to increase their demand for credit, even as the number of such borrowers is likely to decline. As long as the banking system is healthy, however, such borrowers should be able to find a source of credit and escape mention in the survey. We take the results of the 1934 survey as prima facie evidence that credit rationing existed and therefore that bank distress, whatever its source, was disrupting credit intermediation. Thus, while much effort has been spent by others in identifying a causal impact of bank distress on economic activity, that is not the goal of this paper. Our focus in this paper is on how the disruption in credit intermediation was propagated through the banking system—whether it was through bank failures, funding constraints, prolonged liquidation, or bank asset allocations.

The paper proceeds as follows. In Section 2, we provide a more detailed description of the different theories regarding the ways that the collapse of the banking sector reduced credit availability. Section 3 contains a discussion of the survey on credit availability we use in this paper. We present our data regarding the banking system and describe how we construct our variables measuring credit disintermediation in Section 4. Section 5 presents our analysis of the impact of the banking variables on credit availability. Section 6 concludes.

Section 2. Channels linking the banking sector distress and credit disintermediation

In this section we review the various channels, described in previous literature, through which developments in the banking system associated with its collapse in the 1930s may have reduced credit intermediation and affected the real economy.

The first channel focuses on asymmetric information and the special role that banks play in addressing this issue and reducing the cost of intermediation; banking distress raises the cost of credit intermediation and reduces credit availability. Bernanke (1983) describes this channel in some detail. In that discussion, bank failures are emphasized as a prominent supply-side channel that increases the cost of credit intermediation. In normal times, banks facilitate lending by gathering information about borrowers. When banks fail, this specialized information is lost. New potential lenders, either banks or non-banks, must incur costs to learn about new borrowers and overcome information asymmetries, which raises the cost of intermediation and thus reduces the availability of credit. To the extent that collateral values deteriorated or became more

uncertain in this period, the importance of specialized information about creditworthiness was likely reinforced. While not so prominently featured, another factor that could affect the cost of intermediation is the set of risk preferences of the bank manager. If a bank manager becomes more risk averse, and adjusts behavior for instance by tightening lending standards or terms, then that would also reduce credit availability.

While the first channel emphasizes an active role for banks, the second channel emphasizes the role of depositors. This channel draws heavily on the ideas of Friedman and Schwartz (1963).[5] Their discussion of the impact of a drop in deposits on the money supply touches on many aspects of the economy and includes implications for credit availability. While in normal times their argument likely mattered more on a national scale, during the Depression learning about the health of non-local banks and the health of the region those banks were in may have been exceptionally difficult and the inter-regional funding markets were impaired. Thus, one might expect that deposit outflows had impacts on a sub-national basis.[6] (Alternatively, one might view the arguments of Friedman and Schwartz (1963) as focusing more on the actions of depositors rather than a special role for banks which is emphasized in asymmetric information channel.) Large scale deposit declines, or the potential for such declines, can reduce credit availability in at least two ways. First, with a smaller deposit base, banks were simply able to extend fewer loans and forced to become more selective about the loans they did make. Second, to meet potential withdrawals, and especially runs by depositors, banks' preference for liquid assets increased which would reduce lending and boost cash and securities holdings relative to deposits. (While the resulting impact on the bank's asset portfolio from this shift in liquidity preference is similar to the impact due to a shift in the risk preferences of the bank manager, the trigger for the change in behavior is subtly different.)

Finally, a third channel involves the process of liquidation of failed banks during the Great Depression, which took an extended period, as noted by Anari, Kolari, and Mason (2005). They argue that the lengthy process of liquidation increased asset market overhang which could

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[5] It may be worth noting that Friedman and Schwartz are quite specific in arguing that the impact of deposit outflows distinct from the impact of bank failures: "bank failures were important not primarily in their own right, but because of their indirect effect. If they had occurred to precisely the same extent without producing a drastic decline in the stock of money, they would have been notable but not crucial" (page 352).

[6] Consistent with the idea that liability pressures mattered at a very local level, Richardson and Troost (2010) find an impact from differences in Federal Reserve discounting policy for banks located just a few miles apart but in different Federal Reserve districts.

negatively impact the value of collateral in the region around the area of the banks being liquidated. Further the lengthy liquidation process transformed liquid deposits into long-term claims which reduced depositor liquidity and wealth, and resulted in an implicit reduction in the money supply. These effects should result in reduced credit availability. To the extent that this mechanism focuses on how assets and deposits are constrained by the liquidation process, it represents a distinct channel from the information-centric bank failure channel we noted above, as well as from the channel highlighting funding constraints after general deposit outflows due to both active and inactive banks.

Section 3. The Credit Survey

In this section we discuss the credit survey. We present tabulations of the results and also describe some of the anecdotal information that respondents volunteered regarding the reasons that credit was or was not available.[7]

Section 3.1 The survey

Our measure of credit availability comes from a survey conducted by the Federal Reserve System and the Treasury Department in March 1934.[8] Those asked to participate included all banks that were members of the Federal Reserve System (i.e. all nationally chartered banks and state chartered member banks). At the same time, the Federal Reserve System also contacted a more informal sample of Chambers of Commerce across the country. The survey inquired about the credit needs of commercial and industrial businesses. The survey was conducted as legislation was debated in Congress regarding having the Federal Reserve and the Reconstruction Finance Corporation become more actively involved in providing credit directly to non-financial firms.[9] Concerns about credit availability also motivated somewhat similar

[7] The survey used in this paper is the Survey of Banks and Chambers of Commerce conducted in 1934 and can be found in the records of the Federal Reserve System, Record Group 82, Boxes 1368-1377, index number 332.604; National Archives and Records Administration, College Park, MD.

[8] Most of the survey was conducted by Federal Reserve Banks, but a small portion of the largest banks in the country were directly contacted by the Treasury Department.

[9] An article in the Commercial and Financial Chronicle on March 3, 1934 mentions the survey and describes it as providing evidence on the need for government-run "Intermediate Credit Banks."

surveys that were conducted by the Commerce and Treasury Departments around the same time. See Appendix 2 for a comparison with other credit surveys conducted in the 1930s.[10]

The survey took place during the week after March 5, 1934, about one year after the bank holiday. The text of the telegram sent to banks and Chambers of Commerce was as follows:

> I shall appreciate a collect telegram from you stating how much, if any, credit is needed in your trade territory, for purpose of providing working capital for established industrial or commercial businesses with sufficient unincumbered assets and prospects to justify loans having maturities not exceeding five years, such credit not to apply on liquidation of existing debt. Shall also appreciate your indicating to what extent in numbers the extension of this credit would continue the present employment, as well as the numbers by which the payrolls would be increased.

It is important to point out that the survey focuses on creditworthy borrowers as is evident from the reference to "sufficient unencumbered assets and prospects to justify loans." We interpret affirmative responses from banks (that credit was needed) as indications that these creditworthy business borrowers were faced with credit rationing. We consider credit rationing to be distinct from a simple increase in the cost of credit intermediation, since the telegram asked specifically if there were firms with "sufficient unincumbered assets" and which would not use a new loan to pay down existing debt. In this paper, we simply record for each bank whether the bank reported a need for credit that was not being met or whether there was no unmet need.[11]

While the telegram specifically refers to "working capital," the most pertinent information for this paper is what type of credit the banks had in mind when forming their responses. It is clear from the responses that banks considered working capital loans to be within their domain, but at the same time, banks generally did not restrict their responses to just that type of bank credit. Instead, most discussed general credit conditions. The banks' responses are understandable: they appear to have focused on types of business loans with which they had experience, rather than on a specific class of working capital loans that was not explicitly delineated in the original telegram.[12]

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[10] These surveys include Hardy and Viner (1935), United States Bureau of Census (1935), National Industrial Conference Board (1932 and 1939), as well as two unpublished surveys by the Philadelphia Federal Reserve Bank.

[11] Many banks also gave numerical estimates of the amount of credit and the impact on employment, but since other banks did not give such estimates, and since the numerical estimates were not uniformly derived, we do not use think there is much useful information in the numerical estimates from a research point of view.

[12] Our interpretation of the survey—that banks focused on general business lending—is consistent with a second letter, sent by the Cleveland Federal Reserve Bank to its districts' respondents, that asked for more specific

It is worth noting that a negative response (that credit was not needed) can be interpreted as indicating a sufficiency of credit, but is also consistent with a lack of demand; the lack of demand, in turn, could indicate either that the local commercial and industrial (C&I) firms did not need additional credit, or that the area largely lacked such firms. Indeed, many banks returning negative responses noted that their locations were primarily agricultural.

A smaller numbers of Chambers of Commerce responded to the survey. We describe the survey of Chambers of Commerce as more informal, because it is not clear which Chambers were asked to participate and on what basis, although a rough matching of the respondents with a list of known Chambers (described later) suggests that about one-third of existing Chambers responded. Like banks, these institutions appear to have focused on general credit needs rather than working capital loans. We use the term Chamber of Commerce somewhat loosely: while most responses were from actual Chambers, some towns without Chambers nevertheless contained responses from groups with similar functions, such as a business-men's association.

