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ABSTRACT

This paper assesses the validity of comparisons between the current financial crisis and past crises in the United States. We highlight aspects of two National Banking Era crises (the Panic of 1873 and the Panic of 1907) that are relevant for comparison with the Panic of 2008. In 1873, overinvestment in railroad debt and the default of railroad companies on that debt led to the failure of numerous brokerage houses, an antecedent to the modern investment bank. For the Panic of 1907, panic-related deposit withdrawals centered on the less regulated trust companies, which were less directly linked to the existing lender of last resort, similar to investment banks in 2008. The popular press has made numerous references to the banking crises (there were three main ones) of the Great Depression as relevant comparisons to the present crisis. This paper argues that such an analogy is inaccurate in general. Banking crises in US history reflected widespread depositor withdrawals whereas the recent panic arose from counterparty solvency fears. The lessons from the past, therefore, appear less directly relevant for the current crisis.

I INTRODUCTION

Three quarters of a century without a dangerous banking crisis in the U.S. is testimony of the success with which banking stability was maintained. Something must have changed to have made the existing banking structure unsustainable. And we think we know what those changes are. They are deeply embedded in the evolution of banking markets, the size of participant institution and their interconnections, the complexity of new financial products traded and the globalization of the financial markets. The cumulative effect of these changes did not become evident until the termination of a prolonged and then intense housing bubble, reflecting an overextension of credit toward housing. The nature of systemic risk had changed. Latin American debt, the Savings and Loan crisis, and Long Term Capital Management (LTCM) now seem like small potatoes in comparison, although the 1981 crisis could have been much worse without government intervention on a large scale.

In stark contrast to the seventy five years of relative banking stability was the sixty years of banking instability between 1873 and 1933: four major banking crises in 1873, 1893, 1907, and 1914 and three banking panics in 1930 and 1931. And then there was the complete collapse of the banking system in March 1933. What, indeed, is anomalous is that the U.S. established a central bank, the Federal Reserve System, in 1913 in part to prevent a recurrence of the national banking era crises and yet the worst banking crises occurred in 1930 and 1931. The banking acts of 1933 and of 1935 and the Securities and Exchange Act of 1934 were designed to prevent a recurrence of the banking panics of the Great Depression. The legislation had been successful in preventing banking panics like those that occurred during the Great Depression. But the

current crisis bears little or no resemblance to the banking disturbances of the Great Depression. And the difference, we suspect, arises from a distinction of the sources of the crises, and an isolation of different conceptions of systemic risk.

Defining Systemic Risk in the Presence of “Too Big to Fail” Institutions

The key to understanding the origin of financial crises resides in the concept “systemic risk.” We define systemic risk as the risk associated with the transmission of a financial shock – that is, how an initial shock gets diffused throughout the financial system. Systemic risk implies that the initial financial shock is persistent as it is transmitted throughout the financial system.¹

The loss of depositor confidence in banks has been portrayed as an irrational response to an information deficit about individual bank solvency. The word “panic” as defined in the dictionary refers to “a sudden, unreasoning hysterical fear often spreading rapidly.” Contagion, however, need not be confined to an irrational response. Depositors may be rationally seeking information otherwise not available, resulting in a long line of information seekers.

Loss of depositor confidence in the solvency of the banking system is one example of systemic risk. A bank run is a response by depositors to an information gap concerning either liquidity or solvency (or both) to an individual bank. Suppose a long line of depositors awaiting their chance to liquidate their deposits forms at a bank; the existence of the line may generate fear and uncertainty about the financial status of *that bank* among the depositors of other banks. If that observation leads to bank runs on other banks for just that reason – that a depositor thinks “other banks are suffering runs,

¹ Persistence may imply “correlation” and “connectedness” of financial institutions in ways that spread the financial shock throughout the system. See Lo 2008.

so maybe I should remove my deposits from my bank” – then the subsequent banking crisis would be an observation of contagion-based systemic risk. A bank run creates systemic risk transmitted through the banking system via contagious bank runs. Depositors may lose confidence in banking firms and engage in runs on the banks. The demandable liabilities held by depositors create the danger that banks may have insufficient liquid assets to satisfy depositor demands. Widespread liquidation risk is the source of the type of banking panic that arose during the National Banking Era of the United States.

A second source of systemic risk is the loss of confidence of banks in each other, referred to as counterparty risk. The possibility that banks may lose confidence in each other lends substance to the “too big to fail” doctrine. The policy that some banks are “too big to fail” also implies that policy makers fear allowing an insolvent institution to fail will impose negative external effects on other intermediaries and risk further financial contraction. The policymaker actions reveal another type of systemic risk, but one that reflects a different kind of underlying source. The expression itself suggests that there may be undesirable repercussions to follow if a mega-bank – here, referred to as a large complex financial institution (LCFI) is allowed to fail. The repercussions are often described in general terms – either additional bank suspensions or severe impairment of the credit markets, or both. When an LCFI faces insolvency or the threat of insolvency, a network of interbank connections may endanger the solvency of other banks with whom it is connected.²

² Flannery 2009 describes how governments had apparently no choice but to support potentially insolvent financial institutions during the 2007-2009 crisis.

