

NBER WORKING PAPER SERIES

THE DEVELOPMENT OF OPACITY IN U.S. BANKING

Gary Gorton

Working Paper 19540

<http://www.nber.org/papers/w19540>

NATIONAL BUREAU OF ECONOMIC RESEARCH

1050 Massachusetts Avenue

Cambridge, MA 02138

October 2013

This paper draws on ideas in joint work with Tri Vi Dang, Bengt Holmström and Guillermo Ordonez to whom I am very grateful. Thanks to Yiming Ma and Arwin Zeissler for research assistance. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2013 by Gary Gorton. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

The Development of Opacity in U.S. Banking
Gary Gorton
NBER Working Paper No. 19540
October 2013
JEL No. E32,E41,E42,E44,G01,G21

ABSTRACT

An examination of U.S. banking history shows that economically efficient private bank money requires that information-revealing securities markets for bank liabilities be closed. That is, banks are optimally opaque, which is why they are regulated and examined. I show this by examining the transition from private bank notes, the predominant form of money before the U.S. Civil War, to demand deposits and show that markets endogenous closed. The opacity of bank money in the recent financial crisis is also briefly discussed.

Gary Gorton
Yale School of Management
135 Prospect Street
P.O. Box 208200
New Haven, CT 06520-8200
and NBER
Gary.Gorton@yale.edu

1. Introduction

The idea that opening financial markets is good and closing them is bad comes from the theory of complete markets. It is best when markets are complete, that is, when the existing financial claims are sufficient to construct any conceivable payoff, corresponding to any state of the world (in a world without frictions). Complete markets are desirable because risks can be hedged. A separate idea about financial securities is that “market efficiency” is desirable. This says that the prices of financial securities are informative, providing information to investors, for example. Contrary to these ideas, in this paper I look at U.S. financial history and show that the production of private money by banks optimally involves closing informative financial markets where bank liabilities (debt and equity) are traded. The efficient use of bank claims as money entails eliminating informative financial markets, so that banks are opaque and their monies consequently are accepted at par.

The output of a bank is its debt which is used as money, whether demand deposits, private bank notes, sale and repurchase agreements, or other forms of short-term debt. For short-term bank debt to function efficiently as money it must trade at par, that is, it must be accepted at face value without any suspicion that it is worth less than its face value. And no information should become available to create suspicion. For this to be successful the banking system keeps secret the value of the backing for its debt. Banks, for example, lend predominantly to households and small businesses, entities for which there is little or no public information. Bank examiners check the banks’ portfolios, but their assessments are also kept secret. Banks are inherently opaque institutions, which is why they are examined and regulated.

This opacity has a cost: short-term bank debt is vulnerable to bank runs because the backing for bank debt is not riskless. The private sector cannot create riskless assets. In a bank run, the holders of the debt become suspicious about the backing of the debt. A financial crisis is an information event, occurring when holders of bank debt become suspicious of the backing of the debt. This occurs when there is unexpected news of a coming recession or unexpected news of a decline in an important sector of the economy.

In order to understand the above points, this paper traces the historical transition from private bank notes to demand deposits in the United States. Rather than make the above points in theory, U.S. financial history is used to show how this endogenously occurred and made the economy more economically efficient.¹

Before the U.S. Civil War, the predominant form of bank liabilities used as money was private bank notes. The federal government did not issue paper currency at that time, but banks issued their own paper currencies. Bank notes traded at discounts from face value, revealing information about the issuing banks’ backing assets. And, bank equity traded in information-revealing stock markets. Gradually, demand deposits (checking) grew significantly and after the Civil War the government

¹ The corresponding theory can be found in Gorton and Pennacchi (1993), Holmström (2008, 2011), Dang, Gorton, and Holmström (2012) and Dang, Gorton, Holmström and Ordóñez (2013).

imposed a tax on private bank notes, essentially forcing them out of existence. The transition from bank notes to demand deposits is instructive about the optimal form of banking and bank money. The transition involved closing informative bank note and stock markets in which bank liabilities traded, reducing the available information, so that demand deposits could more effectively function as money. The transition involved the creation of opaque banks.

Closing private bank note markets and bank stock markets was possible because a monitoring role developed centering on private bank clearing houses. Ostensibly initiated to clear checks, internalizing the bank note secondary market, clearing houses managed the information about member bank risk, without revealing (most of) it. During financial crises—bank runs—clearing houses assumed the role of a central bank. During a crisis, the clearing house managed the information environment, further suppressing information about member banks while at the same time producing information that it kept secret when the clearing house examined some banks during a crisis. The clearing house also issued new liabilities, which were the joint liabilities of the member banks. These two acts, suppressing bank-specific information and issuing joint liabilities, effectively joined the members into a single banking system. Rather than focusing on whether any specific bank was weak, the clearing house by these two acts, made the only relevant question one of whether the banking system was solvent.

The idea that firms or other nonmarket organizations may dominate markets in allocating resources is hardly a new idea (see, e.g., Coase (1937), Williamson (1975), and Holmström (1999)). What is different about banks is that attendant financial markets must be shut down to produce efficient private money. And this causes private bank clearing houses to assume the role of suppressing information, but also to assume a central bank-like role during financial crises and in non-crisis times. The clearing house is a unique organization—not a firm-- necessary because bank-specific information had to be suppressed in order for banks to produce money.

In the context of the above ideas, the information environment of the financial crisis of 2007-2008 is also briefly discussed. I focus on three particular informational aspects of the crisis. This is followed by the conclusion.

2. Private Bank Notes

It is perhaps easiest to understand the above information issues with bank money by starting with the period of U.S. history when banks issued their own currency, 1837-1863, sometimes referred to as the Free Banking Era. This was a period, prior to the U.S. Civil War, during which the U.S. government did not issue paper money. It was also a period in which the use of demand deposits (checking accounts) was growing. I focus on the transition from private bank notes to demand deposits, and the concomitant alterations in the information environment concerning banks.²

² Not all states passed Free Banking laws, though banks in all states issued private currency. For background on the U.S. Free Banking Era see Rockoff (1975), Rolnick and Weber (1983, 1984), and Gorton (1996, 1999).

A private bank note was a perpetual noninterest-bearing liability of a bank. The note holder had the right to go back to the issuing bank at any time and demand redemption in gold or silver. The notes were printed in denominations similar to government money today, e.g., one dollar bills, five dollar bills, etc. During 1837-1863 there were around 1,500 currencies circulating at one time. Since these were the liabilities of private banks, these currencies were not riskless, so when they circulated at any distance from the issuing bank—so that returning to redeem the money would take time—the notes circulated at discounts. For example, the bank notes of Boston banks would circulate at discounts from par in New York City. A ten dollar note of a particular bank in Boston would circulate at say a five percent discount from face value; a ten dollar note might only buy \$9.50 worth of goods in New York City.