Responses from both groups—banks on the supply side and business groups on the demand side—are valuable, since while banks might have been somewhat unwilling to admit that there were unmet credit needs, business groups might have been more willing to say that their members were unable to obtain credit (possibly as they may have been more willing to view their members as creditworthy). We view the biases of banks and Chambers of Commerce as pointed in opposite directions, and to the extent that we find similar analytical results when using either group as our arbiter of credit availability, the robustness of our analysis is reinforced.

For illustration, consider the following examples of affirmative and negative responses from banks and Chambers of Commerce. Eaton National Bank of Eaton, Ohio reported no need for credit:

> We have ample funds to take care of any industrial or commercial business demands in our community needing working capital and would supply the same if within the sphere of sound banking. Do not know of any such needs just now in our territory and cannot see any chance of increasing employment in our town or vicinity through this measure.

In contrast, a need for credit was identified by the First National Bank of Oshkosh, Wisconsin.

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information about working capital loans, as well as the internal analysis completed by the Federal Reserve Banks and transmitted to the Board of Governors, which described the responses as discussing broad business lending. It is reassuring that when many of the Ohio banks sent follow-up letters to the Cleveland Fed, none of them indicated that the basic yes/no response was any different when considering only working capital loans.

> Believe about one million of credit could be used to advantage in this community for working capital requirements of business of our customers. Extensions of credit would continue present employment of about six hundred and would increase number to eleven hundred provided a reasonable increase in volume of business however if banks were not forced to demand continuous liquidation of loans we believe that many of these credit requirements would be taken care of in the local community.

An informal glance at bank developments in the communities of Eaton National Bank and the First National Bank indicate some differences consistent with these responses. Eaton's deposit base only edged down slightly between 1929 and 1933, by 3 percent, while the First National of Oshkosh saw deposits run off by over 25 percent. Two banks of the five banks in Oshkosh failed and five of the sixteen in that county closed. No bank failed in Eaton and only two of the ten banks in Eaton's county closed.

Turning to responses from business groups, the Chamber of Commerce in Van Wert, Ohio reported a need for credit:

> A hurried canvass reveals the need of approximately fifty four thousand in credit for business and industry in Van Wert. Unfilled orders accumulated for want of cash to purchase material. Will increase payroll seventy five percent in one case sixty percent in another. We believe loans justifiable.

In contrast, the Chamber of Commerce in Marietta, Ohio expressed little concern:

> We have had no complaints from industrial or commercial businesses being handicapped because of lack of banking facilities in our community. One of our local banks advertised for loans to industry without receiving any applications.

In this case, an informal glance at the balance sheets of the local banks is at first somewhat inconsistent with the survey responses, as Marietta contained one failure of a relatively large bank with a resulting drop in deposits, while the Van Wert banks fared relatively well. However, the Marietta banks appear to have remained more committed to lending, as their ratio of loans to total financial assets declined only slightly from 0.64 to 0.61 between 1929 and 1933, while the same ratio at Van Wert banks tumbled from 0.65 to 0.45.

Section 3.2 Survey results in five states

In this paper, we focus our analysis of the survey responses on five states: New York, North Carolina, Ohio, Texas, and Wisconsin. We select these states for a variety of reasons. First, they have high quality bank-level balance sheet data and event information (failures,

mergers, etc.) for state chartered banks available for the 1929-1933 period, which is not true for all states. Second, branch banking in all but North Carolina was generally limited; in states such as California with widespread branch banking, a local analysis of credit availability would be rendered less useful.[13] Third, these states have fairly good response rates in the survey from their Federal Reserve member banks and, with the exception of New York, also had relatively large numbers of responses from Chambers of Commerce. Finally, these states were relatively large and diverse, and crucially also contained significant amounts of commercial and industrial activity; since such activity was the subject of the survey, heavily agricultural states in the Great Plains and elsewhere have less interesting survey responses. We discuss the differences between these states and the rest of the country in the Appendix, where we present the survey's results for all states.

Table 1 summarizes the number of respondents to the survey for our five states. Responses total 1231 banks and 276 Chambers of Commerce. We believe that the Federal Reserve Banks contacted every national bank and every state member bank in these states and across the country; across the five states, the response rate for such banks is fairly high—a bit better than 75 percent for national banks and for state member banks—and thus the survey is likely to be representative at least of the towns containing such banks. We have responses from banks in 71 percent of the 572 counties in our sample of states.

There are fewer responses from Chambers of Commerce. The number of requests for information that were made to Chambers of Commerce is not known, so it is difficult to judge the response rate. However, a 1931 United States Commerce Department publication lists all of the Chambers of Commerce and similar business groups that existed in each state. While the list is not ideal because it is not clear whether all such groups were truly active, a rough analysis suggests that about one-third of these groups sent responses to the Federal Reserve Banks in our four states.

Among responding banks, 66 percent indicated that they were able to meet local credit needs, while 34 percent indicated that there were unmet credit needs. A significant number of

[13] In Ohio, branch banking was legally restricted to be within the county of the home office while in New York branches had to be within the city of the home office. Branch banking was not allowed in Texas and Wisconsin. North Carolina was a bit of an exception as statewide branching was allowed; however, even here most branches were established close to the city of the home office. (Carlson and Mitchener 2008 provide a more detailed breakdown of branch banking activity in different states at this time.)

the banks reporting no unmet credit needs indicated that their area was almost entirely agricultural, but since such information was volunteered and not required, it is problematic to use this information systematically in the analysis. We instead use county-level measures of agricultural intensiveness, described in the next section.

Overall, Chambers of Commerce were less sanguine, as one might expect. Of these institutions, 39 percent indicated that local credit needs were being met, while 61 percent indicated there were unmet credit needs. Part of the difference in opinion between Chambers of Commerce and banks can be explained by the fact that Chambers of Commerce are more likely to exist in areas with non-agricultural business activity; thus, there are fewer Chambers reporting a negative answer simply because their local area has no industry. In the 191 towns that contained both a Chamber of Commerce and at least one bank that responded to the survey, the responses were more similar.[14] Banks and Chambers of Commerce agreed 80 percent of the time about whether or not there were unmet credit needs. In most of the instances where they disagreed, the Chambers of Commerce were the institutions reporting that credit needs were unmet.

Section 3.3 Anecdotal information contained in the survey.

In the survey, some banks and Chambers of Commerce volunteered information pointing to what they viewed as the factors underlying the lack of credit availability in their regions. These anecdotes provide support for most of the ideas mentioned in Section 2. We caution against forming strong conclusions from these anecdotal replies alone, especially as this information was only provided by a modest number of respondents. Nevertheless it is useful to note that the channels identified in theory were also noted by contemporary observers. We present some responses here that we believe to be representative and informative.

Some responses point to problems associated with scarcity of deposits or some other basis to fund loans. For instance, the Commercial Bank of Delphos, Ohio, reported that:

> Additional working capital up to Fifty Thousand dollars at nominal interest would insure one industry continuing one hundred on pay roll and substantial increase if and as business conditions in general improve...The

[14] For the purpose of this comparison, we aggregate bank responses to the town level. Assuming there is more than one bank in a town, the aggregate figure is equal to the response from the majority of banks, and if there is an equally split response, we don't record that as an aggregate credit need.

> industry referred to [previously] is The New Delphos Mfg. Co. who manufacture[s] Galvanized metal products...They have wanted working capital for some months, but owing to our cramped condition here at the bank, we have been unable to grant them any credit, although our board has felt they were entitled to it...With deposits continually shrinking, up to the past year at least, we have been severely criticized for not reducing our loans accordingly.

Other respondents, both banks and Chambers of Commerce point more toward bank failures as a constraint on credit availability. The De Pere, Wisconsin Commercial Association reported that:

> Survey indicates need two hundred thousand dollars to keep two hundred men employed and employ one hundred additional. Due to defaulting cashier [the National Bank of De Pere, the only bank in town] city has been and now in unnatural financial crisis. Credit would relieve conditions as city industrial activities fundamentally sound.

Some responses highlight tighter lending policies. The Portage, Wisconsin Chamber of Commerce reported "capital ... has in the past been supplied by the local banks and they now appear to be refusing credit to these lines or are demanding unusual requirements which in themselves prohibit the extension of credit." Other banks noted the complications introduced by the liquidation process. The Central United Bank of Cleveland cited cases where "loans were held by closed banks ... hence open banks could not furnish money with which to do profitable business."

Additional responses point to problems that could be read as covering a few of the channels we have outlined. For example, the Security National Bank of Raleigh, North Carolina noted that:

> banks [are] refusing to take over capital loans which at the present time may be tied up in some institution in liquidation, or perhaps have been for many years in the hands of some other bank which now is asking for retirement.

This response could indicate that the liquidation process was inhibiting new credit or alternatively could be read as indicating that banking relationships had been lost and that it would be challenging to establish new ones. As another example, The Home Banking Company of Gibsonburg, Ohio pointed to both a lack of a funding base, noting that it had applied for $25 thousand from the Reconstruction Finance Corporation to fund new credit in their territory, and to bank failures, noting that nearby bank failures were reducing credit supply: "Within a radius

of nine miles, our location is the center of ten banks either under liquidation, restricted, or conservatorship."