We have just experienced a banking crisis in which intermediaries lost confidence in the solvency of other intermediaries. In such a setting, a bank failure may pose a threat to other banks when the bank in difficulty is heavily indebted to other banking intermediaries. It is especially problematic if that indebtedness is in short-term credit instruments. The origins of a financial crisis arise from these interconnections between financial intermediaries. The difference between the current financial crisis and those that preceded it is the increasing importance attached to the second kind of systemic risk.

Interbank connections have been an element of bank disturbances throughout US history. Some banks have always been linked through the holding of correspondent bank balances and when the lead bank fails its correspondents are vulnerable as well.³ In earlier periods the second source of systemic risk, the interconnections between banks, was confined to correspondent relationships, holding company affiliates and chain banking networks. But the network of correspondent balances never bore responsibility for generating a panic, even if it contributed to its severity. What is new about the current crisis is the more recent growth in bank size, the willingness to fund off-balance sheet, and the increasing sophistication of new financial products. These new financial products allow LCFIs to create private contracts through which the contracting parties can generate exposures to loss from a small group of counterparties that may ultimately justify “too big to fail” actions of policymakers. We will need to wait for data and evidence of bank balance sheets to uncover the answer.

The complexity of the contracts – residential mortgage-backed securities, collateralized debt obligations, credit default swaps, etc. – contributed to valuation

³ The effects of the correspondent banking system during panics suggest that it may have been more of a mechanism for transmitting disturbances as opposed to an ultimate source of crisis.

difficulties, namely how problems among subprime mortgage assets – rising defaults and foreclosure rates -- would affect the value of the structured investment securities (asset-backed securities) that were rated as AAA. But that complexity itself did not introduce anything new to the underlying source of the crisis. The complex derivative contracts and structured financial contracts were vehicles through which credit was extended to home mortgage borrowers. Still, the underlying problem – excessive credit – is the most important basic component of the financial crisis. Instead, contract complexity re-introduced and magnified opacity of investment value, and exacerbated the asymmetry of information between borrower and lender (the value of the asset as investment and the underlying probability that the borrowers will repay the loan [see Gorton 2009]).

The first casualties in the current crisis were the investment banks, many of which were the largest producers of the mortgage-backed securities that suffered the sharp value declines. Many informative articles examine in detail the crisis of 2007-2009, and so the description in this article will focus more attention to historical antecedents, both in terms of the market and economic conditions that sparked a financial crisis and the responses by market participants and public authorities to the events.

The balance sheets of LCFIs post many numbers that presently reflect information that is less descriptive of its financial condition than in the past as a result of financial innovations. Bank examinations that take place today are less clear cut; the extensive use of derivative contracts and off-balance-sheet entities offer bank employees the opportunity to put the bank's solvency at risk with bank management, much less bank supervisors, having only limited control on employee actions.⁴ If a bank is then less

⁴ See discussions of Nick Leeson of Barings and of Jerome Kerviel of Societe Generale, (<http://www.nytimes.com/1996/03/31/books/upper-class-twits-made-me-do-it.html>)

aware of its own financial position, why is it not surprising that there was an increase in counter-party risk in markets that operate using daily financial through overnight lending facilities?

Gorton (2008, 2009) argues that the overnight repurchase agreement market, often associated with the “shadow banking” sector, experienced a panic in a way similar to the panics of the National Banking System. He explains that the overnight repo market often used structured financial products, like CDOs of mortgage asset backed securities, as collateral. That collateral suffered from opacity of the underlying investment portfolio. When subprime mortgages started to default, it was not clear how those defaults would affect each CDO, so in a sense it was rational to “run” away from all CDO collateral that could include mortgage backed assets. Gorton claims that response was essentially a banking panic with respect to the overnight repurchase agreement market and the shadow banking system (see Gorton 2009).⁵ Although the abstract concept of opacity applies, the remainder of Gorton’s analogy to National Banking Era panics beckons for additional support. The panics of the National Banking Era were intense yet brief; the panics took place in the span of a few weeks, and the constraints on financial trade may have lasted as long as three months. In contrast, the panic that Gorton describes took place over a full calendar year. The decline in liquidity in the overnight markets started as early as August of 2007. Innovative programs offered by the Federal Reserve System (the Treasury Securities Lending Facility and the Term Auction Credit Facility are the most direct

<http://www.nytimes.com/2008/02/19/business/worldbusiness/19iht-socgen.5.10203247.html>).