Bank notes of nearby banks, say the notes of Boston banks in Boston, would have no discount. A note holder of a Boston bank could always go back to the bank and ask for gold, without bearing any real transportation costs and without taking much time; the bank was viewed as riskless over very short intervals of time. But, outside Boston there would be discounts on the notes' face values, and the discounts increased as the distance from the issuing Boston bank increased. Over time, discounts decreased as technological change occurred, i.e., the introduction of the railroad, which made it easier to return to the Boston bank. At a distance away from the issuing bank, a transaction would be made at the note discount. The discount was determined in informal note secondary markets in which note brokers traded bank notes. The discounts were recorded by newspapers called "bank note reporters," the financial press of the time. (See Dillistin (1949).) A Philadelphia bank note reporter, for example, *Van Court's Counterfeit Detector and Bank Note List*, covered 3,089 banks in 35 states, territories, and provinces of Canada. See Gorton (1989).

So, in order to transact with a customer, a storekeeper would look up the discount in the local bank note reporter. The banknote reporter, usually published monthly, got the discount information from a note broker (who traded in an informal note market). Each large city had at least one bank note reporter. The bank note reporter would list the discounts on all bank notes circulating in that particular location, say in Boston or New Haven. Notes from very distant locations would not circulate, e.g., notes of Wyoming banks did not circulate in Philadelphia. Most notes from Boston banks circulated at the same discount in Philadelphia, but not all Boston banks. And the further away the location of the banks, the less like that the notes in a distant location would circulate at the same discount.

Figure 1 shows the discounts in Philadelphia on a single bank, the Bank of Virginia. The y-axis scale is percent discount. Most of the time the discount is low, but there is a lot of volatility to the discount. In the face of such volatility, the bank note reporter's role was to provide market participants with the discount at the time of the transaction. Table 1 further provides a sense of the variation in note discounts. As examples, the table shows the average annual discount, in Philadelphia, averaged over months, together with the number of banks for Ohio and for South Carolina. (See Gorton (1989).) The mean discounts and their standard deviation in Ohio are both much larger than those of South Carolina. State banking systems were regulated differently, so the risk could differ even holding distance

constant. It is clear that the discounts varied over time, sometimes rather dramatically. The standard deviation also varies over time.

The bank note market was efficient, in the financial economics sense of “market efficiency,” in that the discounts on notes some distance from the issuing bank accurately reflected the bank’s risk, given that it would take time to get to that bank (the effective maturity of the note), time during which the bank could fail. See Gorton (1999). Furthermore, the discounts functioned to discipline new banks. The discounts of new banks were higher than the discounts on the notes of other banks at the same location, creating an incentive for note holders to go back and demand cash, to check on the new bank. The higher discount thus acted to reward those monitoring new banks. See Gorton (1996). In sum, bank note markets functioned as “efficient” markets; the discounts were informative about bank risk. Banks at the same location competed, and the note market enforced common fundamental risk at these banks.

While the note market was efficient from the point of view of the note discounts, there was a market failure: it was not economically efficient. The problem was that the costs of transacting with bank notes were high. Sumner (1896) explains this in his History of Banking:

The bank-note detector did not become divested of its useful but contemptible function until the national bank system was founded [creating government money]. It is difficult for the modern student to realize that there were hundreds of banks whose notes circulated in any given community. The bank-notes were bits of paper recognizable as a species by shape, color, size and engraved work. Any piece of paper which had these came with the prestige of money; the only thing in the shape of money to which the people were accustomed. The person to whom one of them was offered, if unskilled in trade and banking, had little choice but to take it. A merchant turned to his ‘detector.’ He scrutinized the worn and dirty scrap for two or three minutes, regarding it was more probably ‘good’ if it were worn and dirty than if it was clean, because those features were proof of long and successful circulation. He turned it up to the light and looked through it, because it was the custom of the banks to file the notes on slender pins which made holes through them. If there were many such holes the note had been often in bank and its genuineness was ratified. All the delay and trouble of these operations were so much deduction from the character of the notes as current cash. A community forced to do its business in that way had no money. It was deprived of the advantages of money. We would expect that a free, self-governing, and, at times, obstreperous, people would have refused and rejected these notes with scorn, and would have made their circulation impossible, but the American people did not. They treated the system with toleration and respect. A parallel to the state of things which existed, even in New England, will be sought in vain in the history of currency. (p. 455)

These complaints were commonplace during the Free Banking Era. Here is another example from D.R. Whitney:

The business man of today knows little by experience of the inconvenience and loss suffered by the merchant of sixty years ago arising from the currency in which debts were then paid. Receiving payment in bank notes, he assorted them into two parcels, current and uncurrent [sic]. In the first he placed the notes issued by the solvent banks of his own city; in the other the bills of all other banks. Upon these latter there was a discount varying in amount according to the location and credit of the bank issuing them. How great the discount he could learn only by consulting his "Bank Note Reporter," or by inquiring at the nearest exchange office. He could neither deposit them nor use them in payment of his notes at a bank. The discount on the note varied from one percent upwards, according to the distance the bills had to be sent for redemption and the financial standing of the bank by which they were issued. Many banks were established in remote places, mainly for the purpose of making a profit on circulation. The more distant they were from the business centers the more expensive it was to send their bills for redemption, and the more difficult it was for the general public to know their true financial condition. (Quoted by Knox (1903), p. 365.)

Thus, although the discounts displayed market efficiency, there was a market failure in terms of private banks being able to produce debt that could be used as money without the concomitant disadvantages of bank notes. Bank notes were not an efficient transaction medium.

3. Demand Deposits and Bank Stocks

Demand deposits (checking) were an innovation that grew enormously during the years before the U.S. Civil War; see Figure 2. Checking accounts had several advantages over private bank notes. First, these accounts paid interest. And, second, there was no discount on local checks; the checks were accepted at the value the payer denominated. The disadvantage is that checks not only depend on the bank but also on the person writing the check, who must have the money in the bank account. A check is a "double claim," being a claim on both a specific bank and a specific person's account. Consequently, markets for such specific claims would be very thin; it would be too costly to have a secondary market in the checks of individual people at a specific bank. So checks first grew in urban areas where a person's identity was most easily verified. One way to think of the discount on checks is that the discount was either zero or 100 percent. Out-of-town checks had a 100 percent discount at first, while local checks had zero discounts. It took some time for out-of-town checks to become accepted.

Bank note markets were organized informally by note brokers. But, checks require "clearing." The checks written on one bank would be deposited at another bank. So, the receiving bank had to present the check to the other bank for payment. With many checks, the process of clearing by banks each sending messengers to all the other banks to present checks for payment, while all the other banks were sending their messengers with checks for payment, was quickly very cumbersome. Clearing houses were established so that banks could go to a single location and submit and receive checks from other banks. The first clearing house in the United States was established in New York City in 1853 and

subsequently spread across the nation (see Gibbons (1859; Cannon (1910), Redlich (1951), Gorton (1984, 1985), Timberlake (1985), and Gorton and Mullineaux (1987)).

In the clearing process a bank might face another bank which owed the first bank a large amount of money or vice versa on another day. This counterparty risk, as we would call it today, meant that the clearing house took on other responsibilities related to monitoring member banks. Clearing houses imposed capital requirements, reserve requirements, interest rate restrictions, ongoing audits and reporting. (See Cannon (1910).) In the process of clearing, the clearing house became informed about the state of individual member banks and, in fact, started a bank examination process. The results of examinations were kept secret, but the clearing house did require members to publish balance sheet information weekly in newspapers.³ As Bolles (1903, p. 379) explained:

The extent of the supervision exercised by this association over its members the public will never know, because it is best that much of it remain secret. The banks thus associated learn more about one another than they ever would if acting entirely alone and examinations are made, and warnings given, of which the public has no knowledge. The direct interest that every bank has in knowing the true condition of every other member is one of the great merits of the system.

