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Causes of bank suspensions in the panic of 1893

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Abstract

There are several competing theories explaining bank panics. Some argue that panics are driven by real shocks, asymmetric information, and concerns about insolvency. Others argue that bank runs are self-fulfilling, driven by illiquidity and the beliefs of depositors. This paper tests predictions of different theories using information uniquely available for the Panic of 1893. The results suggest that real economic shocks were important determinants of the nationwide scope of panic, however at the local level, liquidity concerns are found to be a more important trigger of bank panics.
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1. Introduction

The National Banking Era, extending from 1865 until 1913, witnessed major financial crises in 1873, 1893, and 1907. During these crises hundreds of banks either

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failed or suspended operations; roughly 575 banks closed their doors either permanently or temporarily during the Panic of 1893 (Bradstreet's, 1893) and clearinghouses in 73 cities partially suspended cash payments in the Panic of 1907 (Sprague, 1910). The crises were also associated with plummeting stock markets and surging risk spreads (Mishkin, 1991). During these crises, specie was hoarded, and circulated at a premium over checks drawn on banks, even in major financial centers such as Boston and New York City. Due to these disruptions in the financial system, some non-financial businesses found it difficult to obtain the funds they needed to meet payrolls and were forced to suspend operations (Noyes, 1909). Efforts to eliminate these crises led to the development of many modern financial institutions including the creation of the Federal Reserve System (Calomiris and Gorton, 1991).

While these crises affected a variety of financial institutions and markets, this paper focuses only on banks and in particular banks during the Panic of 1893. During this crisis there was a bank panic, meaning that multiple banks in several regions suffered bank runs.[2] Additionally, there were several citywide panics where many of the banks within the city experienced runs simultaneously.

Several theories have emerged to explain bank panics and this paper tests their predictions to determine which more accurately explains the events of 1893. Diamond and Dybvig (1983) argue that panics result from illiquidity and depositors' concerns about whether the demand for deposits will exceed the bank's liquid reserves. Because the bank pays out on a first-come first-serve basis, depositors that would otherwise be patient run to the bank to withdraw their deposits before the bank runs out of cash. Smith (1991) shows how the banking system of the National Banking Era could cause such a panic to expand nationwide. A second theory argues that panics occur when depositors witness a real economic shock that affects bank solvency (Calomiris and Khan, 1991; Gorton, 1987). The shock may have caused some banks to become insolvent, however, due to asymmetric information, depositors do not know which ones so they close all the banks. Nationwide panics are caused by nationwide shocks. Goldstein and Pauzner (2002) and Morris and Shin (2001) construct a hybrid model in which bank runs occur because depositors fear that deposit withdrawal demand will exceed available liquid reserves (as in Diamond and Dybvig), however, depositors' beliefs about the actions of other depositors are determined by real economic events.

A similar debate on the nature of panics exists in the international economics literature today. Scholars argue over the reasons that the recent financial crisis in East Asia spread from Thailand to other countries. Some scholars (Glick and Rose, 1998) argue that the devaluation in Thailand was a negative real economic shock to Indonesia, Korea, Malaysia, and other countries because it reduced the competitiveness of their exports. A lack of information about the impact of this shock on the ability of other Asian countries to meet debt obligations may have led investors to question the solvency of the East Asian countries and withdraw their funds much as depositors in the asymmetric information theory withdraw their money from banks. Other

[2] A "bank run" in turn is a surge in deposit withdrawals at a single bank.

scholars (Radalet and Sachs, 1998) argue that the economies of the East Asian countries were sound and that the Thai crisis caused investors to be concerned that other investors would withdraw their money from the region, leading to a Diamond, and Dybvig style panic.

This paper examines the importance of liquidity, real economic shocks, and depositors' actions in triggering a panic. The analysis focuses on the Panic of 1893 because of the unique information available about it. After this panic, the Comptroller of the Currency published a list of the national banks that suspended but resumed operations as well as the banks that failed. Bradstreet's did the same for all banks—national, state, savings, and private. Banks that suspended, but resumed operations are presumed to be solvent and were closed solely due to the panic.[3] Thus, examining the reasons that these banks suspended provides an excellent test of the different theories.

The analysis is conducted on three levels. The first examines the entire nation and tests whether bank suspensions in a state were influenced more by the real shocks that occurred in the state or by the dependence of the state on the national banking system for liquidity. Second, I test whether the connections to the national banking system affected the likelihood that individual national banks within a particular region suspended. Within these first two levels of analysis, tests can be conducted across time as well as across states or banks. Midway through the panic, the central reserve city of New York suspended payments to the interior, which, if liquidity is important in causing a panic, should affect bank suspensions. The third level of analysis is a case study of Denver and the impact of a citywide mini-panic on Colorado as a whole.

The results at the national level support the idea that panics follow real economic shocks while the results of the case study suggest a larger role for liquidity. The experience of different states reveals a strong positive relationship between indicators of real shocks and bank suspensions. The description of events in Denver suggest that the panic was by uninformed depositors motivated by concern that banks were illiquid, even though the panic fell most heavily on the weaker banks.

The paper is organized as follows. Section 2 presents historical background, covering the National Banking Era and the Panic of 1893. Section 3 describes previous theoretical work on the sources of panics and the empirical work that has tested them. Section 4 tests the theories using data from the Panic of 1893. Section 5 presents concluding arguments.

2. Historical background

2.1. The national banking era

The banking system of the National Banking Era had a pyramidal reserve structure. At the bottom of the pyramid were the numerous national "country" banks.[4]

[3] Wicker (2000) suggests that this is largely an accurate assumption.

[4] A national bank indicates that it was chartered by the national government. There were also many state chartered and private banks that had varying levels of association with the national system.

These were national banks located anywhere in the country outside certain designated cities. Country banks were required by law to hold reserves equal to 15% of outstanding bank notes. Up to 60% of these reserves could be held as deposits in reserve city banks. All remaining reserves were required to be held as cash.[5] The next level of the pyramid consisted of the reserve city banks. Reserve cities were specified by an act of Congress and consisted of large cities such as Boston, Philadelphia, and Kansas City. Reserve city banks were required to have reserves equal to 25% of outstanding bank notes. Half of these reserves could be held as deposits at banks in central reserve cities and half were required to be held as cash. Thus, reserve city banks held deposits from country banks and could place deposits with central reserve city banks. In practice, reserve city banks acted as pass-through banks, most of the interbank deposits they received from country banks were placed as deposits at central reserve city banks.