⁵ The haircut (or discounted valuation) on collateral (mainly, asset backed securities) for repos increased from virtually none, to 3 percent, to 6 percent, to 20 percent, and to 40 percent over a span of months. These actions curtailed the amount of liquidity that the assets to free up by the amount of the haircuts; the idea may sound inconsequential, but the overnight repo market was estimated at \$12 trillion, so a 40 percent haircut implies nearly \$5 trillion less in liquidity available to the market.

examples) worked to add liquidity by increasing the quality of collateral available. Further, the solvency of counterparties during the National Banking Era was rarely in question; the New York Clearing House and the Chicago Clearing House examined its members regularly, and had timely information regarding the balance sheet condition of all its members. Illiquidity was the issue for National Banking Era panics, whereas the recent panic appears to be one that reflects more generally the threat of insolvency.

Additional issues distinguish the 2008-09 financial crisis and economic downturn from those of either the National Banking Era or the Great Depression. As time passes, we are observing the extensive exposure of all banking institutions – large and small – to mortgage lending, both commercial and residential, as well as to real estate developers. Not only was the subprime mortgage market extended excessive credit, but it looks as if real estate lending was excessive at several levels.

II A LOOK AT HISTORY FOR GUIDANCE TODAY

The defining characteristic of the banking panic of the national banking era was the suspension of cash payment in New York City followed by selected suspensions in the interior, usually bringing an end to further bank closures arising from panic related withdrawals.⁶

The decision to suspend cash payment was made separately by local clearing house bank associations; it could be either partial or complete. If partial, then individual banks might pay up to a specific amount in cash (usually \$50 or \$100). Also, New York City banks might restrict payment to individual depositors while still making

⁶ See Appendix 1 National Banking Era Institutions for more information.

discretionary payments to the interior. Initiative for the country as a whole originated with the New York Clearing House.

Sprague identified four proximate effects of the suspension of cash payment: 1) payroll difficulties, 2) dislocation of domestic exchanges, 3) the increase in hoarding of cash, and 4) the emergence of a currency premium. The immediate impact of the suspension of cash payment was partial disruption of the payments mechanism, which increased real transactions costs. Wages were paid in currency; and if business firms experienced difficulty in obtaining currency there might have been temporary closings, layoffs and the creation of innovative currency substitutes. The domestic exchanges were also disrupted because bankers were reluctant to make out of town remittances. The existence of a currency premium was an added incentive not to deposit currency in banks.

Neither bank runs nor bank failure was the way most people experienced a banking crisis. The number of bank suspensions was relatively small both in New York City and in the interior, except in 1893. Table 1 shows the estimated total number of bank suspensions in New York and the interior in each of the three major panics of the national banking era.

Table 1.1 Bank Suspensions in New York City and the interior during Banking Panics: 1873-1907				
Source: Wicker (2000)				
		New York City	Interior	Total
1873		37	64	101
September				
1884		15	27	42
May				
1890		10	8	18
November				
1893		3	500	503
(May-August)				
1907		13	60	73
(October-December)				

Table 1.2 Percentage of total bank suspensions to total number of banks in each of the Banking Panics of the national banking era and the Great Depression				
National Banking Era			Great Depression	
Panic	Percent		Panic	Percent
1873*	N.A.		1930	0.034
1884	0.006		1931(I)	0.0295
1890	0.0015		1931(II)	0.0427
1893	0.042			
1907	0.0026			

*The percentage of state and national bank suspensions of total number of state and national banks was 0.0165 in 1873; Wicker (2000) had not uncovered estimates of total number of unincorporated banks in 1873.

Another measure of bank panic severity is the percentage of bank suspensions relative to the total number of banks. The percentages are set out in Table 1.2 for each of the banking panics except 1873.⁷ It is quite clear that the panics of the national banking era had less serious failure outcomes than the Great Depression, the single exception being 1893. The ratio fell below 1 percent in 1883, 1890, and 1907. For the Panic of 1893, the ratio was 4.3 percent, the same as the second panic of the Great Depression.

In 1873 and 1893, issues of clearing house loan certificates preceded the suspension of cash payment – four days in 1873 and two weeks in 1893. These initiatives were announced simultaneously in 1907. Clearing House Loan Certificates enabled the member banks to conserve much needed cash by providing an instrument for discharging debt at the Clearing House.

The 1873 Banking Panic

We have to go back more than 130 years to identify a speculative boom that resulted in a banking crisis. The 1873 banking panic was caused by the reckless expansion of railroad mileage in what was then the western territory. As railroad construction outpaced the freight and passenger demands, railroad defaults struck first the investment and brokerage houses that facilitated the credit allocation to the railroads, and left numerous European investors with substantial losses. The initial losses in 1873 forced the closure of the well-known brokerage of Jay Cooke and Company, along with other lesser known but still important brokerage houses.