The clearing process produced information, as did clearing house member bank examinations, but other than the information that was required to be made public, no other information was revealed. In other words, because there were no discounts to the face value of demand deposits, and because the information garnered by the clearing house was not made public, information from note discounts was effectively lost.

In order for checks to be accepted at par, that is with no discount for the risk of the issuing bank, there must be no information available to price the bank risk of a bank's checks. Clearing houses replaced bank note markets and kept the information about the risk of individual banks secret. But, what about bank stock prices, renowned as information-revealing? Bank stock prices, which in the Free Banking Era were publicly available in New York City for large banks, would reveal information, because the stock prices were efficient. Such information-revealing prices could have led to discounts on checks or runs on banks. Why did that not occur?

The answer is quite straightforward: the market for bank stocks was also effectively closed, by the banks themselves. Banks took actions to make their stocks very illiquid. Goetzmann, Ibbotson and Peng (2001) collected individual firm stock prices for NYSE stocks over the period 1815-1925. They exhaustively collected stock prices from a variety of sources, covering over 600 companies during the sample period. Their data display an interesting phenomenon, which is portrayed in Figure 3. The figure graphs the

³ On clearing house bank examinations see Bolles (1903), Cannon (1910) and Smith (1908). Smith (1908) described the government bank examinations as "defective."

total number of companies with actively traded stock in their sample, and the total number of banks in the sample with traded stock. Bank stocks were quite prevalent up to 1872 after which they disappear. The transition to demand deposits entailed making bank stocks illiquid, so that their prices would be uninformative. O'Sullivan (2007): "For the most part, bank stocks were not widely traded" (p. 517).

Banks remained public companies but they took actions to insure that their stock was illiquid. This was accomplished by making the stock price of a single share very high, out of reach of most investors. And, the stock ownership was concentrated. Loeser (1940, p. 158): "For a long time the stocks of these institutions [bank, trust, and insurance companies], particularly the leading ones, were looked upon as 'rich men's investments.' In many instances share prices were high, as indeed some still remain today. In other instances there was a high degree of concentration of shareholdings among family groups and groups of business associates and other with allied interests."

Banks recognized that fluctuations in stock prices, in particular declines in a stock price, could lead to bank runs because the informative price could reveal that the backing assets had declined in value. As Stevenson (1910) put it:

No bank can long exist without a complete trust on the part of the depositors. If stories which affect the bank's standing and character seem to be a part of the speculative tactics, should they grow, which may cause panic, then it is incumbent that those in the management of large banks see to it, as far as in their power to, and prevent the dealing of bank stocks and their quotations on the stock exchanges of the country. (p. 341)

Also Loeser (1940) noted:

Within the past decade, with one exception, leading banks with issues listed in New York had their issues removed from listing. Many banks in other cities also delisted their securities. The reason generally given for this voluntary delisting was that the banks were apprehensive that the publicity which might be given to prices declines of their issues on the exchanges might be misconstrued by the public and might affect the confidence of depositors adversely (p. 160-161).

The Federal Reserve System was founded in 1914 with the express purpose of preventing banking panics. Indeed, it did prevent a panic in 1920 (see Gorton (1988) and Gorton and Metrick (2013)). For a brief period in the 1920s some banks listed on the New York Stock Exchange, as follows:

- Bank of America, 1927-1928
- Bank Manhattan, 1927-1928
- Bank of New York, 1927-1929
- Chase National Bank, 1927-1928
- Chatham Phoenix National Bank, 1927-1928
- Chemical National Bank, 1927-1928
- Commerce Guardian Trust & Savings Bank, 1927-1929
- Continental Bank, 1927-193
- Corn Exchange National Bank, 1927-195

Farmers Loan & Trust, 1927-1928
Hanover National Bank, 1927-1928
National City, 1927-1928
National Park, 1927-1929

Banks that listed quickly delisted in a few years. The Corn Exchange is the only bank that remained listed after January 1930.

The lack of information about banks persisted, even after deposit insurance was adopted in 1934. In 1964 the U.S. House of Representatives commissioned a study on the issue of bank opacity as it related to bank equity holders. The committee noted that:

Stockholders of banks in many cases receive little or no information concerning the financial results of their bank's operations. Less than 50 percent of all banks publish annual reports. Of those who publish annual reports, 29 percent do not reveal the size of their valuation reserves. Before-tax earnings are not disclosed by 36 percent of all banks and after tax earnings are not disclosed by 34 percent of all banks. (U.S. House of Representatives (1964), p. v).

The report contained Table 2 below. The table shows the number of shares traded in 1962 for different number of shares outstanding. Surprisingly, the number of shares traded monotonically declines in number of shares outstanding. In other words, larger banks with more shares outstanding have the lowest number of shares traded. The total annual trading volume of bank shares on the New York Stock Exchange is shown in Figure 4. Until the early 1960s bank stock did not actively trade.

In the transition from bank notes to demand deposits two information-revealing markets closed: the market for bank notes which set the discounts; and bank stock markets. Closing information-revealing markets that would reveal bank risk was economically efficient because bank liabilities could then be accepted at par, avoiding the transactions costs associated with bank notes.

4. Clearing Houses and Pre-Fed Financial Crises

Before the Federal Reserve came into existence, financial crises were managed by the clearing houses, which acted as lenders-of-last-resort. A financial crisis is a bank run; holders of bank short-term debt no longer want to hold the debt and instead want their cash back. The debt holders want cash because they have received information about a coming recession during which their bank may fail (see Gorton (1988)). Since banks are opaque there was no way for them to know which banks were weak and which were not. Hence, all banks were run on. When this happens in the entire banking system at the same time, banks cannot possibly honor the demands for cash because their assets—mostly loans—cannot be sold. The entire banking system is insolvent because the debt holders' contractual right to ask for cash cannot be honored.

The first act of the clearing house when a crisis started was to cut off the publication of bank-specific information, which was required in normal times, usually followed by suspension of convertibility, that is banks would refuse to pay cash to redeem checks.⁴ During normal times, the clearing house required members to publish balance sheet information; newspapers published these numbers weekly. Bank-specific information might identify the weaker banks, which would then be subject to runs. To stop the desire to run on the banks, the clearing house had to convince bank debt holders that the member banks were solvent, that the bank assets were illiquid but not in default. This required management of the information environment in two very specific ways. First, a securities market had to be *created* to reveal information about the solvency of all member banks jointly, effectively the banking system.⁵ Secondly, the clearing house needed to convince the public that certain specific banks, those subject to persisting rumors of weakness, were in fact, solvent.

The clearing house also had to address the illiquidity problem. After suspension occurred, the clearinghouse issued “clearing house loan certificates,” a new form of private money that could be used in the clearing process instead of cash.⁶ Loan certificates were the jointly liability of clearing house members. In other words, the banks banded together formally by assuming this joint liability. The prospect of this happening meant that in normal times the member banks had an incentive to monitor each other. (See Gorton and Huang (2006).)