Responses from banks that did not report a need for credit were also useful. One frequently cited reason that helps inform the analysis below is that the local areas were mainly agricultural. Other respondents reported no unmet need for credit as there was little demand; many others simply stated their banks had sufficient resources. The First National Bank of Lincolnton, NC wrote "those who could meet your qualifications can be taken care of by the bank;" the Circleville, OH Chamber of Commerce felt "the resources of the four local banks are sufficient to care for such needs." Indeed, some banks reported advertising for loans but not receiving much response, and as a result they parked excess funds in cash or securities.

Section 3.4 Linking the Survey to Economic Activity

The survey is a rare measure of the gap between supply and demand, in contrast to most measures of credit availability which focus on data regarding equilibrium amounts of credit outstanding. Nevertheless, it is useful to have some sense of whether the survey data is related to economic activity. Here we provide some cursory evidence to suggest that it is.

We expect that areas with reports of unmet credit needs would exhibit weaker economic progress in the period after the survey. The best real economy data we have found for this purpose are same-store retail sales data from 1934 and 1935, collected under the Census of American Business.[15] Table 2 displays results from regressing, on the county level, the growth rate of same-store retail sales on the share of each county's banks (or CoCs) reporting a need for credit, and state dummies. The results indicate that same-store retail sales growth was lower between 1934 and 1935 in areas with larger shares of either banks or chambers of commerce indicating credit need were not being met. In terms of the magnitude, if an additional one-tenth of a county's banks reported credit needs not being met, the predicted level of sales growth would decline by about 13 percentage points. These results are suggestive and help bolster the relevance of the survey; we expect to explore this linkage in more depth in future research.

Section 4. Data on the Banking Sector

[15] Linking the survey to real outcomes must be done carefully, as there is greater scope for reverse causality from the real economy into the banking sector.

In this section, we review the data used in the analysis and describe the construction of our measures regarding changes to the banking system that might reflect reduced credit intermediation. We also discuss how these measures relate to the different theories outlined in Section 2.

Section 4.1 Banking data for four states

We collect balance sheet data in December 1929 and December 1933 on all commercial banks in five states: New York, North Carolina, Ohio, Texas, and Wisconsin. The data cover state and nationally chartered institutions in all states, as well as private banks that existed in New York and Ohio. Thus we digitized the balance sheets for about 4700 banks in 1929 and about 3400 in 1933, as a large numbers of bank failures and some bank mergers are in no way offset by a small number of new banks. Crucially, we also collect information on such failures and liquidations, as well as mergers, conservatorships, reorganizations, and any other structural events that occurred between 1929 and 1933. Information on failures is clearly necessary for creating some of the useful measures while information on consolidations is important in some situations for capturing some important changes to the firm. Our data sources are given in the data appendix.

The balance sheet data include, most importantly, information on loans, deposits, and total assets, but also includes securities holdings, cash, capital, surplus, borrowings in the form of rediscounts, and other items. We collect the balance sheet information on live banks in both years and banks in receivership and conservatorship in 1933. The information provided regarding banks in receivership is much less uniform across states and regulators; indeed, total deposits is the only variable consistently reported. (Moreover, we were unable to locate balance sheet data for states banks in receivership in Texas. Thus, certain parts of the analysis are restricted to using information from the other four states.)

When conducting the analysis, we focus on banks in counties that had at least three banks as of the end of 1929. This is done to reduce the volatility in the variables measuring bank distress, as those variables are more extreme in counties with only one or two banks. Otherwise, we include all observations, with a few exceptions. First, we exclude Wilson County, North Carolina, which was the headquarters of the Branch Banking and Trust Company (BB&T). North Carolina had statewide branching during the 1920s, but this generally is unimportant as

most branches were within the same counties. However, BB&T acquired many banks between 1929 and 1933, rendering Wilson County an extreme outlier according to our banking variables. Second, we exclude three boroughs of New York City: Manhattan, Queens, and Brooklyn, as New York banks operated fundamentally differently than banks in the rest of the country at this time. Finally, there was a major oil boom during the late 1920s in a previously sparsely populated region of northern Texas, including the counties of Gray, Gregg, Refugio, Rusk, and Smith. This boom results in extreme outliers in the banking and control variables (growth in manufacturing value added from 1920 to 1930 exceeds 20,000 percent in Gray county) and we exclude these counties as well.

Section 4.2 Constructing measures of changes in the banking sector, relationship of these measures to theory

We construct five variables to measure channels through which credit intermediation might have been disrupted due to banking distress. These variables are related to varying degrees to the channels identified in Section 2. All variables are constructed at the county level.

Our first variable is the share of all banks' loans as of 1929 that were held by banks that ultimately failed by 1933. By constructing the share of loans in this way, we implicitly weight each bank by its importance in the county economy. Across all banks in the five states, there are about 1200 failures, and such institutions account for 16 percent of loans as of 1929. This variable reflects the impact of bank failures and loss of knowledge that banks have about their borrowers and is most closely connected to the idea that bank failures increase asymmetric information and reduce credit information (as in Bernanke 1983).

While in many cases it is clear whether or not a bank has failed, some situations are less certain. In these cases, to determine whether the banks failed, we are guided by the idea that information about borrowers is embodied in the bank officials. In particular, if banks reorganized into new charters while retaining the same set of officers, we do not consider this to be a failure as specialized information was not likely to have been lost in such a process. Similarly, banks that were suspended or in conservatorship at the end of 1933 are not considered

failures for our purposes.[16] (Robustness checks indicate that alternative treatments of banks in conservatorship do not change our results.) On the other hand, if a bank merges with another bank that ultimately fails, the acquired bank is considered to have failed and its loans from 1929 are also counted among the loans of failing institutions.

Our second variable is the percent change in the deposits at all open banks in 1929 and all open banks in 1933.[17] This measure captures flows from failed banks to other banks, deposits at new banks, and automatically adjusts for mergers. Across all counties, deposits contracted an average of 37 percent between 1929 and 1933, roughly in line with the decline in deposits nationwide (Federal Reserve 1943). While a significant portion of the decline in deposits reflects bank failures, the contraction is apparent even among banks that remained open throughout the sample period; looking only at these banks, the average county-level deposit contraction was 19 percent.[18] A contraction in deposits ought to have reduced the ability of banks to fund loans. We view this variable as arising from the issues described by Friedman and Schwartz (1963). While their point is that the nationwide decline in the deposit base reduced the money supply and the ability of banks to make loans, we argue that the exceptional circumstances during the Great Depression increased the difficulty in assessing non-local bank quality impaired inter-regional deposit markets so that deposit declines may have mattered at the local level during this period. The link between the deposit decline variable and theory is not quite as close as with the bank failure variable and it is possible that this variable captures other ideas. For instance, Bernanke (1983) notes that deposit outflows would likely increase the cost

[16] There are about 144 banks in conservatorship at the end of 1933 across our four states. Although they faced some restrictions on their activities during the conservatorship process, these institutions were being rehabilitated with the goal of returning them to solvency (Upham and Lamke 1934). Further, a few of the institutions initially in conservatorship and that were subsequently placed in receivership record more deposits upon entering receivership than they had when placed into conservatorship. Many of the institutions in conservatorship at the end of 1933 are subsequently relicensed.

[17] Banks need not be open in both years to be included in the deposit total for a particular year. As noted earlier, based on information in the reports of the state banking commissioners, the reports of the Comptroller of the Currency, and descriptions of the dealings with closed and distressed institutions (Upham and Lamke 1938), we treat banks in conservatorship as open institutions when computing the deposit ratios. Balance sheet data at the end of 1933 for National banks in conservatorship are the values as of the date the institutions entered into conservatorship minus any distribution of funds or the values of the balance sheet items when the bank was placed in receivership if that change occurred within the first few months of 1934. State banks in conservatorship appear to have been listed with other open banks. In Ohio, these banks are flagged as being in conservatorship and in North Carolina there are listed as operating on a restricted basis. State banks in conservatorship are not separately identified in New York of Wisconsin.

[18] All numbers in this paragraph account for the effects of mergers.

of credit (although even here the source of the disintermediation lies with the depositor rather than direct action on the part of the bank).[19]

Our third measure is the portion of the decline in deposits from 1929 to 1933 (described above) that owes to deposits held by institutions being liquidated at the end of 1933. As noted above, deposits is the only liquidation variable reported consistently across states and regulatory authorities.[20] Of the $5 billion net outflow of deposits in the four states for which we have balance sheet data for banks in receivership, about 11 percent is due to deposits stuck in liquidation at the end of 1933. This variable corresponds most closely to the idea that the liquidation process kept financial resources out of the system (similar to Anari, Kolari, and Mason 2005).

Our fourth variable is the change in the ratio of loans to the total of loans, securities, and cash, between 1929 and 1933.[21] To calculate this ratio, we use a consistent set of institutions in 1929 and 1933; that is, we first determine which institutions exist in both 1929 and 1933, so that we consider only institutions that exist in both periods.[22] This effectively excludes banks in 1933 that were founded in the previous four years, of which there were few, and banks that exited after 1929. Between 1929 and 1933, loans declined in importance on bank balance sheets, with the average ratio of loans to loans, securities, and cash in our sample declined from 60 percent to 47 percent. The connection between this variable and theory is the least clear of the variables that we construct. It could reflect a change in lending standards with banks requiring a higher return or a safer borrower before lending. It could reflect a change in preferences regarding liquid assets as bankers faced a greater likelihood of depositor runs. It could also reflect a decline in demand for loans leaving banks to invest more in other types of assets.