Although not the first to fail, Jay Cooke's demise on September 18 drew national and international attention. According to Henrietta Larson, Cooke's biographer (1964, 64) the firm was overloaded with weak investments and advances made to specific railroads

⁷ We have no estimate of the number of unincorporated banks for that year.

including Northern Pacific. She thought the ensuing panic marked an important phase of American business, that is, “the speculative promotion of railroads beyond a reasonable expectation of returns under the drive of postwar conditions.” The closing of Cooke’s affiliates in Washington, D.C. and Philadelphia brought pandemonium to New York City, where stock prices collapsed. More than 40 brokerage houses (private banks) failed in September in New York City, Philadelphia, and Washington, D.C. as the result of excessive stock market speculation. The closed brokerage houses, the predecessor of the investment bank, were the institutions that suffered most directly from the railroad losses. Over time, the losses filtered down into the banking system because many banks lent directly to railroads, and the railroad losses had knock on effects on peripheral businesses, many of which borrowed from banks. For the country as a whole, brokerage houses account for about 60 percent of total suspensions. Only one national bank and two trust companies failed in New York City. The loss of depositor confidence was confined to the savings banks all of which suffered runs. Loss of depositor confidence in the interior was greatest in Chicago. But banking unrest extended to Memphis and all along the Atlantic coast from Petersburg, Virginia to Savannah, Georgia.

The New York Clearing House responded to the banking crisis of 1873 by pooling bank reserves and the issue of clearing house loan certificates. Unlike the response to crises in 1860 and 1861, reserve pooling did not deter the New York Clearing House from suspending cash payment. Although cash reserves had fallen to an extremely low level, it is still debatable whether suspension was necessary.⁸ We have no direct measures of cash hoarding, but we have the specie and legal tender totals for New York City national

⁸ We do not have monthly estimates of hoarding for 1873.

banks. In the first week of September 1873, legal tender and specie was over \$67 million; by the week of October 20, those reserves dwindled to \$19 million. The threat of falling to zero was non-trivial.

Contemporaries described the post panic years as “of gloom and depression.” The qualitative evidence is insufficient to verify that claim. Unemployment estimates do not begin before 1890. We only have annual GNP estimates for 1873 and afterwards. We know that annual estimates may smooth the quarterly figures. Romer (1988) provides estimates of real GNP indicating that real GNP was increasing between 1873 and 1875. Annual estimates of industrial production by Joseph Davis (2004) suggest that the contraction in 1873 was less severe than previously estimated. Balke and Gordon (1999) reveal only a one percent decline in 1873-74, offering little justification for labeling the episode a depression.

Assessment: Common Characteristics of Panics in 1873 and in 2007-2009

The crisis of 1873 displays several similarities to the Financial Crisis of 2007-2009. Most notably, the excessive issuance of credit allocated toward railroad finance led to the financial crisis in 1873, which resembles the over-issuance of credit allocated toward home mortgage finance from 2001 to 2007. Less obvious, but perhaps nearly as important, the source of much of the investment capital in 1873 aimed toward railroad expansion came from overseas investors. Similarly, overseas capital financed a large portion of the recent home mortgage credit expansion. In the recent financial crisis, investment capital was transformed into complex and opaque financial claims using elaborate extensions of financial contract design. However, at its basis, the recent financial crisis arose from the same basic elements of past crises – excessive lending,

increasing leverage, and faulty underwriting of loans.

The Panic of 1893

The 1893 panic stands apart from all other banking panics of the national banking era. Three fourths of all bank suspensions in 1873, 1893 and 1907 occurred in that year. They were widely diffused geographically and contraction in quarterly GNP was almost as severe as the contraction in the first year of the Great Depression. There were runs on urban banks by fear ridden depositors who were testing bank solvency. The suspended banks that reopened shortly thereafter were probably solvent at the time of closure. For the country as a whole, one in four suspended banks reopened and resumed normal operations and had liabilities equal to the same proportion.⁹ The proportion of reopened banks to total suspended differed by region. One third of suspended banks resumed in the Pacific region and slightly more than 36 percent in the Southern region. In Denver, Louisville, and Kansas City the proportion was even higher.

The 1893 banking crisis was accompanied by a stock market collapse. The stock market plunged on May 3 and National Cordage failed the next day. But the weakness in National Cordage stock was apparent earlier. The immediate impact was felt in the closing of the brokerage houses, the signature of the 1893 panic, which had been speculating in National Cordage stock. Repercussions were transmitted to the rest of the country. The collapse in depositor confidence was reflected in increased hoarding of cash. Like 1873, we do not have monthly estimates of currency in circulation but we have what was effectively the level of bank reserves available to national banks in New York City. In the week of May 15, the New York City national banks held \$134 million

⁹ We have no information regarding the need for capital injections prior to reopening the suspended banks.

in specie and legal tender; that total fell to a nadir of \$76.5 million by the week of August 7, 1893.