Individual member banks would apply to a clearing house committee for loan certificates, offering collateral from their balance sheets. The clearing house went to great lengths to protect the secrecy of which banks borrowed loan certificates. Preventing leaks concerning the loan certificate borrowings of individual clearing house members was important for preventing signs of weakness at banks with large borrowings.⁷

By issuing loan certificates, the clearing house could buy bank assets and economize on the use of cash in the clearing process (where the certificates were accepted as cash) so that cash could be handed out to depositors. Later, clearing house loan certificates were issued directly to the public (see Gorton (1984)). Also, certified checks circulated as cash, and banks accepted them as cash in the clearing process. Certified checks are not dependent on any single account. Further, the checks were stamped “Only Payable Through the Clearing House.” This meant that they were the joint liability of the clearing house, rather than of a single bank. These checks circulated as a hand-to-hand currency.

⁴ This was always illegal but never enforced; see Gorton (2012).

⁵ The New York clearing house members were the largest banks in the country and held most of the banking system’s reserves, so the solvency of the New York Clearing House was effectively the solvency of the banking system.

⁶ Clearing house loan certificates were not permanent. They would all be retired at the end of the crisis.

⁷ This was later the underpinning of the Federal Reserve’s discount window when the central bank was established in 1914. Discount window borrowing was to be kept secret.

Importantly, by agreeing that certified checks were acceptable as money, the clearing house created a market in these checks. The currency premium on checks was reported in newspapers. The currency premium was the excess check amount that needed to be paid to receive a dollar of cash. In other words, an informative financial market was created where the risk of the clearing house failing was priced. Figure 5 shows the high and low currency premiums during the Panic of 1873. The high was five percent, meaning that \$1.05 of certified checks was needed to buy a dollar of cash. The figure shows the decline in the currency premium, which led to the end of the crisis. As information contained in the premium suggested the clearing house was solvent, the premium went down.

Also, the clearing house would also send special examination teams to study the situation of certain banks that were the subject of rumors. In the case of a special examination during suspension, the results of the examination were publicized with a certificate of financial health issued by the Clearing House Committee. This occurred even if privately the Clearing House Committee had reservations about the bank's solvency. The certificates issued by the clearing house simply stated that the specific was solvent; no detailed information was released. In fact, the detailed results of clearing house examinations were never made public, even in normal times, although bailouts of member banks were public. There were thirteen special examinations conducted during the five panics of the National Banking Era, 1863-1914. See Gorton and Talman (2013).

During the National Banking Era, the New York Clearing House had around sixty members, the largest banks in the country. In the five major panics (1873, 1884, 1890, 1893, 1907) a total of five members failed.

A clearing house, clearing system, is an inherent part of the use of checks as money. It replaced the bank note market. Bank stocks stopped trading also. There was no information leakage and so checks traded at their face value. During a bank run, the clearing house first suppressed all bank-specific information, so individual banks would no face runs. But, a market did open, a market for claims on the clearing house, and the prices of these claims revealed information about the banking system.

The opacity of banks was endogenously created so that checks could trade at par. The vulnerability to runs meant that the clearing house had to take a central bank-like role as lender-of-last-resort. This role entailed managing the information environment during the crisis. This delicate task meant preventing the revelation of some information while producing and revealing other information. Notably, "transparency" was never the goal, nor would it have been advisable.

5. The Financial Crisis of 2007-2008

With the advent of deposit insurance in 1934, depositors had no incentives to produce information about their banks. Deposit insurance guarantees opacity in the sense that no market participants writing checks need worry about the risk of the bank issuing the deposits. Checks are accepted without a second's thought (about the bank). The government's bank examiners look after the banks and the results of their examinations are kept secret.

The issue of bank opacity, however, has arisen again with the growth of the “shadow banking system,” which refers to a large market in which uninsured short-term bank debt plays a role similar to demand deposits, except that the depositors are large institutions. I do not review the details here, but make a few observations concerning opacity and banking with respect to this crisis. See Gorton (2010, 2012) and Gorton and Metrick (2012) for details on the crisis.

In the modern era bank money has expanded to include sale and repurchase agreements and asset-backed commercial paper (ABCP). These forms of bank debt are issued by financial intermediaries that were not regulated as commercial banks. ABCP was issued by special purpose vehicles that used the proceeds of issuing the paper to buy asset-backed securities (ABS), bonds backed by portfolios of loans, mortgages, auto loans, credit card receivables, etc. See Gorton and Metrick (2011) and Gorton and Souleles (2006). Similarly, sale and repurchase agreements (“repo”) often also used ABS as collateral. In a repo, a depositor (lender) deposits money with a dealer bank, usually overnight, and receives interest. The loan is backed by collateral in the form of bonds (with a market value equal to the amount lent). The depositor takes possession of the bonds.

ABCP is often one to four day maturity and repo is usually overnight. These liabilities serve as a kind of money for large institutions. The short maturity is essential so that depositors have flexible access to their cash. In order for this to function as money the backing collateral must be opaque, as discussed above. For this purpose ABS are ideal. As explained by Gorton and Metrick (2011) and Gorton and Souleles (2006), ABS consist of layers of bonds ordered by seniority (called “tranches”) linked to the same large portfolios of loans. The loan portfolios are homogeneous, for example all auto loans or all prime mortgages. Asset classes are never mixed in a portfolio. Also, an importantly, ABS have no traded equity. That part of a transaction is held by the originator. ABS are complicated, opaque, and it is not profitable in normal times bother doing credit analysis on them. Since ABS have no traded equity, no information is revealed.

Shadow banking consists of repo and ABCP backed by bonds linked to portfolios of loans. This is real banking: loans are financed by deposits (repo), so to speak, of institutional investors who have a demand for this kind of interest-earning, short-term, saving. This bank money works because the ABS is opaque. Like the older banking system, which finances loans via deposits, shadow banking is vulnerable to runs, just as the older banking system was prior to deposit insurance.

I now focus on three aspects of the financial crisis related to the information environment. The first issue concerns “stigma.” Stigma refers to the negative effects on a bank of information leakage about the bank’s borrowing from the discount window. This is perceived to be a sign of weakness, potentially leading to a run on that bank. Fed Chairman Bernanke (2010):

Many banks . . . were evidently concerned that if they borrowed from the discount window, and that fact somehow became known to market participants, they would be perceived as weak and, consequently, might come under further pressure from creditors. To address this so-called stigma problem, the Federal Reserve created a new discount window program, the Term Auction Facility (TAF). (p. 2)

Armantier, Ghysels, Sarkar, and Shrader (2011) studied TAF and found that “banks were willing to pay an average premium of at least 37 basis points (and 150 basis points after Lehman’s bankruptcy) to borrow from the Term Auction Facility rather than from the discount window.” The TAF and other programs obscured which banks were trying to borrow by creating auctions, and keeping secret which banks were bidding, how much was bid, and which banks got funds. Also, lending to institutions through the Troubled Asset Relief Program (TARP) was also kept secret.⁸ The special lending programs set up by the Fed during the financial crisis, like the clearing house loan certificates, required secrecy so that individual banks would not be singled out by the market.