New York City, and later Chicago and St. Louis, were designated as central reserve cities. Throughout the National Banking Era, New York was the primary central reserve city, holding a vast majority of the central reserve cities' interbank deposits. In fact, interbank deposits formed the bulk of the liabilities for several large New York banks. Sprague (1910) calculates that New York reserve agents had roughly three times the liabilities to bankers as to individuals.

New York banks used a substantial amount of the bank deposits they received to provide loans to brokerage houses involved in the stock and commercial paper/bond markets. Bordo et al. (1991) calculate that close to 75% of central reserve city banks' loans were loans to financial firms.[6] The loans could be called in at the banks' discretion and were therefore referred to as "call loans." These loans were thought to be very liquid and thus appropriate for reserve agents to hold.

2.2. The panic of 1893

One of the most severe panics of the National Banking Era occurred during 1893 (Kemmerer, 1910; Sprague, 1910). Scholars have noted that financial markets were strained even before the crisis. In the months prior to the crisis, the gold reserves of the Treasury were nearing the legal limit required to maintain gold parity. Some contemporary scholars claim that this led to a fear of depreciation and that the crisis was really a run on the currency (Lauck, 1907; Noyes, 1909). Other contemporary and most modern scholars maintain that concern over gold parity had little effect (Friedman and Schwartz, 1963; Sprague, 1910; Wicker, 2000) noting both that the Treasury reached the limit in late April but the bank runs did not start until June

[5] The requirements for state banks were quite different. Prior to 1887 state banks had few reserve requirements. By the early 1890s state banks were required to hold reserves valued at between 15 and 25% of deposits, depending on the state. (States also varied concerning whether reserves needed to be held against all deposits or just checking deposits.) One half to three quarters of reserves could be held as deposits in other banks, the rest had to be cash.

[6] From deposit and loan percentages it appears that money lent by the banks to be invested in the stock market did not return to the banking system in New York in large quantities.

and that the crisis was centered in parts of the country where "there is no evidence that people were distrustful of silver money (Sprague, 1910, p. 169)."[7]

The bank panic was also preceded by a stock market collapse. On February 26th, the Philadelphia and Reading Railroad, a large Eastern concern, failed. This created concern about the solvency of other firms and caused a decline in the stock market for the months of March and April (Markham, 2002). On May 5th, the National Cordage Company failed. This led to a further collapse in the stock market and led to a large increase in the interest rate on call loans (Noyes, 1909).

Despite the declining stock market, money from the interior continued to flow into New York, possibly to take advantage of the high interest rates on call loans. Then in early June, these inflows to New York reversed and money flowed back to the interior as panics engulfed interior cities such as Milwaukee, Los Angeles, and Detroit. The reverse of flows was large and sudden enough to cause the New York, Boston, Philadelphia, and Pittsburgh Clearinghouses to authorize the issuance of clearinghouse certificates (Noyes, 1909).[8] There was, however no widespread suspension of payments in these financial centers. Bank failures, and citywide panics continued throughout July in such cities as Portland, Kansas City, Denver, and Louisville (Wicker, 2000).[9] Reserves at New York banks continued to decline and on August 3, 1893, New York partially suspended cash payments to the interior. Once New York and some of the other financial centers refused to allow depositors to make large withdrawals, a premium for currency was generated (Noyes, 1909). Bank suspensions and currency hoarding continued until September when the currency premium disappeared, banks reopened, and the crisis was resolved. The suspension of payments by New York is exactly the shock that Smith (1991) hypothesized would cause a Diamond and Dybvig type panic to spread nationwide.

Throughout this period business failures were rampant. Markham (2002) indicates that business failures in general were widespread, with some 15,000 businesses failing in 1893. As indicated by the Historical Statistics of the United States (1970), this was a record number of failures and the highest business failure rate since 1878. The average liabilities per failure were the highest in over a decade it was not until 1920 that average failure liabilities would again be as large as those in 1893. Especially hard hit was the railroad industry. Over 70 railroad companies failed, placing one quarter of American railroads in the hands of receivers (Markham, 2002).[10] Faulkner (1959) describes the railway industry as overextended having lain miles

[7] There are other reasons to believe this was not a run on the currency. While some deposits withdrawn during the panic were hoarded, a significant share were redeposited in other banks. Also, in Dun's Review, 1893 reports that both gold and notes traded at a premium with respect to bank deposits. On some days the premium paid for notes, which would have lost value relative to gold if a depreciation occurred, exceeded that for gold. Regardless, the argument made by Lauck and Noyes can be thought of as a sudden shift in the need by depositors for their deposits and treated as a panic similar to the one described by Diamond and Dybvig (1983).

[8] Clearinghouse certificates allowed interbank settlements without the use of cash, increasing liquidity in the system.

[9] See Wicker (2000) for a detailed description of the panics in these cities.

[10] It should be noted that the business failures in the Historical Statistics of the United States (1970) do not include the failures of either railroads or banks.

of track that were "not needed, through miles and miles of uninhabited wilderness merely to insure that another road would not claim the territory first (p. 145)." Widespread business failures coupled with concern generated by the falling stock market may have provided a real economic shock needed to trigger a panic like that described by Calomiris and Khan (1991) and Gorton (1987) or the hybrid panic described by Goldstein and Pauzner (2002) and Morris and Shin (2001).

The silver industry also suffered during 1893. This shock was fairly minor for the country as a whole, but is worth noting as it significantly affected Colorado, which features prominently in the analysis below. The new Presidential administration in 1893 had stated that one of its key objectives was the repeal of the Silver Purchase Law of 1890, which mandated that the government use legal-tender notes to purchase a specific quantity of silver each year. As it became clear that the law would be repealed the price of silver collapsed and many mines were closed (Bradstreet's, 1893; Rocky Mountain Times, 1893).

There are two possible explanations for the widespread nature of the panic. The first is that it spread through the banking system. The partial suspension of banks in New York caused banks in the interior to lose access to some of their most liquid assets.[11] In addition some banks in large interior cities publicly refused to honor commitments to country correspondents (Wicker, 2000). As news spread about the inability of some banks to access their interbank deposits, the populace may have become concerned about their ability to access cash. The interconnectedness of the banking system would have allowed the initial suspensions to cascade into widespread bank runs.

The second explanation is that the panic could have occurred due to the real shock of the collapse of business and the railway industry in particular. Business failures would have been detrimental to banks' loan portfolios and the bankruptcy of railroad firms would have affected balance sheets through the default of railroad bonds—a popular investment. In this view, bank runs resulted from depositors pulling their money from potentially insolvent banks.