The Balke-Gordon quarterly GNP estimates reveal a decline in real GNP of 14.7 percent from the fourth quarter of 1892 to the fourth quarter of 1893. This compares with a 19 percent decline from the third quarter of 1929 to the fourth quarter of 1930. **Chart 1** displays the Balke-Gordon real GNP estimates as a proportion of peak real GNP prior to the recession/depression. The contraction of 1893 is the (green) line with the circular observation indicators, whereas the Great Depression is the (blue) line with the diamond squares. The contraction following 1893 was sharper than the Great Depression for the first three quarters following the peak. There was, however, no severe depression during the next four years observable in the real GNP figures, and real GNP had regained the peak level of real GNP after nine quarters. While 1896 was a year of the doldrums when real GNP declined by 2.9 percent, thereafter, the economy began to recover.

The crisis in banking during the Panic of 1893 took hold mainly in the interior of the country. Although 500 national banks failed during this financial crisis, only three of those national banks were New York national banks. There was little indication of a financial crisis in Wall Street; the mild upward spikes in the call loan interest rate (see Chart 2) were modest even in comparison to some non-panic periods. Whereas the New York City banks supplied currency to the interior during the 1873 crisis, those banks were not supplying sufficient currency to the interior in 1893.

Assessment: The Panic of 1893 and the Current financial Crisis

The crisis of 1893 displays few similarities to the Financial Crisis of 2007-2009. The financial shock was transmitted through the investment brokerage houses, similar to

1873 and the investment banking industry in 2008-09. The key difference is that the 2008-09 financial crisis affected the money center, whereas the Panic of 1893 affected mostly the interior banking institutions.

The 1907 Banking Panic

The 1907 banking panic had its origins in New York City with relatively little effect on the interior of the country with respect to financial distress. The source of the disturbance was trust companies, which were state chartered institutions, and were not central to the payments system. New York City national banks were central to the payments system, especially the largest ones, and it was that functional difference that set up the tension between the trust companies and the commercial banks. Because the trust companies were not important players in the payments system, the trust companies in New York City as a group chose not to become members of the New York Clearing House, even though membership was offered. The restrictions necessary to join the association – one crucial element, a 10 percent cash reserve balance -- were deemed more costly than the benefits of membership. As a result, the trust companies fell outside the effective regulatory framework of the New York Clearing House, and when the Panic of 1907 struck, the trust companies had only indirect access to the clearing house and its potential store of liquidity.

The National Bank of Commerce announced that it would no longer clear checks for the Knickerbocker Trust during the Panic of 1907, an example of a form of “counterparty risk” that would not occur between clearing house member banks. Prior to its closure on October 22, 1907, the Knickerbocker Trust Company requested support from the New York Clearing House, which was rejected. The main justification

for the rejection was that fact that the Knickerbocker Trust was not a member of the New York Clearing House. J.P. Morgan also refused to intervene. JP Morgan is rightfully given credit for organizing the support to bail out the trust companies later in the crisis; it is ironic that he was also partly responsible for allowing Knickerbocker Trust to fail.

Trust companies and New York City national banks both issued a large proportion of loans to the call loan market on the New York Stock Exchange. It could have been this shared credit exposure that finally convinced the New York Clearing House and J.P. Morgan to support the Trust Company of America after Knickerbocker Trust failed. Loans on call held by New York national banks actually increased during the panic, likely reflecting a transfer of those loans from trust companies.¹⁰ The shared exposure to investment in an external market was the source of interconnectedness between these two different intermediary types.

In retrospect, the decision to allow Knickerbocker Trust to fail appears to have been a mistake; by 1907, the New York City trust companies in aggregate had total assets and deposits that rivaled the aggregate assets and deposits of New York City national banks. The 1907 panic is notable for its relative lack of national bank failures along with relatively stable national bank loan and deposit figures for New York City banks. These statistics hide the substantial contraction in trust company deposits and loans in New York City (over 30 percent), which suggests that net credit to the economy contracted along with the contraction in real output.

Real GNP declined 12 percent between the 2nd quarter of 1907 and the first quarter of 1908. Chart 1 demonstrates that the depth of the contraction in real GNP in the 1907 business cycle matches the sharp pace of decline in the 1893 contraction. Further,

both these contractions appear to decline more sharply than the initial output contraction in the Great Depression. The financial distress in 1907 was apparent in Chart 2 as the Call Money Interest Rate – the rate of interest paid on overnight demand loans made on stock market equity collateral – spiked over 20 percent in October 1907, and stayed over 10 percent for the rest of the year. Cash hoarding, as reflected in the currency to deposits ratio, increased notably during the panic. Chart 3 displays the currency to deposits ratio taken relative to the level of that ratio at the beginning of the crisis. The chart shows that the ratio increased by over 10 percent throughout the panic.