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[19] One might argue that deposit flows are also related to the actions by bankers to the extent that they can adjust the interest rates they pay on deposits to attract new funds. However, given the magnitudes of the deposit declines observed, we find it unlikely that modest changes in the interest rate paid on deposits would have been sufficient to retain deposits.

[20] Even for just this variable, some estimation is required. Information on deposits still in liquidation at the end of 1933 is directly available for state-chartered banks in all four states. At the national level, we take deposits at closure and subtract payouts that have occurred since the banks were placed in receivership. Banks in conservatorship are not included in closed banks.

[21] We sum the balance sheet items before computing the ratios, resulting in a weighted average ratio.

[22] Banks that are acquired between 1929 and 1933 are combined with the acquiring institution in 1929. For banks in conservatorship, data on loans, securities holdings, and cash are unavailable. Thus, though we consider such banks to be active insofar as our deposit change measure is calculated, they are necessarily not included when calculating the loan concentration ratio.

Despite the lack of a clear connection to a single theory, this variable still has the potential to provide information on the mechanism linking banking sector distress to credit availability.

Finally, our fifth variable measures the *ex ante* risk of failure among banks that survived to the end of 1933 in each county. We construct this measure as closely as we can to the failure prediction framework used in Calomiris and Mason (2003), with a first stage in which we use several balance sheet and other variables in the full sample of banks to predict failure between 1929 and 1933.[23] One might expect that banks that were experiencing financial difficulties to curtail lending due to safety and soundness concerns. Calomiris and Wilson (2004) find some evidence of this effect. Our variable of *ex ante* failure risk provides a proxy for such potential financial difficulties.

Section 4.3 Control variables

In the analysis below, we also include a few sets of control variables. The first set of such variables relates to the importance of agriculture in each county, as measured by the 1930 census. Since the survey asks specifically about credit to commercial and industrial firms (as opposed to generally credit needs), some banks indicated that the reason that there were no unmet credit needs to commercial and industrial firms was that they were located in heavily agricultural regions. We control for agricultural intensity using the ratio of income from agriculture to the sum of income from agriculture and the value added by manufacturing. We also control for the growth of the agricultural sector between 1920 and 1930.[24]

The second set of control variables accounts for the economic environment. While there are limited data available at the county level to measure the change in the economic environment between 1929 and 1933, one useful indicator is the percent change in retail sales between 1929

[23] Not all balance sheet measures used by Calomiris and Mason are available here, because their analysis used Federal Reserve member bank data, for which more detailed data exists, whereas we require data available from all banks. Our predictors are log assets (size); loans and securities as a share of assets (a measures of interest earnings capacity); securities divided by loans (loan concentration); cash due from banks relative to deposits (liquidity risk); the combination capital, surplus, undivided profits and reserve accounts (i.e. net worth) relative to assets (leverage); net worth other than capital as a share of net worth (reflecting retained earnings and profitability); bills payable as a share of assets (share of assets from more expensive borrowed funds); county level data on agricultural intensiveness; and dummies for national bank chartering as well as state level dummies. We fit the probability of failure for each bank that survived to 1933 and create a county aggregate. The results use a weighted aggregate (by loans in 1929) but the results are insensitive to weighting.

[24] The growth in the agricultural sector is the percent change in the sum of land values, farm equipment, and farm buildings between 1920 and 1930.

and 1933.[25] We also include a measure of unemployment: the ratio of people on unemployment relief in 1933 divided by the population.[26] Lastly, we include the growth in the manufacturing sector between 1920 and 1930.[27] A stronger economic environment, as indicated by greater manufacturing (as well as agricultural sector growth) and a lower unemployment rate, might be expected to support the banking sector and support credit availability.[28]

Our third set of control variables accounts for the size of the banking sector in each county. We include the log of the number of banks in 1929, which provides information on the level of competition and number of alternative sources of credit. We also include a measure of the size of the banking system relative to the size of the county economy, by dividing the assets held by banks at the end of 1929 by the value of manufacturing and agricultural output.[29] Lastly, we include the share of assets in each county held by the three largest banks (i,e, the 3-bank concentration ratio).

Section 5. Analysis and results

In this section, we present our analysis and results.

Section 5.1 Empirical strategy

In our analysis, we are interested in whether the five banking distress variables described in section 3 are related to the reports that there were unmet credit needs. These variables are: the share of loans in 1929 held by banks that subsequently failed, the percent change in deposits, the share of the change in deposits due to deposits in liquidation at the end of 1933, and the change in the ratio of loans to loans, securities and cash, calculated within a consistent set of banks. All these variables are calculated at the county level.

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[25] We thank Price Fishback for making these data readily available.

[26] We divide by population because the workforce by county is not available in 1933. We linearly interpolate 1933 population from the 1930 and 1940 censuses.

[27] The growth of the manufacturing sector is the percent change in the value added by manufacturing between 1920 and 1930. In cases where the census data indicates that there was no manufacturing activity in the county, we set the growth rate of manufacturing to zero.

[28] A stronger economic environment may also reflect stronger demand for credit.

[29] We tried including the log of county population. This measure was highly correlated with the fraction of income from agriculture. Including log population does not affect the banking variables but does affect the significance of some other independent variables.

We start the analysis using some simple comparisons of the average levels of the five variables between counties based on whether or not the survey responses pointed to unmet demand for credit. We then turn to more formal regression analysis. As the survey responses are binary in nature, we use a logit model. We predict *bank-level* survey responses using a set of variables that are generally at the *county* level. Consequently, banks within the same county will be affected by a common source of variation at the county level, and so we cluster the standard errors within counties. In addition, the number of observations per county varies widely, as the most populous counties (such as those containing Cleveland, OH or Madison, WI) will also have large numbers of banks. In our baseline specification, we weight each bank observation by the inverse of the number of survey responses from banks in each county; this effectively weights each county equally, rather than placing a large weight on the handful of counties containing major cities. We also reported unweighted results below.

We don't believe identification of our five banking distress variables to be a serious concern. Other scholars have studied the relationship between bank supply of credit and economic activity, and such studies typically struggle with the task of separating supply from demand effects. In particular, one might imagine that both bank distress and credit demand are at least partly functions of local economic activity and thus may be correlated. The presence of a weak local economy may cause creditworthy borrowers to increase their demand for credit, although the number of such borrowers is likely to decline and so the net effect on demand from creditworthy borrowers is ambiguous.

However, in this paper we are predicting instances in which credit intermediation process was disrupted, which is more clearly related to a lack of credit availability or to credit rationing rather than credit demand or other changes in economic activity. Indeed, the 1934 survey is worded to capture the gap between supply and demand, and we take the results of the survey as evidence that credit was not available in some cases. Thus, whether a local economic shock is causing both the bank distress and reducing credit availability is largely irrelevant, because even if that is the case, we directly observe the disruption of the intermediation process. After all, in the event of a local economic shock but in the absence of bank distress, creditworthy borrowers should be able to find a source of credit and escape mention in the survey. Our focus then is on the extent to which different aspects of distress in the banking system were related to these reports of credit needs not being met.

Section 5.2 Simple comparisons

We first present some simple comparisons to provide summary statistics as well as to conduct a broad consistency check on the data. We use the same set of counties here, and below, as described in section 4.2, i.e. those that had at least 3 banks in 1929 and excluding the small number of outliers noted above.[30] In particular, our analysis sample contains 1086 responses from banks in 319 counties, and 217 responses from Chambers of Commerce in 169 counties (and is thus slightly smaller than the sample reported in Table 1).

In Table 3, we split counties into two sets: those in which more than half of banks reported a need for credit, and the others. For each set of counties, we calculate the mean of our five bank distress variables, and display the p-value for a simple statistical test of the difference between the two means.

Overall, both sets of counties appear to have experienced significant distress in their banking sectors. On average, about one-fifth of each county's loans were held in 1929 by banks that subsequently failed. The decline in deposits was even more severe, at 37 percent on average, as surviving banks also experienced outflows. On average, 14 percent of the deposit contraction was due to deposits that were frozen at the end of the 1933 due to banks' receiverships. Banks' assets moved away from loans between 1929 and 1933, with the average ratio of loans to loans, cash, and securities declining by 13 percentage points. Finally, the average *ex post* risk of failure among surviving banks was about 20 percent.

Three of the five banking distress variables have significant differences across the two sets of counties, with the counties reporting a need for credit experiencing greater distress (two of the four for Chambers of Commerce). These three variables are the share of loans held by banks that subsequently failed, the percent change in deposits, and the share of the deposit contraction due to receivership. In counties reporting a need for credit, fully one-quarter of loans were held in 1929 by banks that subsequently failed, which is eight percentage points more than in the other counties. There is also a seven percentage point difference in the mean deposit change across the two sets of counties. In addition, in counties reporting a need for credit, the deposit contraction is more likely to reflect deposits in receivership. In contrast, the change in

[30] In addition, data for one control variable, the growth in manufacturing output, are missing for several counties and so those counties must be excluded from the analysis. We exclude them here as well for comparability.

loan concentration is roughly the same across the two sets of counties, as is the survivors' *ex post* risk of failure.