These two channels are not mutually exclusive. The panic may have spread through both channels. The panic may also have spread through different channels at different times. The Panic of 1893 was unusual in that it began in the interior and spread to New York. It is possible that during the first phase of the panic (when New York was not in suspension) that the panic was focused in places where business failures were prevalent and that during the second phase (when New York suspended payments) depositors panicked because they were worried that too many of their banks' reserves were frozen in New York.

3. Related literature

There are two classic trains of thought regarding panics. Friedman and Schwartz (1963) argue that panics are caused primarily by a loss of confidence in

[11] During normal times there were regular specie flows between New York and the interior, often following seasonal patterns. Kemmerer (1910) details these flows.

the banking sector and result in depositors withdrawing specie or other money from banks and hoarding it, resulting in a severe monetary contraction. The second train of thought, as articulated by Kindleberger (1978), is that crises are part of a boom and bust cycle. A boom occurs as the financial sector extends a large amount of credit to the real sector based on expectations of remarkable future growth. When there is a reversal of economic fortunes and borrowers are unable to repay their loans, there is a financial crisis as lenders find they lack the reserves to cover losses. Recent theories of bank panics are more formal and narrowly tailored, but they are built on ideas from the theories presented above. This section presents several theories of bank panics as well as studies that have tested their predictions.

3.1. Random withdrawal

Diamond and Dybvig, in their seminal 1983 article, present a model in which bank runs occur because depositors believe, based on a possibly random signal, that other depositors are going to withdraw and the banks lack the liquid reserves to meet this demand. In this model, bank runs are a rational response to beliefs possessed by rational agents. Agents may invest in a two period project that pays some return if completed and no return otherwise. In period 1, agents discover if they are first or second period consumers. First period consumers must liquidate their investment in order to consume. Second period consumers wait to consume in period 2. A bank pools risk by taking deposits, investing some deposits, and holding others to meet period 1 withdrawals.

Bank runs arise if second period consumers believe that the bank is holding insufficient reserves to meet all the period 1 withdrawals.[12] Without sufficient reserves, the bank would have to liquidate assets and be unable to meet its period 2 obligations. All depositors then run the bank in period 1 to avoid being left with nothing. Runs can be prevented by the threat of suspension or the introduction of deposit insurance.[13]

Two essential assumptions of the Diamond and Dybvig model are the existence of a sequential service constraint and that agents cannot trade shares in the bank's assets, which would allow them to insure against a run. One way of justifying these assumptions, as well as extrapolate the model from individual bank runs to a nationwide panic has been to embed the Diamond and Dybvig model in the banking structure of the National Banking Era. Smith (1991) presents a model where individual country banks act like the depositors of the Diamond and Dybvig model and are concerned about the level of reserves held by the central reserve city, which acts like Diamond and Dybvig's bank. If the amount the country banks want to withdraw

[12] Runs may be random or due to a signal such as business failures or the suspension of other banks. Because, however, the signal could be anything, the change in beliefs would appear random.

[13] Wallace (1988) argues that if the sequential service constraint used by Diamond and Dybvig is taken seriously, and people are isolated from each other, then deposit insurance is not feasible. Engineer (1989) shows that if depositors are sufficiently forward looking, the threat of suspension does not deter bank runs.

from the central reserve city exceeds the reserves held there, the central reserve city is forced to suspend, preventing some banks from obtaining their deposits, and precipitating runs on those banks as depositors become concerned that the country banks lack sufficient reserves. Panics are thus spread through the reserve system. The geographic separation of the country banks prevents them from trading state-contingent claims on New York or from coordinating withdrawals, and the separation naturally gives rise to the sequential service constraint. An important component of this model, reserves with the central reserve city, is used below to test the importance of liquidity.

3.2. Asymmetric information

In this model, when depositors observe negative real economic shocks and become concerned about bank solvency, they run all the banks because, due to asymmetric information, they do not know which banks were affected by the shocks. Gorton (1987) argues that depositors hold bank deposits as long as the expected return on deposits is higher than the return on holding cash. With full information, depositors would know whether a shock has caused the returns on bank deposits to fall below the return on money and whether they should withdraw their deposits. If depositors receive only an imperfect signal about the returns on the bank's loans, depositors close some banks that are solvent and leave open some banks that should have been closed. Calomiris and Khan (1991) present an alternative model in which some depositors receive a costly and imperfect signal about the quality of the bank. Based on this signal, they decide whether to withdraw their funds from the bank. The depositors that do not receive a signal watch the lines at the bank. If they perceive that the informed depositors are withdrawing their funds, then they too withdraw their deposits.

3.3. Global games

Some recent work by Goldstein and Pauzner (2002) and Morris and Shin (2000) develop models where depositors use signals about the real economy to determine the actions of other depositors and withdraw if they believe the bank lacks the liquid reserves to meet the deposit demand. The models are similar to the one posited by Diamond and Dybvig, except that period 2 consumers do not have perfect information about the return on their deposits. They do however receive a private signal about expected returns and can use this signal to infer the actions of other depositors. When signals about economic fundamentals are ''good'' and the bank is expected to pay a high return then each period 2 consumer believes that it is unlikely that other period 2 consumers will withdraw their deposits. When period 2 consumers receive signals that fundamentals are ''bad'' then they believe that other period 2 consumers will withdraw and they decide to withdraw—generating a bank run. Thus, bank runs are still based on liquidity and self-fulfilling beliefs of depositors, but real shocks serve to coordinate these beliefs and affect the likelihood of a run.

3.4. Summary of theories

Here, I briefly summarize the main components of the different theories. The random withdrawal theory emphasizes the role of liquidity, the asymmetric information theory focuses on real economic shocks, and the global games theory indicates that both have a role. Both the random withdrawal and global games theories indicate that panics are the result of self-fulfilling beliefs by depositors regarding the actions of other depositors. Panics in the asymmetric information theory result from uncertainty about which banks are affected by the shock. Thus, discovering which theory explain panics requires determining the importance of liquidity relative to economic shocks, as well as the roles of asymmetric information, and depositors beliefs.

3.5. Tests of the theories

Several papers have tested different aspects of the theories of panics. Some have focused on predictability as panics driven by economic shocks should be predicted ex post, by changes in real economic variables while panics driven by shifts in beliefs may not be.[14] Using quarterly data, Gorton (1987) finds that consumption weighted deposit losses predict panics, which supports the asymmetric information theory. Using higher frequency weekly data on interest rates, Donaldson (1992) finds that panics are unpredictable events, arguing against a decisive role for changes in economic fundamentals.