The New York Clearing House addressed the crisis by restricting the convertibility of payments into currency and by issuing Clearing House Loan Certificates by over \$80 million. Similar actions taken by clearing houses across the country essentially increased the available currency supply for those depositors who demanded currency.

Assessment: The Panic of 1907 and the Current financial Crisis

The Panic of 1907 displays a number of similarities to the Financial Crisis of 2007-2009.

- 1) The 1907 financial crisis centered among the trust companies, not national banks. In the recent financial crisis, investment banks mainly suffered from perceptions of counterparty risk as lenders would not renew their loans.
- 2) Neither trust companies in 1907 nor investment banks in 2008-09 had direct access to the relevant lender of last resort – the New York Clearing House for the trust companies in 1907 and the Federal Reserve System for investment banks in 2008-09.
- 3) Both financial crises highlight the undesirable outcomes arising from uneven regulation on competing financial intermediaries. Neither trusts nor modern investment banks were important parts of the payment system, yet the crises

¹⁰ See Moen and Tallman 1992.

focused on these institutions and put the payment system and component institutions at risk nevertheless.

The Recession of 1913 and the Financial Crisis of 1914

We sketch briefly three aspects of the financial crisis of 1914, although it justifies more scholarly attention as a successful policy intervention during a financial panic (see Wicker 2005, and Silber 2007). First, Chart 1 displays the real GNP contraction relative to the level of real GNP at the peak of the business cycle (January 1913). We see that the rate of real output contraction accelerated notably after the Declaration of War in August of 1914. Chart 3 displays the hoarding of currency following the onset of the financial crisis (July 1914), and the degree of hoarding is similar to the degree of hoarding during the Panic of 1907. However, the implementation of the Aldrich-Vreeland Act provision for the creation of an emergency currency satisfied the depositor's withdrawal demands without the imposition of restrictions on convertibility of deposits into currency. On the other hand, the New York Stock Exchange was closed from August to November 1914, preventing European investors from liquidating investments and exporting gold to the Continent (see Silber 2007). So to some extent another "circuit breaker" was implemented during this crisis.

The Economic Contraction of 1920-21

There was no financial panic during the recession of 1920-21, but there was a substantial economic contraction. Chart 1 illustrates how real GNP fell during the 1920-21 contraction; the box indicators display real GNP in 1920-21 taken relative to its level at the peak real GNP level prior to the contraction. The Chart reveals that this recession, after 5 quarters from the previous peak, was the deepest of the five contractions – even

deeper than the Great Depression at that point. Unlike the Great Depression, that five quarter mark was the nadir of the real output performance for the 1920-21 recession. It is notable that the Federal Reserve System maintained a substantial level of borrowed reserves during the contraction, thereby providing sufficient liquid reserves to the banking system. The Fed fulfilled its role as provider of liquidity during this crisis.

A further notable characteristic of the 1920-21 experience is the behavior of the currency to deposits ratio, which indicates hoarding of cash and disintermediation. Despite the absence of a banking crisis, there appears to be some cash hoarding throughout the two years following the business cycle peak (see Chart 4). It is important to note that the degree of hoarding was minimal in comparison to panic hoarding in 1907.

Banking Panics of the Great Depression

We will refer specifically to the three waves of bank suspensions during the Great Depression: November-December 1930, January 1931, April-August 1931, and September-October 1931. The banking panics of the Great Depression bear little or no resemblance to what happened in 1873, 1893, and 1907. Nor do they resemble what has happened in the current financial crisis. There were multiple crises, or rather a sequence of crises, and not a single crisis. Also the crises of the Great Depression differed in origin, severity, and what was done in response by the private market participants and the public sector institutions.

Post-civil war panics were single episode events whereas there were multiple banking crises in 1930 and 1931. The significance of multiple banking panics resides in the fact that there was a progressive and continual deterioration of depositor confidence as revealed by Federal Reserve notes in circulation, seasonally adjusted. During the 1930

and 1931 banking crises, hoarding accelerated during the panic, leveled off at a higher plateau and then accelerated again at the onset of a new crisis. Depositor confidence was never restored. Chart 3 displays how the currency deposits ratio increased after the first banking crisis in November 1930, but accelerated dramatically after September 1931, more than doubling by February 1932.

The fact that 9000 banks failed during the Great Depression vastly exaggerates the impact of the three banking panics. Only 40 percent of the suspended banks were panic related. The remaining 60 percent, no less a problem, were the consequence of the three year contraction of output and employment. These failures were depression related. Nevertheless, the panic related suspensions greatly outnumbered those in 1873, 1893, and 1907.