Table 4 displays simple summary statistics of control variables that will be used in the analysis below. Some of the control variables also differ between counties in which a need for credit was reported and counties not reporting a need for credit. As expected given the survey responses described above, the share of county output from agriculture was higher in locations where banks indicated no unmet demand for credit. Unemployment rates were generally lower in counties in which credit needs were reportedly being met. Counties where banks generally reported no need for credit also tended to have larger banking systems relative to county output.

Section 5.3 Results using bank responses

We now turn to more formal regression analysis to consider the relationship between whether credit needs were reported as being met and the various measures of banking sector collapse.

We first estimate five specifications in which each of the five bank distress variables are entered separately, and then we estimate "horse-race" type specifications in which we include two of the bank distress variables together. In addition to the control variables described above, we also include state dummies.

Results of analysis examining the banking variables separately are shown in Table 5. In the first column, we find a statistically strong relationship between failures, as measured by the share of loans at failed banks, and the indicator of credit availability. The coefficient estimate of 0.45 reported is an estimate of the marginal effect; thus, if the share of a county's loans at failed banks rises by one standard deviation—about 20 percentage points—the probability of a bank in that county reporting unfilled credit needs rises by roughly 9 percentage points, which is economically significant and certainly nontrivial. Counties in which there were considerably larger declines in the deposit base were also notably more likely to report that some firms were unable to obtain credit. The magnitude of the estimated marginal effect, -0.39, is roughly similar to that of the failures variable. In addition, the liquidation variable also has a significant relationship with an estimated marginal effect of 0.43. As might be expected given the statistics

reported in Table 3, we do not find that changes in the loan concentration ratio or survivors' risk *ex post* risk of failure have any significant effect on reported credit availability.[31]

As for the control variables, counties with higher unemployment rates were more likely to have unmet credit needs, as in Table 4. There was also some tendency for counties with stronger sales growth from 1929 to 1933 (or at least less deterioration in sales) to be less likely to have reports of credit needs not being met. Counties with stronger manufacturing growth from 1920 to 1930 also appeared to have fared slightly better. As noted above, many banks responded that their regions were largely agricultural and thus had few commercial or industrial businesses. Consistent with those responses, we find that counties more dominated by agriculture are less likely to report that businesses lack credit.[32]

In Table 6, we test the relative explanatory power of the bank distress variables by estimating specifications in which two variables at a time are included as independent variables, along with the standard set of controls. We focus here on testing the importance of three of the five variables, excluding the loan concentration measure given its lack of standalone significance. Before discussing these results, it is worth noting the pairwise correlations among the three variables. The failures variable is fairly highly correlated with both deposit measures, with a correlation of about 50 percent for the change in deposits and 60 percent with deposits at banks in receivership. The remaining correlation, between the two deposits variables, is fairly low, around 25 percent. The main result from Table 6 is that the failures variable dominates the deposit variable and the liquidation variable, suggesting that the standalone significance of the latter two variables in Table 3 is the result of their correlation with the failures variable. Both the deposit change variable and the liquidation variable lose significance when the failures variable is also included in the specification. For both variables, the lack of significance derives from an estimated marginal effect that is closer to zero, while the standard error remains largely the same.

In the next two subsections we examine in more detail the results from the bank surveys, first by further exploring the relative explanatory power of the failures variable compared to the

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[31] In terms of the liquidation process, one source of variation not exploited in Table 4 is the variation in legal resolution regimes across states. Of the states in our analysis, only Ohio required court-appointed receivers, which lengthened the resolution process as noted by Mitchener (2005) and Anari, Kolari, and Mason (2005). Nevertheless, interacting the liquidation variable with an Ohio dummy (not shown) does not yield notable results.

[32] Our goodness of fit measures suggest that our explanatory variables do a moderately good job in explaining variation in the survey responses, which seems reasonable as we are examining whether county level variables are informative about individual level responses.

deposit contraction variable, and second by conducting a number of robustness checks. We then revisit the baseline analysis with the responses from the Chambers of Commerce.

Section 5.4 Further exploration of the deposit changes versus failures

Deposits in a county can decline because depositors withdraw them from the banking system or because a bank fails and reduces the deposits at open institutions. To the extent that the latter reason is important in explaining the decline in deposits, it is hard to distinguish between the impact of deposit declines and bank failures. In this section, we present two tests designed to examine this issue further.

As a first test, we create a new variable that measures the change in deposits only at surviving banks—i.e., excluding failures but also any other bank that did not exist in either 1929 or 1933. This variable would in some sense measure the change in deposits not caused by failures, at least directly. There is still substantial contraction as measured among these banks, 18 percent on average. However, as shown in line (1) of Table 7, this variable has no predictive power over the survey responses, even when the failures variable is not included.

As a second test, we report results for a subsample of counties that had low failure rates (defined as counties with less than 10 percent of loans at failed banks—just above the 50th percentile. The idea is that the deposit changes in these counties would be less confounded by failures. Nevertheless, as shown in line (2) of Table 7, deposit changes have little predictive power over credit availability in these counties.

Finally, on line (3) of Table 7, we alter the deposit change measure slightly by excluding banks in conservatorship in 1933 (see footnote 16 above for a discussion) so that they are not treated as active in 1933. The banks in conservatorship or not counted as failures, either. While this measure has predictive power when included by itself (not shown), its significance once again fades when the failures variable is included.

Section 5.5 Robustness

We further verify the robustness of the results in a few ways. First, we limit observations to samples in which the counties have particular attributes. Second, we revisit some of the technical aspects of our estimation, such as the weighting scheme, the coding of the survey

responses, and the geographic treatment of county borders.[33] Finally, we run the bank analysis on just the set of towns with Chamber of Commerce responses, to check that the subsample is not changing the results. As there are fewer Chamber of Commerce results, we limit our robustness exercises to analysis using the bank survey responses.

Table 8 contains the first set of robustness checks, starting in the first line with the agricultural intensiveness of counties. In the analysis above, we controlled for the importance of agriculture directly by including the share of agriculture in county output in the regression analysis. However, this linear measure may not fully capture the importance of agriculture if the survey responses are simply not meaningful where manufacturing activity is very small. As an alternate specification, we limit the analysis to counties in which manufacturing accounts for at least 35 percent of the value of county output. As shown in line (1) of Table 8, we obtain quite similar results when using this specification.

There may be different dynamics in locations with larger numbers of banks as there would be more scope for depositors or borrowers to shift to a different bank in the event their usual bank experienced distress. Relatedly, having more banks in the county might mean that other banks might be more able to pick up slack in the event one bank is experiencing difficulties. To test the robustness of our results in this regard, we repeat the analysis limiting the sample to counties in which there are at least 10 banks. As shown in line (2) of Table 8, the results are as before. Repeating the horse race regressions limiting the sample in this way produces results similar to those in Table 3.

The remaining lines in Table 8 deal with quasi-technical details of the baseline analysis. In line (3), we redo the baseline analysis using just the counties for which we have responses from Chambers of Commerce, to confirm that the variation in county samples is not important. In line (4), we redo the baseline analysis without weighting observations, so that the counties with more responses have more effective sway over the analysis, effectively putting weight on larger cities, such as Cleveland, that is roughly proportional to their sizes. The results are broadly similar to the baseline results: the failure and deposit change variables remain significant, although the magnitude of the coefficients is somewhat diminished. Finally, similar

[33] We also tested the robustness of the linear specification of the bank variables. We did not find any evidence to lead us to reject a linear relationship.

results are obtained in line (5), in which we remove about 30 survey responses that were difficult to classify as affirmative or negative responses.

In Table 9, we continue the robustness checks. In line (1), we revisit the treatment of county borders. Since county level measures may not fully capture credit conditions for towns that are near borders with other counties, in this specification we take into account banking conditions in neighboring counties. Survey respondents are allowed to be affected by banking conditions in a "neighboring" county if that neighboring county has at least one bank that is located within 10 miles of the survey respondent; of the 1086 survey responses, 466 satisfy this criterion. Thus, the specification includes a variable measuring bank failures in neighboring counties, a dummy variable indicating whether the town is considered to have a neighboring county, and their interaction.[34] We find that bank failures in neighboring counties have predictive power of about the same magnitude and significance as bank failures in the home county, underscoring our findings. In line (2), we check that whether the length of time between bank failure and the survey date mattered by allowing failures in 1930 and 1931 to predict the survey response separately from failures in 1932 and 1933. Failures in both periods have predictive power.[35]

Section 5.6 Results using Chamber of Commerce responses

In this section, we repeat the same specifications as above but use the Chamber of Commerce responses as the dependent variable.[36] The results are shown in Table 10 for estimations when each of the banking development variables is included individually. The sample is smaller, with 217 responses (again less in some cases as deposits at banks being liquidated are not available for Texas). However, the results are fairly similar to the bank survey results, as the failures and deposits variables exhibit statistical significance, though the variable measuring the deposit liquidation process does not have any clear predictive power. The

[34] About three-fourths of these 466 observations only have one neighboring county, and only a handful have three or four neighboring counties. If there is more than one neighboring county, we measure the neighboring counties' bank failure rate as the arithmetic mean of the counties.