Mishkin (1991) examines the yield spreads between low and high risk bonds for seven financial crises between 1850 and 1910 as well as the Great Depression. He finds that yield spreads peak near the time of the panic. This is consistent with the prediction of the asymmetric information theory, as well as the global games theory, that increased uncertainty about the economic outlook and increased risk of business failure may trigger a panic.

In their detailed study, Calomiris and Gorton (1991) examine whether the sources, location, and conclusion of panics during the National Banking Era indicate whether liquidity or real economic shocks generated panics. They first examine the panic origins. Calomiris and Gorton find that real stock market declines were larger in panic years than in non-panic years, suggesting that economic shocks are associated with panics.[15] To test whether a shock may have increased the need of depositors for their funds, Calomiris and Gorton follow Chari (1989) who argues that since panics were seasonal, large grain harvests may have produced an increase in the demand for deposits.[16] Calomiris and Gorton show that there were several years when crop yields exceed those of the panic years, indicating that this is not a likely source of the panic. While this rules out a particular event as a liquidity shock, it

[14] It unclear whether this test is able to separate the asymmetric information theory from the global games theory (which was develop after these studies were published) as the beliefs of depositors in the global games theory are presumably updated in response to a real economic shock at the same frequency as those of the depositors in the asymmetric information theory.

[15] Though of course correlation does not imply causation.

[16] See also Miron (1986) for a discussion of the seasonal nature of panics.

does not rule out all liquidity shocks. If a stock market crash often led New York banks to suspend cash payments to the interior, then a collapse in the stock market may have precipitated a rise in the deposit demand. Nor do liquidity shocks have to be the same for all panics. Lauck (1907) and Noyes (1909) suggest that the Crisis of 1893 occurred because fear of an abandonment of the gold standard led to a sudden desire by depositors to hold their wealth as specie rather than deposits. Other events may have produced liquidity shocks in the other panics of the National Banking Era.

The location of bank closings is another way to examine the importance of liquidity and economic shocks. If liquidity concerns trigger panics, then bank closings will be highest in areas of high money demand relative to reserves. If real shocks are important then bank closings will be in areas of large real asset shocks. Panics could "spread" only in so far as failures in one region of the country provided information about the solvency of banks in other parts of the country. Calomiris and Gorton find that bank failures were located in areas of real shocks. However, the theories of panics do not necessarily predict that bank panics cause failures, as solvent banks can avoid liquidating their assets at firesale prices and risk becoming insolvent by temporarily suspending operations until either depositors reduce their demand for deposits or until it can be determined which banks are solvent.[17] Thus, examining failures is an imperfect test.

In their examination of the conclusions of the panics of the National Banking Era, Calomiris and Gorton point out that specie could have been imported from Europe and distributed throughout the U.S. in a few weeks. Thus, panics should only have lasted several weeks if liquidity concerns are the determining factor. While the Panic of 1873 and the suspension of payments in New York in the Panic of 1893 each lasted about a month, the Panic of 1907 lasted for two and a half months, substantially longer than one might expect in a liquidity based panic. Calomiris and Gorton take this as evidence in favor of the asymmetric information theory; however, they do not present evidence indicating that the asymmetric theory describes the resolution of the panics.

O'Grada and White (2002) examine the behavior of individual depositors at a savings bank during the panics of 1854 and 1857. They find that depositors in unskilled jobs, who are presumed to be less informed about bank solvency, were more likely to panic in 1854, suggesting a Diamond, and Dybvig panic. In 1857 wealthier individuals in more skilled jobs, who may know more about the condition of the bank, were the first to withdraw their funds, similar to the predictions of the asymmetric information theory.

Thus, tests of the theories are inconclusive. There is some evidence that economic factors mattered at the aggregate level, however other tests finds that economic factors alone are insufficient to explain panics. Results from more microeconomic tests are mixed. The remainder of this paper analyzes a single panic at several levels of

[17] Wicker (1996) argues a similar point, "The tables in the Comptroller's Report for 1893 (pp. 180–91) which list causes of bank failures do not include the large number of banks that suspended and later reopened, the class from which we would expect contagion of fear and bank runs would have played a crucial role (p. 162)."

aggregation to try to provide a more complete picture of how the forces producing a panic interact.

4. Testing the panic of 1893

The Panic of 1893 is examined in detail to see whether events can be related to liquidity shocks, real economic shocks, behavior driven by asymmetric information, or concerns about the actions of other depositors. First, I briefly discuss the origin and resolution of the panic. Most of the analysis, however, focuses on which banks suspended: those in close proximity to real shocks or those most connected to the reserve system.

4.1. Beginning of the panic

The Panic of 1893 appears to have been triggered by a real economic shock, but may have been perpetuated by a lack of liquidity. Sprague (1910) and Wicker (2000) indicate that the failure of several large commercial firms caused turbulence in the financial center of New York. The banking system in the rest of the nation was affected by widespread business failures as described by Markham (2002). These real economic events may have triggered the panic. However, midway through the panic, New York suspended cash payments to the interior. This created a premium for cash and led to cash hoarding (Noyes, 1909). The scarcity of cash and the inability of banks to access their interbank deposits may have resulted in the suspension of some banks consistent with Smith's (1991) description of how a liquidity shock could spread through the banking system.

4.2. Resolution of the panic

If the panic resulted from liquidity concerns, then it would be resolved by an influx of specie or notes. If the panic were caused by a real economic shock, then its resolution would involve examining the banks and certifying which ones were solvent. While the Comptroller of the Currency did examine closed banks to determine whether they were solvent, Noyes (1909) suggests that the panic ended when high interest rates and the premium for specie attracted gold from Europe and boosted domestic liquidity. This suggests that a lack of liquidity played a role in the panic.

4.3. Tests using bank suspensions

4.3.1. Information about bank suspensions

The information available on the Panic of 1893 offers a unique opportunity to examine the causes of bank suspensions. Soon after this crisis, the Comptroller of the Currency published, in addition to a list of banks turned over to receivers, a list of the national banks that suspended and later reopened, the dates for which they were suspended, and the city and state in which they were located. This information

is not available for the other panics of the National Banking Era. Banks that suspended and later reopened are considered to be solvent institutions that were forced to suspend due to the crisis *and otherwise would not have*.[18] This follows the writings of the Comptroller who reported:

> "Many banks after paying out on the one hand all the money in their vaults and failing to collect their loans on the other, suspended and passed into the hands of the Comptroller. With a full knowledge of the general solvency of these institutions and the cause which brought about their suspension, the policy was inaugurated of giving all banks, which, under general circumstances, would not have closed, and whose management had been honest, the opportunity to resume business.... In no instance has any bank been permitted to resume on money borrowed. (Report of 1893, p. 10)"

Bradstreet's also reported bank closure and suspension information for the Panic of 1893 for all types of banks: national, state, savings, and private.