But, wouldn’t stock market prices reveal which banks were weak? Yes, the market did reveal which banks were weaker, but not how weak. See Peristiani, Morgan and Savino (2010). The Federal Reserve undertook “stress tests” to determine how much capital was needed by each bank. The stress tests (Supervisory Capital Assessment Program, SCAP) were introduced in February 2009. Ten of the 19 largest bank holding companies that underwent the SCAP were required to raise equity capital--by \$75 billion in total. Peristiani, Morgan and Savino (2010) studied the market response to the announcement; it was positive for banks that were required to raise equity. There was no stock price response (abnormal return) for banks that were not required to raise equity.

The SCAP was the only instance where the Federal Reserve produced information and announced it during the crisis. But, the Fed only announced how much capital each bank would need. This was akin to the clearing houses’ special examinations during crises. In both cases, the details of the examinations were not announced. Only a conclusion was announced.

Finally, informative stock prices were viewed as a problem during the financial crisis. In 2008 the U.S. Securities and Exchange Commission (and, in England, the Financial Services Authority) banned short sales of the stock of seventeen large financial firms and also Fannie Mae and Freddie Mac. At the time the SEC (2008) wrote:

False rumors can lead to a loss of confidence in our markets. Such loss of confidence can lead to panic selling, which may be further exacerbated by "naked" short selling. As a result, the prices of securities may artificially and unnecessarily decline well below the price level that would have resulted from the normal price discovery process. If significant financial institutions are involved, this chain of events can threaten disruption of our markets.

Later, in September 2008, the SEC temporarily prohibited short selling of the stocks of approximately 800 financial firms, required institutional money managers to report short sales and short positions in certain securities, and eased restrictions on the ability of issuers to repurchase their securities.⁹

⁸ In October 2008, the Emergency Economic Stabilization Act of 2008 (Division A of Public Law 110-343) established the Troubled Asset Relief Program (TARP) for the purpose of enabling the Treasury to purchase and guarantee of “troubled assets.”

⁹ September Emergency Order Taking Temporary Action to Respond To Market Developments, Exchange Act Release No. 34-58592, 73 Fed. Reg. 55,169 (Sept. 18, 2008), available at <http://www.sec.gov/rules/other/2008/34-58592.htm>

The short sales bans were attempts to suppress bank-specific information. The academic studies to date show that the short sale bans reduced market liquidity and hindered price discovery, exactly what the bans were intended to do. See, e.g., Beber and Pagano (2013) and the references therein. The academics, however, view short sales bans as misguided. But, in the context of the financial crisis, it appears to have been an attempt to cut off information about specific banks, to keep the runs from concentrating on the weak banks. Sounds a lot like the 19th century, though in the 19th century bank stocks were already endogenously illiquid and so there could not be short sales.

The response of the central bank and the government to the financial crisis of 2007-2008 was reminiscent of previous responses in the 19th century. The crisis was an information event, and the information environment had to be managed, most particularly by (trying to) suppressing some information, hiding some information, and producing and announcing some information.

6. Conclusion

Banks are inherently opaque so that their debt can be used as money. This opacity notably developed during the 19th century; it entailed shutting informative markets for bank liabilities (bank notes and bank stock), internalizing that information into the clearing house, which kept the information secret. This is not unlike the modern era in which bank examinations are confidential to the government, and discount window borrowing from the Fed is supposed to be secret.

During financial crises bank coalitions (clearing houses) and central banks have always carefully managed the bank information environment. During crises policies have been aimed at preventing bank runs on individual banks, based on information about specific banks. The financial system can unravel serially if banks are sequentially run on. In general, bank-specific information is suppressed thereby forcing attention to the question of the solvency of the entire banking system. In the 19th century an explicit market pricing the risk of the clearing house being insolvent opened, and when the currency premium went to zero, normalcy returned.

Recently, the problem of bank runs emerged again. The development of new forms of bank money, repo and asset-backed commercial paper, have also been created to be opaque, by being backed by ABS, which itself has no information leakage. The same problems as in the 19th century have reemerged, and the Federal Reserve and the government have rediscovered the modern equivalents, overcoming stigma, introducing stress tests, and trying to suppress information-revealing markets.

The financial crisis of 2007-2008 has led to widespread calls for “transparency.” Some blame the crisis on a lack of transparency. But, banking is inherently opaque. Were it not opaque it could not be able to produce money.

[58592.pdf](http://www.sec.gov/rules/other/2008/34-58591a.pdf) ; Amendment To Emergency Order Taking Temporary Action To Respond To Market Developments, Exchange Act Release No. 58,591A, 73 Fed. Reg. 55,557 (Sept. 21, 2008), *available at* <http://www.sec.gov/rules/other/2008/34-58591a.pdf> .

References

- Armantier, Olivier, Eric Ghysels, Asani Sarkar, and Jeffrey Shrader (2011), "Stigma in Financial Markets: Evidence from Liquidity Auctions and Discount Window Borrowing during the Crisis," New York Federal Reserve Bank Staff Report No. 483.
- Bernanke, Ben (2010), Statement by Ben S. Bernanke, Chairman, Board of Governors of the Federal Reserve System, prepared for the Committee on Financial Services, U.S. House of Representatives, February 10, 2010.
- Bolles, Albert (1903), Practical Banking, Eleventh Edition (Levey Bro's & Co.).
- Cannon, James (1910), Clearinghouses (Washington).
- Coase, Ronald (1937), "The Nature of the Firm," *Economica* 4, 386-405.
- Dang, Tri Vi, Gary Gorton, and Bengt Holmström (2012), "Ignorance and the Optimality of Debt," Working paper, Yale and MIT.
- Dang, Tri Vi, Gary Gorton, Bengt Holmström and Guillermo Ordonez (2013), "Banks as Secret Keepers," Working paper.
- Dillistin, William (1949), Bank Note Reporters and Counterfeit Detectors, 1826-1866, Numismatic Notes and Monographs 114 (New York).
- Gibbons, J. S. (1859), The Banks of New York, Their Dealers, The Clearinghouse, and the Panic of 1857 (New York, 1968; reprint of 1859 original).
- Goetzmann, William, Roger Ibbotson and Liang Peng (2001), "A New Historical Database for the NYSE 1815-1925: Performance and Predictability," *Journal of Financial Markets*, 1-32.
- Gorton, Gary (1984), "Private Bank Clearinghouses and the Origins of Central Banking," *Business Review—Federal Reserve Bank of Philadelphia*, January/February, 3–12.
- Gorton, Gary (1984), "Private Bank Clearinghouses and the Origins of Central Banking," *Business Review—Federal Reserve Bank of Philadelphia*, January/February, 3–12.
- Gorton, Gary (1985), "Clearinghouses and the Origin of Central Banking in the United States," *Journal of Economic History* 45, 277–83.
- Gorton, Gary (1988), "Banking Panics and Business Cycles," *Oxford Economic Papers* 40 (4), 751–81.
- Gorton, Gary (1988), "Banking Panics and Business Cycles," *Oxford Economic Papers* 40 (4), 751–81.
- Gorton, Gary (1989), "An Introduction to Van Court's Bank Note Reporter and Counterfeit Detector," data appendix.