[35] This result may reflect difficulties starting a bank during this period to take advantage of the exit of any existing bank. We checked to see if loan growth was stronger at banks where there was a nearby bank failure. We find some small evidence of this, but the effect was more to slightly slow the contraction of nearby banks rather than to result in any actual increase in loan growth.

[36] We limit the dependent variables we consider to those that mattered in the analysis using the bank surveys. The banking variables that did not matter in those regressions did not matter here either.

magnitudes of the coefficients on the failure and deposit variables have the same rough magnitude as in Table 5, in the range of 0.5. The coefficient for the percent of deposits in receivership is not significant here.

For the control variables, higher unemployment rates in 1933 continue to be strongly associated with reports of unmet credit needs. Stronger growth in manufacturing value added again displays some tendency to be associated with a lower likelihood of reports that credit is needed. Retail sales growth retains the same sign as in the analysis using the bank survey responses, though this variable is not statistically significant here. The share of county income from agriculture is not significant in the analysis using the Chamber of Commerce survey responses.

Economically, the results from Table 10 are largely similar to the initial results from the bank survey responses, as there appears to be support for the importance of both the failures variable and the deposits variable. To assess the relative importance of the two variables, we include them both in the regression and report the results in last column of the table. Neither the failures variable nor the deposit change variable is significant separately; however they are jointly significant.

Section 5.7 Discussion

Our results strongly suggest that bank failures resulted in limiting the availability of credit, even to creditworthy borrowers. In other words, the survey provides evidence that banks and business groups recognized the existence of credit rationing in 1934, and our statistical analysis indicates that such rationing is most clearly related to the pattern of bank failures. This is suggestive evidence in favor of the hypothesis outlined in Bernanke (1983) that the banks exist to solve asymmetric information problems and that banking relationships allow the banks to develop special knowledge about their borrowers. When banks fail, that knowledge is lost and credit intermediation is impaired.

From the survey results, it seems that banks were aware of creditworthy borrowers that needed loans, and yet were not supplying those loans themselves. However, for a new bank, it may be costly to evaluate potential new borrowers, even if they are thought to be creditworthy in a general sense. It seems likely that while surviving banks may know whether a firm is generally creditworthy, there may still be large costs in determining the amount of money a bank is willing

to lend, and the optimal interest rate, contract length, collateral requirements, and other terms on the loan. For example, consider collateral in particular; with the value of commercial properties having declined considerably from 1929 to 1933, there was an unusual amount of uncertainty in this period over the value of such properties for collateral. A bank with an ongoing relationship was probably much better placed to evaluate the collateral, while banks without such knowledge would be more likely to demand greater than usual collateral. Indeed, anecdotal reports in the survey responses indicate tighter collateral requirements. The other banking variables, declines in county deposits and the share of deposit losses due to the liquidation process, matter for credit availability when included individually, but do not matter when they are included with the variable reflecting the share of loans at banks that subsequently failed. We do not find any evidence that changes in bank balance sheets, which might proxy for changing lending standards or liquidity preferences, had a substantial impact on credit availability. These results suggest that, while these mechanisms may have contributed to reduced credit availability, their impact on credit availability was not as strong as the mechanism working through the bank failures.

To be clear, we do not interpret these results as necessarily providing negative evidence against the existence of such channels. Rather, we simply are only able to find positive evidence for a systematic effect of failures. There may be idiosyncratic, locally based effects of the deposit variables or of other channels, and the anecdotal survey responses indeed indicate such effects may have existed.

The timing of the survey may also help explain our findings. The survey took place shortly after the Depression-era financial crisis, nearly ideal timing for assessing the impact of bank failures. Our finding that the liquidation variable might not matter in a systematic way may in part reflect the timing of the survey as being premature for that purpose. Anari, Kolari and Mason (2005) argue that the extended nature of the liquidation process contributed to the length of the Great Depression. The credit survey analyzed in this paper took place close to the peak of the assets placed into receivership. It is possible that the failure of a bank severed a relationship, providing an initial shock which the survey was well timed to assess, while the liquidation process and resulting asset overhangs and deposit lock-ups prevented new relationships from forming. The latter pattern might only emerge over time, plausibly well after the survey was conducted.

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Section 6 Conclusion

While many scholars have argued that the bank distress in the Great Depression mattered for credit disintermediation and economic outcomes, the mechanism linking these ideas is a matter of some debate. In this paper, we create five measures reflecting different aspects of developments in the banking sector; these five measures are related to distress that might be expected to matter for credit availability: bank failures, the process of liquidating failed banks, declines in deposits, and shifts in the composition of bank assets. Using a survey regarding credit availability conducted by the Federal Reserve in 1934 and answered by both banks and Chambers of Commerce, we analyze whether these different measures are related to a lack of credit. Elevated bank failures were most likely to predict a lack of credit availability and we interpret these results as providing some support for the ideas expressed in Bernanke's (1983) article arguing that banks possess special information about borrowers and the loss of that special information can increase the cost of credit intermediation and reduce credit availability.

Our results have important policy implications. The finding that more extensive bank failures resulted in reduced credit availability suggests that the procedure for resolving failing financial institutions is one of the most important aspects of dealing with a troubled banking sector. To the extent that the impact of failures on credit availability reflects the loss of lending relationships and reduction in knowledge regarding borrowers, resolution strategies that preserve these relationships, such as the assumption of one financial intermediary by another, are preferred. The FDIC's current resolution strategies typically do this for banks but, to the degree that non-bank financial institutions matter in the intermediation process, establishing a similar procedure for them may matter as well. As regulators work to establish a resolution procedure for large systemically important institutions, how these important relationships might be maintained is an important aspect of the process to consider. Such resolution strategies will also keep resources available to the financial system, rather than stuck in the liquidation process. Our results regarding deposit flows suggest that it is important that policy makers maintain depositor/investor confidence in the financial system as a whole so that money is not withdrawn from the system entirely. Finally, our finding that there does not appear to be much of a relationship between shifts in bank asset portfolios and reduced credit availability suggests that

tighter lending policies by financial institutions may not be as important during periods of financial institution distress compared to other channels by which credit intermediation can be impaired.

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Appendix 1: Data Sources

Banking data for state banks is taken from the annual reports of state banking regulators, listed in the references. These reports include, in North Carolina, *Reports of the Condition of the State Banks*, in New York, *Annual Report of the Superintendent of Banks,* in Ohio, *Annual Report of Division of Banks, Department of Commerce*, in Texas, *Official Report of the Condition of State Banks*, and in Wisconsin, *Annual report of the Condition of State Banks, Mutual Savings Banks, Trust Companies and National Banks of Wisconsin.*

Banking data for national banks are collected from two sources, the *Annual Report of the Comptroller of the Currency*, and the *Individual Statements of Condition of National Banks.*

We filled a few gaps in these sources as necessary. North Carolina's public report includes limited information on failures, mergers, and other structural events. We are very grateful to the Elizabeth Hammond of the North Carolina Commissioner of Banks for providing us with historical information on these events from that office's archives. In New York, we were not able to locate balance sheet information for trust companies for December 31, 1929; as a result, we use the March 31, 1930 data for those institutions. In 1933 and 1934, New York regulators chose not to publish any balance sheet information for state regulated banks. Thus, for the 1933, we use the Rand McNally *Bank Directory* from March 1934, which collected balance sheet information for banks at the end of 1933.[37] In addition, we also supplemented the event information available on New York banks in the public reports with William Dillistin's *Historical Directory of the Banks of the State of New York*, as well as information on the New York bank regulator's website.[38] Event information for Texas state banks is gathered from The Texas Department of Banking's website.[39]

The survey data is taken from the records of the Federal Reserve Board of Governors, stored at the National Archives in College Park Maryland; the full citation is in footnote 8. Census data is taken from Haines (2010).

[37] Most balance sheets are from December 31, 1933. A small number are from January or February 1934.
[38] http://www.banking.state.ny.us/history.htm
[39] http://www.banking.state.tx.us/corp/bnkhistory.htm

Appendix 2: Comparison of surveys of credit availability conducted in the 1930s

In this appendix, we give more detail on the survey of credit needs used in this paper and compare it to some other surveys conducted during the 1930s. The first appendix table displays the survey results by state. (However, given that response rates may have differed across states, we caution against drawing strong inferences from aggregated state level data.) Banks in the five states we use in this paper—New York, North Carolina, Ohio, Texas, and Wisconsin—were more likely to report a need for credit than the average state; in fact, Wisconsin banks were the most likely to report a need for credit, although the state is not an outlier compared to the other states reporting high needs. This is partially due to the relatively high degree of manufacturing activity in Wisconsin, New York, and Ohio, in contrast to the greater degree of agricultural activity in Texas. Banks in the heavily agricultural states of the Great Plains, Midwest, and New England all tended to be less likely to report a need for credit. Nevertheless, there is some variation, as Maryland banks for example reported little need for credit despite the relatively high amount of industrial activity in that state, while banks from North Dakota reported a fairly high need for credit despite the large agricultural focus of that state.