The Office of the Comptroller of the Currency provides a variety of balance sheet information for national banks. The Rand-McNally Bankers' Directory Rand-McNally (1893) provides information on the correspondents, capital, surplus, and undivided profits of all banks. No other balance sheet information is available for state, savings, or private banks.

Table 1 provides information on the location of national bank failures by region and phase of the panic (whether or not New York was in suspension). States in the Northeast were virtually unscathed while the Midwest and Mountain states were especially hard hit. The panic also varied across communities as some cities had large numbers of banks fail or suspend while others had relatively few close. Wicker (2000) documents the experiences of several communities that were hit hard during the panic. This paper examines the panic at the national, regional, and state levels, and uses the observable patterns at different levels to help understand the panic as a whole.

4.3.2. Analysis using state level aggregates

To determine why the banking systems of some states suffered more during the banking panics than others, the state-level the suspension rate of national banks is regressed on variables associated with liquidity and real economic shocks.[19] Business failures, which may result in loan defaults and negatively affect banks' loan portfolios, are used to indicate real shocks. I use the number of business failures in 1892 divided by the number of manufacturing establishments existing in 1890.[20] Lagging

[18] Some of the banks may have suspended without depositor unrest; however, the description by the Comptroller suggests that these were the exception rather than the rule.

[19] The regression used is a simple OLS regression adjusting for heteroskedasticity. Because the number of banks in some states is small, the rates are somewhat "lumpy." In this case, it may be more appropriate to use count data analysis. Doing so yields similar results.

[20] Bradstreet's published quarterly statistics on business failures, but no information on surviving businesses. The best available estimate of the number of existing businesses is the number of manufacturing establishments reported in the 1890 census.

Table 1
Location of national bank failures and suspensions

	Region 1	Region 2	Region 3	Region 4
Entire Period				
Average number of banks	117.5 (101)	43.7 (58)	124.2 (54)	26.6 (20)
Average number of bank failures	0.2 (0.6)	0.7 (1.1)	0.7 (0.8)	1.4 (2.3)
Average failure rate	0.4%	4.3%	0.7%	6.2%
Average number of bank suspensions	0 (0.0)	1.0 (1.7)	2.6 (1.8)	2.5 (3.8)
Average suspension rate	0.0%	2.6%	3.0%	8.2%
Phase 1				
Average number of bank failures	0 (0.0)	0.2 (0.4)	0.5 (0.7)	1 (1.6)
Average failure rate	0.4%	4.0%	0.5%	4.3%
Average number of bank suspensions	0 (0.0)	0.4 (0.9)	0.8 (0.9)	1.9 (3.8)
Average suspension rate	0.4%	1.3%	1.4%	6.6%
Phase 2				
Average number of bank failures	0.2 (0.6)	0.5 (0.9)	0.2 (0.4)	0.6 (1.4)
Average failure rate	0.0%	0.2%	0.2%	2.0%
Average number of bank suspensions	0 (0.0)	0.6 (1.0)	1.7 (1.7)	0.6 (1.2)
Average suspension rate	0.0%	1.2%	1.3%	1.4%

Standard deviations in parenthesis.
Region 1: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.
Region 2: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Tennessee, Texas, South Carolina, Virginia, and West Virginia.
Region 3: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.
Region 4: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming.

business failures also avoids endogeneity concerns arising from using contemporary business failures. This measure has support in the literature as Calomiris and Mason (2001) find that lagged business failures predict bank failures during the Great Depression.

The role of liquidity played in spreading the panic nationwide is analyzed by examining the reserves of the states' banks. As the central reserve city had a limited amount of liquid reserves, a few regional panics would use all these reserves and force the central reserve to suspend payments making all the other regions more vulnerable to bank runs. Under this line of reasoning, a stronger connection to the reserve system should be correlated with a larger the number of bank suspensions. Connection with the reserve system is measured by looking at the share of liquid reserves consisting of "due from reserve agents."[21] Because overall liquidity of the banks within the state may also be important, the share of assets consisting of liquid assets is also included.[22] Data is not available on balance sheet items, and thus on

[21] "Due from reserve agents" is distinct from the other balance sheet items related to interbank deposits such as "Due from National Banks" and "Due from State Banks."

[22] Liquid assets are the sum of notes, specie, "due from reserve agents," and other stocks and bonds.

connectedness to the reserve system, for state, savings, and private banks so the sample is restricted to national banks. It is not clear that reserve city banks react the same way as country banks so the analysis is conducted using just country banks in the state and at all non-central reserve city banks in the state.[23]

The fact that the panic consisted of a period without a suspension in New York and a period when New York was in suspension provides a unique opportunity to test the role of liquidity. When New York is not in suspension, banks can freely access their reserves so there should be no negative effect of holding reserves there. When New York is in suspension, banks cannot access their reserves and their vulnerability to bank runs increases. If a liquidity shock is transmitted through the reserve system, there should be a difference in the effect of having reserves in New York when New York is suspended.

It is quite reasonable that depositors understood that their bank was affected by a suspension in New York. During the two decades prior to the Panic of 1893, there had been three financial crises, each associated with suspensions in New York. Banks were also quite public about their interactions with their correspondents and their ability/inability to transfer money to and from New York (Wicker, 2000). Noyes (1909) confirms that people knew a suspension in New York could cause financial difficulties for their bank.

Odell (1989) argues that not all states were equally integrated into the national banking system. Integration may in turn affect the importance of the liquidity channel. To capture the degree of integration I use the ratio of drafts drawn on New York banks by a state's banks as a share of total drafts drawn on other banks.[24] The larger New York's share of total bank drafts, the more impact a suspension in New York, and the liquidity channel, should have.

The crisis is considered to extend from the beginning of June until the end of August. Only three banks suspended during 1893 prior to June and no banks suspended after August.

4.4. Results

In the first test, I regress state suspension rates for the panic as a whole on the different indicators described above. The results (Table 2) indicate that real shocks had a large impact on suspensions, but that liquidity shocks had no effect. Business

[23] Balance sheet items are reported separately for reserve city banks.