- Gorton, Gary (1996), "Reputation Formation in Early Bank Note Markets," *Journal of Political Economy* 104, 346–97.
- Gorton, Gary (1999), "Pricing Free Bank Notes," *Journal of Monetary Economics* 44, 33–64.
- Gorton, Gary (2010), Slapped by the Invisible Hand: The Panic of 2007 (Oxford University Press).
- Gorton, Gary (2012), Misunderstanding Financial Crises (Oxford University Press).
- Gorton, Gary and Lixin Huang (2006), "Banking Panics and Endogenous Coalition Formation," *Journal of Monetary Economics* 53, 1613-1629.
- Gorton, Gary and Andrew Metrick (2013), "The Federal Reserve and Panic Prevention: The Role of Financial Regulation and Lender of Last Resort," *Journal of Economic Perspectives*, forthcoming.
- Gorton, Gary and Andrew Metrick (2012), "Securitized Banking and the Run on Repo," *Journal of Financial Economics* 104, 425-451.
- Gorton, Gary and Andrew Metrick (2012), "Securitization," chapter in the Handbook of the Economics of Finance, volume 2, edited by George Constantinides, Milton Harris, and René Stulz (Elsevier).
- Gorton, Gary, and Don Mullineaux (1987), "The Joint Production of Confidence: Endogenous Regulation and Nineteenth Century Commercial Bank Clearinghouses," *Journal of Money, Credit, and Banking* 19, 458–68.
- Gorton, Gary, and George Pennacchi (1993), "Financial Intermediaries and Liquidity Creation." *Journal of Finance* 45:49–72.
- Gorton, Gary and with Nicholas S. Souleles (2006), "Special Purpose Vehicles and Securitization," chapter in The Risks of Financial Institutions, edited by Rene Stulz and Mark Carey (University of Chicago Press).
- Gorton, Gary and Ellis Talman (2013), "How Did Banking Panics End?," forthcoming working paper.
- Holmström, Bengt (1999), "The Firm as a Subeconomy," *Journal of Law, Economics & Organization* 15, 74-102.
- Holmström, Bengt (2008), "Discussion of 'The Panic of 2007,' by Gary Gorton," In Maintaining Stability in a Changing Financial System, Proceedings of the 2008 Jackson Hole Conference, Federal Reserve Bank of Kansas City.
- Holmström, Bengt (2011), "The Nature of Liquidity Provision: When Ignorance is Bliss," Presidential Address, Econometric Society, ASSA meetings, Chicago, January 5-8, 2012.
- Loeser, John (1940), The Over-the-Counter Securities Market (National Quotation Bureau Inc.; New York).

- Knox, John J. (1903), History of Banking in the United States (B. Rhodes and Company: New York).
- Macey, Jonathan and Geoffrey Miller (1992), "Double Liability of Bank Shareholders: History and Implications," *Wake Forest Law Review* 27, 31-62.
- O'Sullivan, Mary (2007), "The Expansion of the U.S. Stock Market, 1885-1930: Historical Facts and Theoretical Fashions," *Enterprise & Society* 8, 489-542.
- Peristian, Stavros, Donald Morgan, and Vanessa Savino (2010), "The Information Value of the Stress Test and Bank Opacity," Federal Reserve Bank of New York, Staff Report No. 460.
- Redlich, Fritz (1951), The Molding of American Banking (New York).
- Rockoff, Hugh (1975), *The Free Banking Era: A Reexamination*. New York: Arno.
- Rolnick, Arthur, and Warren Weber (1983), "New Evidence on the Free Banking Era." *American Economic Review* 73:1080-91.
- Rolnick, Arthur, and Warren Weber (1984), "The Causes of Free Bank Failures." *Journal of Monetary Economics* 14:267-91.
- Securities and Exchange Commission (2008), July Emergency Order Taking Temporary Action to Respond to Market Developments, Exchange Act Release No. 58,166, 73 Fed. Reg. 42,379 (July 15, 2008), available at <http://www.sec.gov/rules/other/2008/34-58166.pdf> .
- Smith, Gordon (1908), "Clearing-House Examinations," *The Bankers' Magazine* LXXVI (1908) (The Bankers Publishing Co.), 177-178.
- Stevenson, Charles (1910), "Speculation in Bank Stocks," *Bankers' Magazine* 81, 337-342.
- Timberlake, Richard (1984), "The Central Banking Role of Clearinghouse Associations," *Journal of Money, Credit and Banking* 16, 1-15.
- U.S. Department of Commerce (1949), Historical Statistics of the United States (U.S. Government Printing Office).
- U.S. House of Representatives (1964), "The Market for Bank Stock," Subcommittee on Domestic finance, Committee on Banking and Currency, 88th Congress, 2d Session (December 22, 1964) (U.S. Government Printing Office: Washington D.C.).
- Williamson, Oliver (1975), Markets and Hierarchies: Analysis and Antitrust Implications (New York: Free Press).

Table 1: Note Discounts on Ohio and South Carolina Notes in Philadelphia

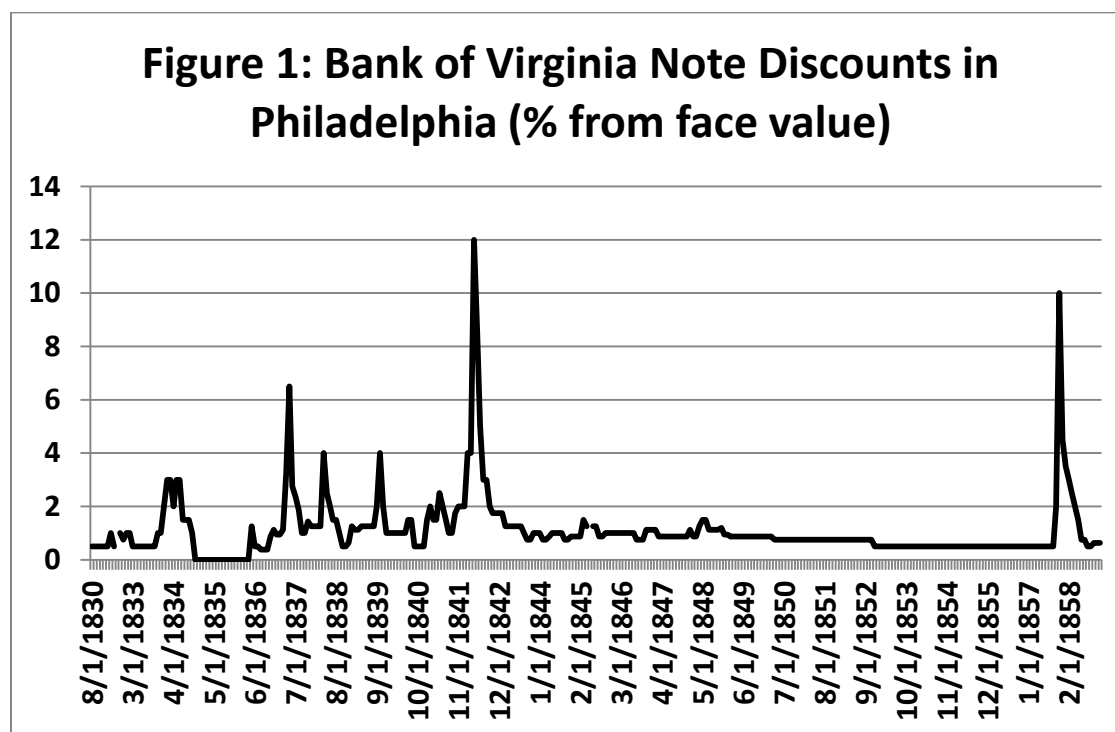
Year	Ohio			South Carolina		
	Mean Discount	Standard Deviation	Number of Banks	Mean Discount	Standard Deviation	Number of Banks
1839	4.18	1.33	38	3.57	1.65	11
1840	4.76	1.55	42	0.34	0.83	12
1841	7.45	3.44	40	1.27	0.91	12
1842	14.18	13.32	34	2.54	1.49	12
1843	14.4	20.18	36	1.81	0.59	12
1844	10.49	16.96	35	0.94	0.25	12
1845	8.97	14.24	35	1.26	0.21	12
1846	7.68	13.97	40	1.35	0.33	13
1847	8.26	18.23	39	1.00	0.37	13
1848	9.18	19.01	44	1.78	0.96	15
1849	12.16	23.23	44	1.17	0.63	15
1850	12.84	24.17	44	0.85	0.26	14
1851	12.4	23.96	43	0.84	0.33	14
1852	6.16	17.91	30	0.87	0.26	14
1853	2.63	10.27	39	0.75	0.11	16
1854	1.86	0.86	37	0.96	0.19	17
1855	3.08	8.18	37	1.08	0.35	18
1856	2.64	8.21	38	0.83	0.11	18
1857	5.69	12.12	38	1.97	2.65	19
1858	6.5	16.33	36	1.63	1.12	20