It is common across most states that Chambers of Commerce report higher unfilled credit needs. This is consistent with many other examples in space and time, as borrowers are generally more likely than banks to allege credit rationing. However, a simple look at the data indicates that at the state level there is a positive correlation between the share of trade organizations responding affirmatively and the share of banks doing the same. This is correlation is especially strong if the states with fewer responses (and thus higher implied standard errors) are ignored. This is reassuring evidence that the two groups are not interpreting the survey in fundamentally different ways.

There are six other extant surveys that were conducted during the 1930s with the goal of understanding the availability of credit. Two of these surveys, conducted in 1932 and 1938 by the Philadelphia Federal Reserve district, we do not believe have previously been noted outside the Federal Reserve System. All six surveys are summarized in the second appendix table. The methodology, time period, and sample group differ across these surveys and consequently direct comparisons among them are difficult; however, together they paint a picture of a need for credit, especially among smaller businesses and especially in the first half of the decade.

Table 1
Survey responses

	Ohio	Wisconsin	North Carolina	New York	Texas	Combined
Banks						
Responses*	266	89	50	455	371	1231
Banks citing need for credit	104	48	26	150	88	416
Percent citing need for credit	39%	54%	52%	33%	24%	34%
Response rate of member banks	88%	72%	92%	78%	69%	77%
Chambers of Commerce						
Responses‡	55	22	31	14	154	276
CoCs citing need for credit	39	16	23	10	80	168
Percent citing need for credit	71%	73%	74%	71%	52%	61%
CoCs in state (approx.)	145	50	50	215	260	
Geographic coverage statistics						
Number of counties	88	71	97	62	254	572
percent with bank responses	92%	66%	38%	97%	71%	71%
percent with coc responses	50%	30%	28%	23%	45%	39%

* 3 additional responses from Wisconsin were not usable. Two responses in North Carolina are from branches, and 6 responses in New York are from banks established in early 1934.
‡ 1 additional response from Ohio and 3 from Wisconsin were not usable.

Table 2: Linking the Credit Availability Survey to Retail Sales Growth

Dependent variable: same store retail sales growth (1934-1935)		
	Bank survey responses	CoC survey responses
Share responses reporting need for credit	-1.32*	-2.09**
	(0.80)	(1.08)
New York	-5.34***	-4.89**
	(0.95)	(2.08)
North Carolina	-4.31***	-4.63***
	(1.14)	(1.70)
Texas	-1.78***	-1.33
	(0.77)	(1.28)
Wisconsin	2.98*	2.77
	(1.01)	(1.80)
Intercept	13.9*	14.2***
	(0.69)	(1.26)
Adjusted R-squared	0.16	0.09
Observations	357	195

Notes: Observations are at the county level. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels respectively.

Table 3
Simple comparisons of banking system stress variables and credit availability

	All 319 counties	229 Counties with aggregate "no" response from banks		90 Counties with aggregate "yes" response from banks			
	Mean	Mean	Std. Dev.	Mean	Std. Dev.	Diff. in mean	p-value
Bank variables							
Share of loans at failed banks	0.20	0.17	0.18	0.25	0.25	0.08	0.001
Rate of change in deposits	-0.37	-0.35	0.15	-0.42	0.18	-0.07	0.001
Share of deposit contraction due to receivership	0.14	0.12	0.18	0.18	0.21	0.06	0.024
Change in loan concentration	-0.13	-0.14	0.10	-0.13	0.09	0.01	0.492
Survivors' *ex post* risk of failure	0.21	0.21	0.07	0.22	0.10	0.01	0.159

	All 169 counties	73 Counties with aggregate "no" response from CoCs		96 Counties with aggregate "yes" response from CoCs			
	Mean	Mean	Std. Dev.	Mean	Std. Dev.	Diff. in mean	p-value
Bank variables							
Share of loans at failed banks	0.21	0.18	0.18	0.26	0.27	0.08	0.033
Rate of change in deposits	-0.37	-0.34	0.16	-0.42	0.21	-0.08	0.008
Share of deposit contraction due to receivership	0.16	0.14	0.24	0.19	0.22	0.05	0.294
Change in loan concentration	-0.15	-0.15	0.10	-0.13	0.10	0.02	0.148
Survivors' *ex post* risk of failure	0.22	0.21	0.06	0.22	0.10	0.00	0.88

Notes: The share of loans at failed bank variable and the receivership variables are shares, and therefore are scaled between zero and one. The survivors' ex post risk of failure is also bounded between zero and one. The rate of change in deposits should be multiplied by 100 to obtain a percent change. The change in loan concentration (share of cash, loans, and securities held as loans) is bounded between zero and one. Within a county, credit is considered to have been reported as unavailable if more than half of the respondents—either banks or Chambers of Commerce—indicated a need for credit.

Table 4

Summary statistics for control variables

	All 319 counties	229 Counties with aggregate "no" response from banks		90 Counties with aggregate "yes" response from banks			
	Mean	Mean	Std. Dev.	Mean	Std. Dev.	Diff. in mean	p-value
Control variables							
Retail sales growth, 1929-1933	-0.35	-0.35	0.13	-0.34	0.08	0.01	0.63
Unemployment over population, 1933	0.07	0.06	0.05	0.09	0.05	0.03	0.00
Manufacturing output growth, 1920-1930	0.53	0.55	1.49	0.50	1.10	-0.05	0.78
Agricultural output growth, 1920-1930	-0.12	-0.13	0.29	-0.10	0.31	0.03	0.42
Share of output in agriculture in 1929	0.47	0.53	0.32	0.35	0.29	-0.17	0.00
Log(Number of banks in 1929)	2.25	2.21	0.61	2.32	0.61	0.11	0.14
3-bank concentration in 1929	0.68	0.68	0.19	0.70	0.18	0.02	0.39

Table 5
Predicting credit availability, as reported by banks, with bank distress variables

Dependent variable: 1(credit needed)					
	(1)	(2)	(3)	(4)	(5)
Share of loans at failed banks	0.444***				
	(0.116)				
Rate of change in deposits		-0.389**			
		(0.155)			
Share of deposit contraction due to receivership			0.420**		
			(0.184)		
Change in loan concentration				0.0158	
				(0.272)	
Survivors' *ex post* risk of failure					0.205
					(0.374)
Retail sales growth, 1929-1933	-0.337	-0.204	-0.400	-0.320	-0.318
	(0.210)	(0.231)	(0.362)	(0.228)	(0.221)
Unemployment over population, 1933	1.095**	0.996*	0.854	1.193**	1.180**
	(0.507)	(0.509)	(0.656)	(0.538)	(0.531)
Manufacturing output growth, 1920-1930	-0.0255	-0.0196	-0.130**	-0.0128	-0.0137
	(0.0203)	(0.0206)	(0.0548)	(0.0206)	(0.0205)
Agricultural output growth, 1920-1930	-0.0242	-0.0152	0.0230	-0.0260	-0.0238
	(0.110)	(0.105)	(0.192)	(0.0995)	(0.0995)
Share of output in agriculture in 1929	-0.292**	-0.291**	-0.333**	-0.236**	-0.238**
	(0.116)	(0.117)	(0.168)	(0.115)	(0.115)
Bank assets / county output in 1929	-0.0130	-0.00790	-0.0352	-0.00702	-0.00621
	(0.0246)	(0.0233)	(0.0350)	(0.0224)	(0.0225)
Log(Number of banks in 1929)	0.0615	0.0833	0.0943	0.0913	0.0982
	(0.0606)	(0.0607)	(0.0754)	(0.0620)	(0.0618)
3-bank concentration in 1929	0.181	0.230	0.359	0.234	0.255
	(0.198)	(0.200)	(0.219)	(0.204)	(0.202)
State fixed effects	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.11	0.10	0.10	0.09	0.09
Observations	1086	1086	827	1085	1085
Observations reporting credit needed	373	373	309	372	372

Notes: The point estimates are marginal effects estimated at the mean of each independent variable. A positive coefficient indicates that larger values of the variable increase the likelihood that credit is needed. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels respectively. The standard errors are clustered at the county level and the observations are weighted by the inverse of the number of responses per county.

Table 6
Relative explanatory power of bank distress variables, using bank survey responses

Dependent variable: 1(credit needed)			
	(1)	(2)	(3)
Share of loans at failed banks	0.402***	0.406**	
	(0.137)	(0.176)	
Rate of change in deposits	-0.107		-0.327
	(0.179)		(0.212)
Share of deposit contraction due to receivership		0.149	0.347*
		(0.196)	(0.177)
Pseudo R-squared	0.11	0.11	0.10
Chi-squared statistic for bank variables = 0	15.5***	13.7***	10.7***
Observations	1086	827	827

Notes: Each estimation includes the control variables and state fixed effects as in the estimations reported in Table 4. The point estimates are marginal effects estimated at the mean of each independent variable. A positive coefficient indicates that larger values of the variable increase the likelihood that credit is needed. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels respectively. The standard errors are clustered at the county level and the observations are weighted by the inverse of the number of responses per county.