[24] A draft is a check drawn by a bank against funds deposited in another bank, typically one with which the bank issuing the draft has a correspondent relationship. Drafts circulated as a medium of exchange in the era prior to a nationwide check clearing system. Drafts circulated in areas where many banks had correspondents in the same town, as that town's clearinghouse could clear payments. As most banks had correspondent in New York, drafts on New York banks were accepted nationwide. There were also regions in which drafts drawn on banks in Chicago or Boston were widely used. Thus, the measure used there indicates how dependent the banks of a particular state were on their correspondent in New York. A different measure, the ratio of drafts drawn on New York banks to total assets, indicates how dependent how important the correspondent banking system was to a states banks. Using this measure yields similar results. Data on state level aggregates of dollar volumes of drafts drawn on banks in different cities comes from the Annual Report of the Comptroller of the Currency for 1891.

Table 2
Analysis of bank suspension rates

Dependent variable: share of national banks in the 1892 Report of the Comptroller that suspended in a state during 1893		
	Not including reserve cities	Including reserve cities
Fraction of businesses failing in 1892	0.63*** (0.20)	0.66*** (0.19)
Share of reserves as "due from reserve agents"	0.07 (0.21)	0.10 (0.17)
Share of assets as reserves	−0.07 (0.21)	0.03 (0.23)
Share of drafts on New York City banks	0.06 (0.12)	0.09 (0.11)
Interaction of drafts and "due from reserve agents"	−0.15 (0.29)	−0.17 (0.26)
Constant	−0.02 (0.10)	−0.05 (0.09)
Number observations	44	44
Number of suspensions	75	84
Adjusted R2	0.13	0.16
F Statistic	2.30*	2.60**

Standard errors in parentheses. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively.

failures are highly correlated with the suspension rate with an increase in the business failure rate by one standard deviation raising the suspension rate by about 3 percentage points. I find no relationship between either having more reserves at the central reserve city or the banks' connection to the national financial system through the share of drafts drawn on New York.

It is possible that I do not find a connection between reserves with the central reserve city and suspensions for the panic as a whole because having reserves in New York only mattered when the central reserve city was in suspension. To test this, I divide the sample in two periods and repeat the regression on a pooled sample that includes a dummy for the period in which New York is in suspension and interactions of that dummy with the reserves to liquid asset ratio. The results (Table 3) again indicate a role for real shocks, shown by the business failure rate.[25] The results regarding liquidity are more complex. I find that there were fewer suspension during the period when New York had suspended cash payments to the interior, the time when the liquidity effects would have been strongest. This suggests that the liquidity channel did not play a decisive role in the panic. However, I do find some evidence that when New York was in suspension that states with more reserves had more suspensions. The size of this effect however, is not nearly as large as for business failures (a one standard deviation increase in the share of reserves due from a reserve agent results in only a 1.5 percentage point rise in the suspension rate). For the average state, where the share of reserves due from a reserve agent was 0.4 the net effect of a suspension in New York (effect of dummy + the interaction) was to slightly

[25] Business failure rates are half year rates lagged six months, so that business failures in the first half of 1892 predict failures bank suspensions in the first half of 1893. A three quarter lag was found to have the strongest effect in Calomiris and Mason (2001).

Table 3
Effect of a suspension in New york on the relevance of reserves

Dependent variable: share of national banks in the 1892 Report of the Comptroller that suspended in a state during a particular phase of the panic of 1893		
	Not including reserve cities	Including reserve cities
Fraction of businesses failing	0.74*** (0.20)	0.70*** (0.20)
Share of reserves as "due from reserve agents"	−0.02 (0.10)	−0.01 (0.11)
Share of assets as reserves	0.12 (0.13)	0.05 (0.13)
Share of drafts on New York city banks	0.04 (0.06)	0.04 (0.07)
New York in suspension	−0.07** (0.03)	−0.07** (0.03)
Interaction of New York suspension and share reserves due from reserve agents	0.14* (0.07)	0.12 (0.07)
Interaction of drafts and "due from reserve agents"	−0.06 (0.15)	−0.07 (0.17)
Constant	−0.01 (0.05)	0.01 (0.06)
Number observations	88	88
Bank suspensions (Phase 1)	52	60
Bank suspensions (Phase 2)	23	24
Adjusted R2	0.16	0.15
F -statistic	3.40***	3.14***

Standard errors in parentheses. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively.

reduce the suspension rate. Thus, the liquidity channel does not appear to have played an important role in causing the panic to spread nationwide.

4.4.1. Analysis of individual national banks

Analyzing individual bank data provides another test of whether panics spread through the banking system via the liquidity channel. Using data on national banks from Colorado, Montana, Oregon,. and Washington, I test whether banks with stronger connections to the banking system were more likely to suspend than other banks.[26] These states are used because they had among the highest suspension and failure rates and also because they include several of the citywide panics described by Wicker (2000). Using individual bank data allows me to control for differences in banks' balance sheets. The balance sheet information is for October 1892 and comes from the Annual Report of the Comptroller of the Currency. Table 4 provides a list of bank suspensions and failures for the four states examined.

The connections to the banking system are the share of liquid assets as "due from reserve agents" and the correspondent relationships of the banks. All but one of the banks had a correspondent in New York, making the effect of such a relationship untestable; however, some banks had correspondents in Chicago, which suffered a panic, while others had correspondents in San Francisco, who may have been strained due to panics in Los Angeles and San Diego. Thus it is possible to test whether panics in these reserve cities spread to the banks in the sample. Additionally, I include an indicator for the suspension/failure of a bank's correspondent.[27]

As above, the sample can be divided into two periods: when New York was open and when it was in suspension, and the impact of the suspension of New York can be tested by interacting the explanatory variables with a dummy indicating that New York was in suspension.[28]

The data on business failures is not disaggregated sufficiently to be able to test the role of real shocks; however, analysis of individual banks does offer a test of the importance of asymmetric information in determining depositor behavior. Not all banks in these four states were targets of runs. The asymmetric information theory suggests that depositors would run on banks which they were concerned might fail and not target the banks that they believed were solvent. Thus according to the asymmetric information theory, banks that were forced to suspend should resemble failing banks more than banks that stayed open. The test of the theory is therefore to estimate the probability of survival based on balance sheet characteristics, using failing and surviving banks from Colorado, Montana, Oregon, and Washington, and, based on those effects, compare the expected survival probabilities for all three groups of banks (banks that failed, survived, and suspended). The asymmetric information theory suggests that the expected survival probabilities of suspending banks

[26] Banks that failed were dropped from the sample.

[27] A dummy equal to one if the bank had a correspondent that failed.

[28] Banks that suspend in the first period are not included in the second period. Allison (1995) suggests that including each bank that it is not in suspension for each period is the appropriate treatment and that there is no "survivor bias."