Prior to October 1931, there was no legislative authority for assisting distressed banks not related to a banking crisis. Lender of last resort responsibilities of the Fed applied solely to panic related distress (e.g., solvent banks in a liquidity crisis) and to member banks of the Federal Reserve System. The continued increase in panic and non panic related bank suspensions led President Hoover in 1931 to propose the establishment of a National Credit Corporation, an agency whose purpose would be to lend to solvent and illiquid member banks with an inadequate supply of eligible paper to discount at the Fed. In early 1932, the agency was transformed into the Reconstruction Finance Corporation (RFC) and was empowered to lend to all banks in need, both solvent and insolvent. The Chairman of the Fed also served as Chairman of the RFC, thereby blurring the lender of last resort responsibilities of the Fed. Contributing to bank stability in panic free 1932 were numerous loans made by the RFC. By July, the RFC had made

\$643 million in loans to 3,600 banks. There was no further erosion of depositor confidence in 1932.

The role of the RFC expanded after the banking collapse of March 1933. The Reconstruction Finance Corporation provided capital injections to banks from 1932 through 1935. This support for the banking system was not related to banking panics.

The RFC purchased the preferred stock in the needy banks. By the end of June 1934 the RFC owned 23.6 percent of the capital stock, notes and debentures of all insured banks. Ultimately, the agency was responsible for acquiring over 25 percent of the capital of insured banks.¹¹ It was successful in restoring depositor confidence and forestalling future bank failures. But the restructuring of the banking system in 1933 did not increase lending at either member or insured banks. Between October 1933 and November 1935, total loans of member banks declined by 9.3 percent. For all insured banks, the decline was 4.4 percent between June 1934 and June 1935. The massive injection of bank capital by the government apparently failed to expand loans. We may well ask was the injection too small or were there other factors at work?¹²

Another distinguishing feature of the banking disturbances of the Great Depression was their origin. National banking era panics (at least 1873 and 1907) had their origin in the central money market from which they spread to the interior of the country. During the Great Depression, their origin was the interior. When the panic originated in New York City, it was regarded as of national significance. When banking disturbances originated in the interior, it was far from obvious that they were of national importance. We can look in vain in the pages of the financial press for an event clearly

¹¹ See Studentski and Krooss 1963, page 372.

¹² Calomiris and Wilson (2004) suggest that banks in New York City were capital constrained. Further

designated a banking panic. It was certainly not the name given to the accelerated bank suspension in the final two months of 1930 (the first banking panic). Friedman and Schwartz (1963) were the first to characterize these suspensions as a banking panic. They assigned a causal role to these suspensions to explain why the money stock fell and the depression deepened, thereby giving dramatic emphasis to the banking crises. We did not learn of the origin of the first banking crisis (November 1930) until the 1980s when John McFerrin's 1939 book on the southern investment bank of Caldwell and Company was rediscovered. The case for regarding the November and December 1930 bank suspensions as purely regional is persuasive. Recent work by Richardson (2007) reinforces this conclusion, and further provides evidence that the causes of bank distress during the Great Depression resulted from both insolvency and illiquidity of banks.

Assessment: The Great Depression Panics and the Current financial Crisis

The severity of the financial crisis of the Great Depression is revealed by the number of bank suspensions, the increase in hoarding, and a 33 percent decline in the money stock, for which there is no equivalent in the current 2008-09 financial crisis. Commercial bank suspensions have been minimal in the current crisis. There has been no general loss of depositor confidence. The money stock has increased substantially as a result of action by the Fed.

We begin with an abbreviated sketch of the primary difference between the present financial situation and the multiple crises of the Great Depression. The current financial crisis bears little resemblance to what happened initially in 1930 and 1931. The first two banking panics were similar to the banking panics during the National Banking Era because the banks lacked sufficient liquid funds to meet depositor withdrawals.

Widespread deposit withdrawals from banks resulted from a contagious run on the banks. Recent evidence in Richardson (2007) confirms that many banks that closed as a result of these runs were only in suspension temporarily. These banks were not insolvent; the panic could have been managed with standard central banking principles as suggested by Bagehot's rule – lend freely and at a high penalty rate. The Federal Reserve policy makers left the rule to be applied at the discretion of individual reserve banks and the consequence was an inordinate number of bank suspensions.

By the latter half of the 1929-33 financial crises, bank insolvency finally played an important role in accounting for bank suspensions from banking panics. By that time, the deepening depression began to take its toll – loan contraction (are we side-stepping whether they were loan defaults? [Aside: Would a loan recalled be the same thing for our purpose?]) and security (asset) depreciation combined to threaten the solvency of many banks. Again, Richardson's findings concur with Wicker regarding the importance of contagious bank runs during the initial period. In 1930, the first banking panic was triggered by the failure of Caldwell and Company of Nashville, Tennessee and the banks in its correspondent banking system.