Table 7
Further investigation of Deposit Declines

	Specification	rate of change in deposits	share of loans at failed banks	Observations
(1)	Deposit growth variable measured only among surviving banks	0.0673 (0.113)		1085
(2)	Sample only includes counties with low failure rate	-0.148 (0.276)		581
(3)	Conservatorships not counted as active in 1933 (estimated jointly)	-0.109 (0.164)	0.403*** (0.133)	1086

Note. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels respectively. Each specification contains the control variables as in Table 4, and is otherwise the same as the baseline specification except as noted.

Table 8: Robustness checks

	Specification	share of loans at failed banks	rate of change in deposits	deposit decline due to liquidation	Observations (first two columns/third column)
		(estimated separately)			
(1)	Using counties in which manufacturing accounts for at least 35 percent of output	0.430***	-0.449**	0.519**	822/747
		(0.144)	(0.202)	(0.218)	
(2)	Using counties in which there are at least 10 banks	0.482***	-0.403*	0.380	772/642
		(0.171)	(0.221)	(0.268)	
(3)	Sample only includes counties with responses from CoCs	0.469***	-0.515**	0.259	527/351
		(0.175)	(0.209)	(0.263)	
(4)	Observations unweighted	0.318***	-0.296**	0.269*	1086/827
		(0.0968)	(0.142)	(0.155)	
(5)	Borderline survey responses removed	0.496***	-0.362**	0.417**	1044/798
		(0.120)	(0.159)	(0.179)	

Note. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels respectively. Each specification contains the control variables as in Table 4, and is otherwise the same as the baseline specification except as noted. This table reports 15 separate estimations.

Table 9: Robustness checks continued

Specification	Coeff.	Standard Error
(1) Neighboring county effects		
Share of loans at failed banks in home county	0.460***	(0.115)
1(near banks in bordering counties)	-0.134***	(0.052)
Interaction: [% loans at failed banks in bordering counties] * 1(near banks in bordering counties)	0.505***	(0.156)
(2) Years of failures		
share of loans at banks that failed in 1930-31	0.492***	(0.142)
share of loans at banks that failed in 1932-33	0.356*	(0.184)
Chi-squared statistic for both terms	14.8***	

Note. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels respectively. Each specification contains the control variables as in Table 4, and is otherwise the same as the baseline specification except as noted.

Table 10: Bank stress variables and reports of credit availability by Chambers of Commerce

Dependent variable: 1(credit needed)				
	(1)	(2)	(3)	(4)
Share of loans at failed banks	0.464**			0.319
	(0.182)			(0.236)
Rate of change in deposits		-0.537**		-0.297
		(0.214)		(0.278)
Share of deposit contraction due to receivership			0.117 (0.270)	
Change in loan concentration				
Retail sales growth, 1929-1933	-0.0829	0.0620	-0.134	0.0116
	(0.367)	(0.386)	(0.523)	(0.378)
Unemployment over population, 1933	2.455***	2.466***	2.284*	2.402**
	(0.937)	(0.938)	(1.346)	(0.945)
Manufacturing output growth, 1920-1930	-0.0295	-0.0291	-0.250*	-0.0313
	(0.0341)	(0.0347)	(0.131)	(0.0345)
Agricultural output growth, 1920-1930	-0.0623	-0.0608	-0.0154	-0.0606
	(0.165)	(0.158)	(0.303)	(0.165)
Share of output in agriculture	-0.101	-0.0842	0.0771	-0.118
	(0.205)	(0.210)	(0.317)	(0.209)
Bank assets / county output in 1929	-0.00478	0.0114	-0.0622	0.000439
	(0.0494)	(0.0492)	(0.0867)	(0.0504)
Log(Number of Banks in 1929)	0.0740	0.117	0.0743	0.0942
	(0.103)	(0.108)	(0.123)	(0.107)
3-bank concentration in 1929	-0.0625	0.0653	0.304	-0.00698
	(0.351)	(0.360)	(0.414)	(0.364)
State fixed effects	Yes	Yes	Yes	Yes
Pseudo R-squared	0.14	0.13	0.13	0.14
Observations	218	218	121	218
Observations reporting credit need	134	134	88	134

Notes: The point estimates are marginal effects estimated at the mean of each independent variable. A positive coefficient indicates that larger values of the variable increase the likelihood that credit is needed. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels respectively. The standard errors are clustered at the county level and the observations are weighted by the inverse of the number of responses per county.

Appendix Table 1 - Survey Responses by State

	Banks				Chambers of Commerce			
State	Total	Yes	No	% Yes	Total	Yes	No	% Yes
Wisconsin	97	50	44	53%	31	19	9	68%
Oregon	42	22	20	52%	17	13	4	76%
Michigan	125	62	57	52%	45	35	5	88%
Tennessee	55	28	27	51%	21	16	5	76%
Mississippi	8	4	4	50%	3	3		100%
North Carolina	49	23	26	47%	32	24	8	75%
Missouri	125	55	70	44%	29	24	5	83%
New Mexico	19	8	11	42%	3	2	1	67%
Ohio	257	106	151	41%	52	37	15	71%
Arkansas	39	16	23	41%	9	7	2	78%
Wyoming	25	10	15	40%	0	0	0	
Indiana	104	39	64	38%	34	26	4	87%
Washington	69	26	43	38%	16	12	4	75%
Florida	40	15	25	38%	46	31	15	67%
Georgia	64	24	40	38%	36	23	13	64%
Connecticut	48	16	28	36%	22	9	7	56%
Louisiana	25	9	16	36%	13	9	4	69%
North Dakota	58	20	38	34%	10	4	6	40%
New Hampshire	45	14	27	34%	15	3	8	27%
Massachusetts	142	42	84	33%	42	24	9	73%
Illinois	178	90	183	33%	51	33	11	75%
New York	443	141	302	32%	11	8	3	73%
Delaware	16	5	11	31%	4	2	2	50%
South Carolina	16	5	11	31%	12	10	2	83%
Utah	16	5	11	31%	5	5	0	100%

(continued)

	Banks				Chambers of Commerce			
State	Total	Yes	No	% Yes	Total	Yes	No	% Yes
New Jersey	209	65	144	31%	15	10	5	67%
Arizona	10	3	7	30%	9	5	4	56%
Texas	377	113	264	30%	153	70	83	46%
West Virginia	64	19	45	30%	12	9	3	75%
Nebraska	116	34	82	29%	1	1		100%
Kentucky	81	23	58	28%	10	5	5	50%
Minnesota	174	49	125	28%	18	14	4	78%
Colorado	75	21	54	28%	1	1	0	100%
Pennsylvania	569	156	402	28%	85	53	32	62%
Virginia	123	34	89	28%	15	11	4	73%
Idaho	28	7	21	25%	6	4	2	67%
Maine	38	8	25	24%	25	11	11	50%
California	118	26	92	22%	55	20	35	36%
Montana	56	12	44	21%	9	4	5	44%
Vermont	35	7	26	21%	14	8	4	67%
Iowa	111	22	88	20%	29	17	7	71%
South Dakota	66	13	53	20%	6	5	1	83%
Oklahoma	175	34	141	19%	4	4	0	100%
Kansas	172	33	139	19%	4	3	1	75%
Alabama	66	12	54	18%	13	11	2	85%
Rhode Island	12	2	9	18%	6	1	3	25%
Maryland	50	9	41	18%	11	4	7	36%
Nevada	6	1	5	17%	5	1	4	20%
D.C.	9	1	8	11%	1	0	1	0%
All states	4845	1539	3347	31%	1066	651	365	64%

Notes:

Appendix Table 2: Surveys of credit needs during the 1930s

Surveyor	National Industrial Conference Board	Philadelphia Federal Reserve	Federal Reserve System	Commerce Department	Treasury Department	National Industrial Conference Board	Philadelphia Federal Reserve
Date	1932	1932	March 1934	August and September 1934	September 1934	1938	Nov-Dec 1938
Sample	3438 businesses of all kinds and sizes	1682 businesses of all kinds and sizes	4545 banks and 1066 Chambers of Commerce	6158 small* manufacturers	1788 pairs of banks and borrowers for which a loan was refused	1755 manufacturers of any size	380 firms
Area	Entire country	Philadelphia Fed District	Entire Country	Entire country	Chicago Fed district	Entire country	Philadelphia Fed District
Question	Do you now, or have you recently found, any difficulty in obtaining from your bank the credit accommodation required for legitimate business purposes?	Not stated.	Do you know of creditworthy businesses in need of credit?	Have you experienced any difficulty in obtaining the capital funds needed for current operations or for meeting maturing obligations?	Why were these loans refused?	Do you now, or have you recently found, any difficulty in obtaining from your bank the credit accommodation required for legitimate business purposes?	Based on your experience and observations, have you found that the small and medium sized business in your community is in need of additional funds?
Results	13.5% of all firms and 17% of small* firms reported difficulty	19% of all firms and 29.5% of small* firms reported difficulty	31% of banks and 64% of Chambers of Commerce report needs	32% of small* firms reported difficulty	"There exists a genuine unsatisfied demand for credit"	9% of all firms and 13.5% of small* firms reported difficulty	17% reported such a need

Notes: The questions are paraphrased for the Federal Reserve System survey and the Treasury Department survey. * Size definitions: a small firm is defined as between 21 and 250 employees for the Commerce Department survey, less than 250 employees for the NICB survey, and less than $100k net worth for the Philadelphia Fed 1932 survey.