Table 4
Suspension and Failures in Colorado, Montana, Oregon, and Washington

Suspensions		Failures	
Colorado			
First National, Rico	June 30		
First National, Ouray	July 1		
American National, Leadville	July 3		
Central National, Pueblo	July 5		
American National, Pueblo	July 5		
Western National, Pueblo	July 5		
Union National, Denver	July 17		
Bank of Commerce, Denver	July 18	Commercial National, Denver	July 18
State National, Denver	July 19		
German National, Denver	July 19		
People's National, Denver	July 19		
First National, Canon City	July 20		
Greeley National, Greeley	July 20		
First National, Grand Junction	July 20		
Montana			
		First National, Philipsburg	July 1
		Livingston National, Livingston	July 7
Bozeman National, Bozeman	Jul 19		
		Merchants National, Great Falls	July 24
National Park, Livingston	July 27	First National, Helena	July 27
		Montana National, Helana	July 27
		First National, Great Falls	July 28
		Stockgrowers National, Miles	July 29
First National, Sulpher Springs	Aug. 5		
Oregon			
		Linn County National, Albany	June 19
Oregon National, Portland	July 27		
Commercial National, Portland	July 29		
Ainsworth National, Portland	July 29		
First National, East Portland	July 31		
First National, the Dallas	July 31		
Washington			
		Merchants National, Tacoma	June 1
Washington National, Spokane	June 6	Citizens National, Spokane	June 6
First National, Palouse	June 6		
		First National, Bellingham	June 22
		Colombia National, Bellingham	June 23
		First National, Port Angeles	June 26
Puget Sound National, Everett	July 5		
		Tacoma National, Tacoma	July 24
		First National, Spokane	July 26
Ellensburg National, Ellensburg	July 27		
		Bellingham Bay, Bellingham	July 31
		Washington National, Tacoma	Aug. 24
		Port Townsend, Port Townsend	Sept. 18

should more closely resemble those of failing banks than those of banks that did not close.[29]

4.4.2. Results

The first test is simply whether bank fundamentals and connection to the reserves system of the National Banking Era affected the likelihood that a non-failing bank suspended. The results appear in Table 5. A positive number indicates that the variable increases the likelihood of survival. I find no evidence that a liquidity shock, transmitted through the national reserve system affected bank survival. Neither having more liquid assets with a reserve agent not having a correspondent in a city that experienced a panic was found to have a significant effect. Repeating this analysis dividing the sample into periods when New York was and was not in suspension produces the same results.

While other interbank connections do not matter, having a correspondent that failed or suspended had a detrimental effect on a bank's likelihood of survival. The reason for this result is unclear. Having a correspondent close may decrease a bank's liquidity by denying the bank access to the deposits at that correspondent. Correspondents were also used to clear checks and drafts. Thus, the loss of a correspondent may affect bank's ability to transact business and force it to close.

Comparing the expected survival probabilities of failing, surviving, and suspending banks reveals little support for the role of asymmetric information in determining depositors' actions. Suspending banks (mean survival probability = 0.87, $SD = 0.15$) are indistinguishable from surviving banks (mean survival probability = 0.91, $SD = 0.11$) and significantly different from failing banks (mean survival probability = 0.71, $SD = 0.20$). These results suggest that depositors were not discriminating between which banks were subject to runs based on balance sheet information.

4.5. Analysis of Colorado

The third level of analysis concentrates on a specific panic episode in a particular region. Doing so allows the behavior and motivations of individual depositors to be examined more closely. The event analyzed here is the citywide panic in Denver and its repercussions for the state of Colorado. As the nation's leading silver producer, Colorado was especially hard hit by the plummeting price of silver. During the crisis period 14 banks failed and 23 banks suspended. The analysis is conducted in two parts. The first part focuses on the panic in Denver which was chronicled by the local Denver newspaper, the Rocky Mountain Times (RMT). Facts about the panic are presented and discussed in relation to the different theories. In the second part

[29] This exercise is similar to the one conducted by Calomiris and Mason (1997) using time to failure analysis. They tested whether banks that failed in the Chicago panic of 1932 more closely resembled survivors of the panic or banks that failed outside the panic period. This exercise compares banks that suspended during the panic to banks that failed during the panic and banks that remained open during the panic.

Table 5
Analysis of individual banks

	Effect on likelihood of survival
Deposits with reserve agents to reserves	0.14 (1.54)
Correspondent in Chicago	−0.38 (0.63)
Correspondent in San Francisco	−0.09 (0.67)
Correspondent Suspends or Fails	−2.14** (1.08)
Ratio of Net Worth to Assets	4.44 (2.86)
Ratio Loans to Assets	−4.40* (2.67)
Log Total Assets	−0.46 (0.33)
Constant	5.93 (2.65)
Number of Observations	169
Suspensions	24
Log-Likelihood	−60.7
Tau-a	0.12

A negative number implies the variable increases the likelihood of suspension. Standard errors in parentheses. The symbols (**) and (*) indicate statistical significance at the 5 and 10 percent level, respectively.

of the analysis, information from the RMT, Bradstreet's, and the Rand-McNally Bankers' Directory, regarding all Colorado Banks, is collected, and examined for patterns.

4.5.1. Denver

On July 18th Denver was swept by a bank panic. The panic began as four savings banks closed their doors, three permanently. The entire Denver banking system had been under pressure for some months,[30] and the savings banks had been the subjects of a previous run which they had forestalled by enforcing a 60 day waiting period on withdrawals. Those 60 days expired on July 17th. Soon the savings banks closed and runs began on several national banks. Some closed that day, while others simply did not reopen the next. The panic ended two days later, almost as swiftly as it began. By the time the panic subsided, six national banks and several other banks were forced to close. The RMT, the local Denver newspaper, closely followed the events. Here, several items about the crisis are reported and analyzed in relation to the theories of bank panics.

Item 1: The weakest banks were targeted, others were the recipients of deposit inflows

- *"A few weaker banks fell before it [the panic], but the solid banks stood nobly. (July 19th, p. 2)"*

[30] The RMT reports that during the 6 months up to and including the panic "about $8 million has been withdrawn from Denver." The importance of this amount is difficult to determine. Eight million represents about 25 percent of the assets of the national banks; however, some of Denver's state and savings banks were also quite large. While one bank that closed during the panic is mentioned in particular, it is not clear how widespread these withdrawals were.

- *"Many parties who had accounts with banks which had suspended [were] coming to Colorado National bank [described as "one of the oldest banks in the city. The strength of its position and connections are well known."] and opening accounts. (July 19th, p. 2)"*

This is consistent with the asymmetric information theory which posits that panics are the result of concerns about solvency and that if certain banks are targeted, it will be the weakest ones about whom there is the most concern about failure.