Source: *Van Court's Counterfeit Detector and Bank Note List* (see Gorton (1989)).

Table 2: Number of Shares Traded in 1962 versus Total Number of Shares Outstanding at Yearend 1962

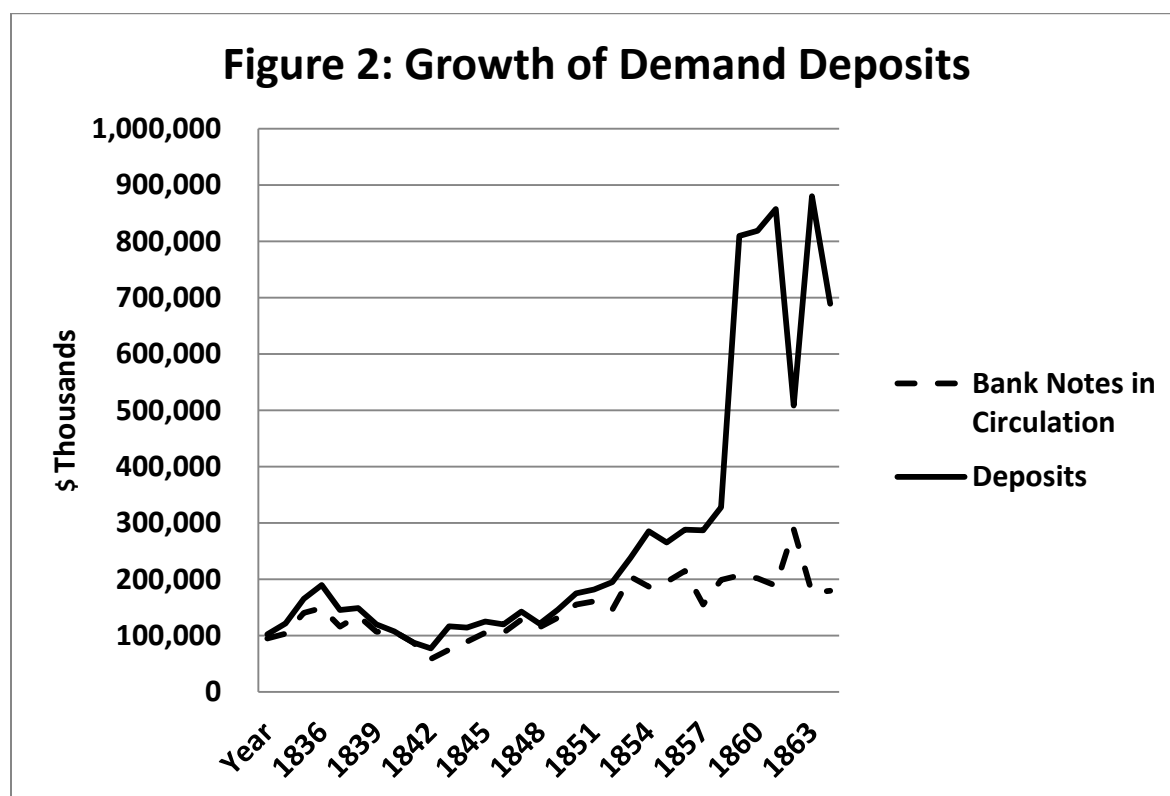
Shares Traded	Number of Outstanding Shares							Total
	0 to 10,000	10,000 to 50,000	50,000 to 100,000	100,000 to 500,000	500,000 to 1,000,000	1,000,000 to 5,000,000	Over 5,000,000	
Less than 1,000	51,684	15,816	1,372	384	98	120	40	69,514
1,001 to 50,000	719	4,288	2,288	2,837	217	30	--	10,379
50,001 to 100,000	--	--	28	177	242	19	--	466
100,001 to 500,000	10	--	--	74	166	299	--	549
500,001 to 1,000,000	--	--	--	--	--	60	30	90
More than 1,000,000	--	--	--	--	--	--	60	60
Total	52,413	20,104	3,668	3,472	723	600	130	81,110

Source: U.S. House of Representatives (1964).

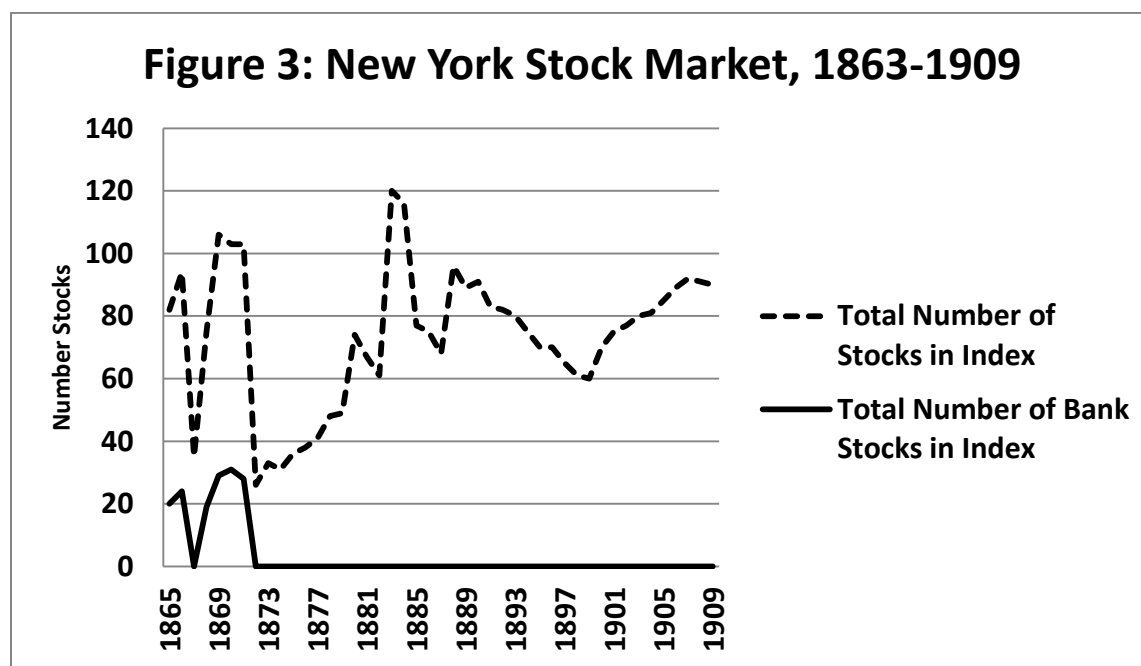


Source: Gary Gorton and Warren Weber, "Quoted Discounts on State Bank Notes in Philadelphia, 1832-1858," Research Department, Federal Reserve Bank of Minneapolis.