Item 2: Runs were primarily by small "uninformed" depositors

- *"Business men viewed the situation with equanimity and in very few cases sought to withdraw their deposits. The stampede was among persons of small means, who are always without exact information as to the exact condition of affairs and blindly resolve to demand their money no matter what consequences ensue. (July 19th p. 2)"*
- *"The scared ones were all small depositors. Just one businessman took out his balance and the bank gives it out cold that he need not bring it back. (July 19th p. 2)"*

This description is similar to the panic of 1854 described by O'Grada and White (2002) who note that the panic was of smaller "less educated" depositors.[31] The asymmetric information theory suggests that during a panic where there is concern that the bank is insolvent the most informed depositors should be the ones initiating the panic. That uninformed depositors panicked while informed depositors, such as businessmen did not make withdrawals suggests that events of the panic are more consistent with the liquidity based panic described by Diamond and Dybvig.

Item 3: Fear about deposit accessibility caused the runs to spread

- *"The run on this bank [National Bank of Commerce] was started by the closing of the savings banks the day before, which tied up the available funds of a large number of working people. This alarmed many others, thus creating a feeling of panic (RMT July 19, 1893 p. 2, column 3)."*
- *"The closing of these banks [the savings banks] produced so serious a drain on us that we [the Union Bank] considered it prudential to close this morning. (RMT July 19, 1893 p. 2, column 3)."*
- *" 'With an ordinary run we were prepared to grapple, but when three of the national banks followed the savings banks and closed their doors, it seemed best for all concerned that we should quit paying out and commence hauling in (the cashier of German National).' (RMT July 20th, 1893 p. 1)"*

[31] Kelly and O'Grada (2000) show that the runs during this panic spread through social networks and were not as connected to news about bank solvency.

- *"Here, was the cause of the run that commenced upon the national banks on Monday afternoon. It was the contagion of fright. The fright of the savings depositors communicated to depositors in national banks, although there was no justification for it. (RMT July 20th, p. 4—editorial page)"*

This is most consistent with a liquidity based panic, where depositors run banks because they are concerned that the banks may not have sufficient liquid assets on hand to meet demand. It is possible that the closing of savings banks provided evidence that a real shock had occurred; however, this is unlikely since the initial run on these banks was 60 days prior and it was only after the 60 days waiting period that the savings banks closed. Thus, the informational content was two months out of date. The savings banks are also described as being small and unaffiliated with the national banks making it unclear why their closing provided information about the solvency of the national banks that were forced to suspend.

4.5.2. Outside denver

An examination of the banks outside Denver and Pueblo suggests a pattern in the suspensions that occurred.[32] Nearly all these suspending banks had correspondent relationships with a bank in Denver that suspended (Rand-McNally, Rocky Mountain Times). Statistical analysis confirms the importance of these correspondent relationships. Using all non-failing banks in Colorado (national, state, savings, and private), I test whether the probability of suspending is affected by being a National bank, having a correspondent in Denver or Pueblo, and having a correspondent that closed (either suspended or failed).[33] The results (Table 6) show that banks with correspondents that closed were more likely to suspend.[34]

A noted above, there are several reasons why the closing of a correspondent might lead to further failures. Correspondent relationships enabled banks to clear checks and offer services to depositors. The loss of a correspondent thus deprived banks of a way of obtaining funds from non-local checks presented to them. Thus if cash balances were already low, banks may have been forced to suspend. Concerned depositors may have increased withdrawals, fearing that the bank had insufficient liquid assets. Depositors may also have feared that this loss of ability to conduct business may have harmed banks' profitability. Thus if correspondent networks did cause financial instability to spread, it is unclear whether it can be attributed to the loss of liquidity, a negative impact on bank profitability, or simply a disruption in the payment system.

4.6. Discussion

The evidence from the different tests shows that both real economic shocks and liquidity shocks contributed to the Panic of 1893. Test results using state level aggre-

[32] Pueblo suffered a minor bank panic in early July, about two weeks before the one in Denver.

[33] The test is conducted using logit estimation.

[34] Wicker (2000) describes the reverse in Louisville, Kentucky. There the correspondent banks ran down their balances enough to force the bank is Louisville to close. Here, the suspension of Denver caused correspondents to close one or two days later.

Table 6
Analysis of Colorado banks

	Effect on likelihood of survival
Bank is a National bank	−0.34 (0.52)
Correspondent in Denver or Pueblo	−0.45 (0.73)
Correspondent in Denver or Pueblo suspends or fails	−0.95* (0.53)
Number of observations	117
Suspensions	22
Log-likelihood	−56.6
Tau-a	0.09

A negative number implies the variable increases the likelihood of suspension standard errors in parentheses. The symbol (*) indicate statistical significance at the 10 percent level, respectively.

gates indicate that the panic was nationwide due to widespread real shocks, such as business failures. Bank suspensions were more prevalent in states with higher business failure rates. At the local level liquidity concerns mattered more. The quotes from the RMT suggest that depositors withdrew their money because they were concerned about whether the banks had the cash resources to meet demand.

That both liquidity and real economic shock mattered most closely matches the global games theory of Goldstein and Pauzner (2002) and Morris and Shin (2001). In these models, depositors use real shocks to infer the actions of other depositors and run to the bank if anticipated demand for deposits exceeds the available reserves. The predictive power of real shocks regarding the location of panics indicates that depositors do not form their beliefs randomly. Finding that new information about liquidity triggered a panic is difficult to reconcile with an asymmetric information style panic.

The findings of this study also suggest that the level of aggregation affects the results. When the actions of depositors regarding a particular bank are observable, one can see how liquidity concerns affect investor's decisions. When depositors are aggregated and only general trends are observable, then only the affects of real economic shocks are observable.

5. Conclusion

This paper tests whether factors identified by economic theory as the source of panics explain bank suspensions in the Panic of 1893. The analysis combines findings from the local, state, and national levels. Using state level aggregates, I find that real economic shocks are an important determinant of where bank suspensions will occur. Information at the city level suggests that depositors' behavior was driven more by liquidity concerns than solvency concerns. This integrated analysis shows that both liquidity and solvency factors were important in generating panics; however, which factor is observable depends on the level of aggregation in the data.

In addition to uncovering evidence about different shocks, I find evidence that correspondent banking networks played a role in transmitting the panic. Banks that

had correspondents close were themselves more likely to suspend. The reason for this is unclear. The closure of a correspondent affected a bank's liquidity, profitability and its general ability to conduct business. Exploring the impact of correspondent networks may prove fruitful grounds for further research.

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