<http://minneapolisfed.org/research/economists/wewproj.html>

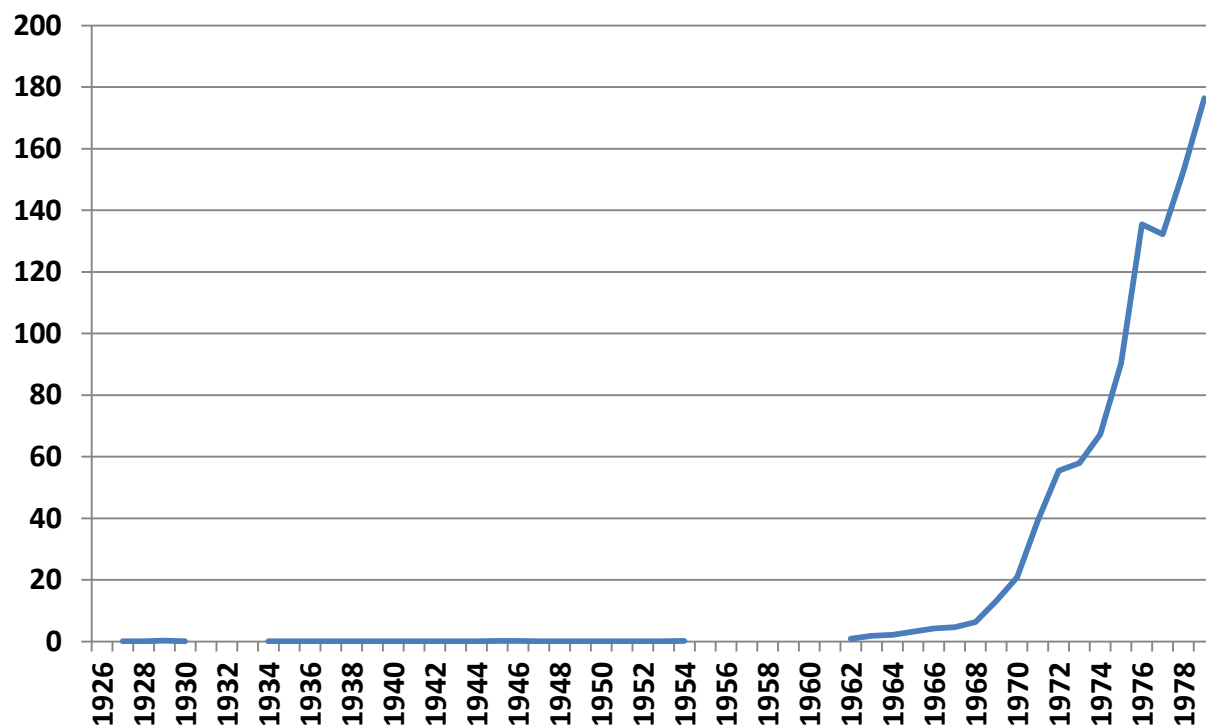


Source: Historical Statistics of the United States 1789-1945 (1949), p. 263-4

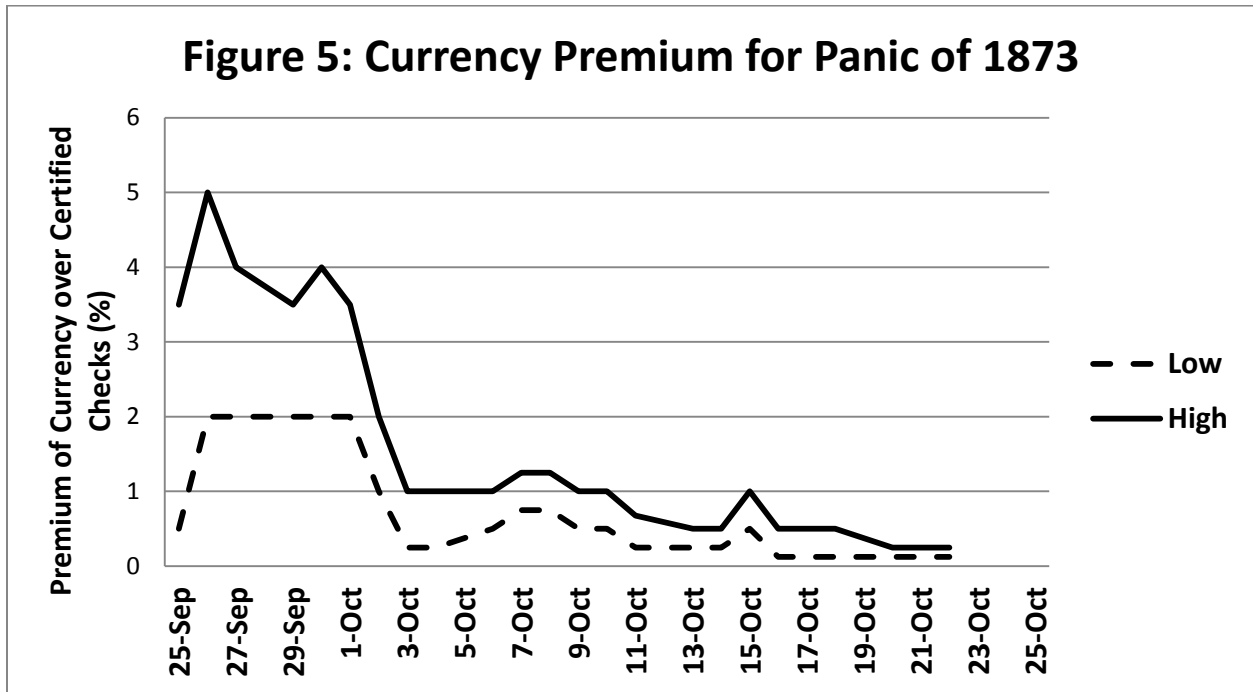


Source: Goetzmann, Ibbotson and Peng (2001).

**Figure 4: Bank Total Annual Trading Volume
(NYSE Only, Millions of Shares, 1926 to 1979)**



Source: CRSP; SIC = 6010, 602x; EXCHCD = 1; SHRCD = 10, 11



Source: Commercial & Financial Chronicle.