Six characteristics distinguish the 1929-33 banking disturbances from the current crisis:

1. There was no major banking disturbance or banking panic in the central money market (Wall Street, New York City) between 1929 and 1933. The markets remained calm and stable even after the collapse of one of the largest banks in the country – The Bank of United States – in December 1930. Wall Street is clearly the locus of the current crisis, as it was in 1907 and other National Banking Era (1863-1913) crises prior to the creation of the Federal Reserve System. [I think 1873 is best example.]

2. Banking panics of the Great Depression had their origin in the interior of the country and were region specific. Below, we'll discuss the first panic and the influence of the failure of Caldwell and Company on the contagious runs. There was no nationwide banking panic in 1930 or during the first half of 1931.

3. Hoarding, as measured by an increase in the currency-deposit ratio, was the telltale characteristic of banking panics of the Great Depression beginning with the first one. The increase in the currency-deposit ratio was an important determinant of the money stock, a fact at the root of the Friedman-Schwartz narrative. Each successive banking panic raised the amount of currency hoarded to a new and higher plateau. When a panic subsided, currency in circulation failed to return to its pre-panic level. Depositor confidence continued to deteriorate. Currency in circulation seasonally adjusted increased by \$270 million between October 1930 and January of 1931. Chart 3 displays the currency to deposit ratios taken relative to the ratios at the beginning of three financial crises: October 1907, July 1914, and November of 1930. Although hoarding increases more sharply in both 1907 and 1914, those peaks are dwarfed as the continual increase in hoarding as the Great Depression continued.

So far in this crisis, there has been no increase in hoarding and no obvious loss of depositor confidence in the banking system. The base money stock (high powered money) has increased by \$1 trillion (an increase of 100 %)

4. Fed policymakers acknowledged only limited responsibility for preventing widespread bank suspensions during the Great Depression. Bank suspensions were region specific and the response to these instances was left to the individual Reserve Banks to serve the banks in their districts. The policies were thereby idiosyncratic – there

was an obvious difference for example between the St. Louis District (eighth) and the Atlanta District (sixth) towards supplying liquidity to banks in their jurisdiction. The Atlanta Bank promoted liquidity provision and experienced a notably lower failure rate among banks in the portion of Mississippi that it serviced than the St. Louis District showed for its banks in Mississippi. In 1932, the Open Market Investment Committee approved a program of \$1 billion purchases of government securities, but purchases were discontinued when it was perceived that banks were accumulating excess reserves.

The Fed presided over a massive, 33 percent contraction in the money stock (see Chart 5). Their policy focus concentrated on the nominal interest rate, not the real interest rate – along with the level of discount window borrowings. They did not assume responsibility to prevent the closure of non-member banks. Also, the discount window was constrained to require “eligible paper” for extending credit.

In this crisis, Fed policymakers have responded in vigorous and imaginative ways. They have asserted their leadership in the crisis by finding creative ways to issue more liquid assets for illiquid assets. But as the crisis turned into a concern about the solvency of the banking system, Fed policies were unable to stem those losses.

5. The Glass-Steagall Act in 1933 separated commercial and investment banking after which investment banks fell outside the regulatory orbit of the bank regulators. The banking crisis of 2008 was primarily an **investment banking crisis**, which included Bear-Stearns, Lehman Brothers, Merrill-Lynch, along with AIG, Citibank and its investment banking subsidiaries. Even stalwarts GoldmanSachs and Morgan Stanley have now changed to a bank holding company charter.

6. The so-called banking panics of the Great Depression, it may be surprising to learn, went largely unheralded. No dramatic headlines in leading newspapers. Even historians did not note the banking panics of the Great Depression – except the Bank Holiday of 1933. Of course, bank closings were noted, but not always on a national basis. And the words “banking panic” were not applied to the three episodes. The label Banking Panics was first used by Friedman and Schwartz in their *Monetary History*. And historians of the period did not use the term to apply to the three waves of bank suspensions.

Common characteristics of the Current Crisis with the Great Depression

We turn now from the differences to the similarities between the current crisis and the Great Depression. There is at least one that has particular relevance to the current crisis. At the time of Roosevelt's inauguration on March 4, 1933 the banking system of the U.S. had virtually collapsed. Banks had closed their doors in 33 states; deposit restrictions were in effect in 10, and optional closing in 5. He merely recognized the existing situation by declaring a nationwide bank holiday on March 6. A bank holiday was a legal artifice for closing the banks without compromising their solvency. It was not a new device; it had been used in 5 states during the panic of 1907. The Emergency Banking Act granted the government the necessary power to reopen the banks at the sole discretion of the Secretary of the Treasury. The government had agreed to guarantee the soundness of each of the reopened banks. Only one-half of the nation's banks were permitted to reopen in March. Licenses to reopen were completed by April 12 at which time 13000 banks had reopened with deposits of \$31 billion and 4215 permanently closed with deposits of \$4 billion.

IV A NEW CHALLENGE: WE HAVE MET THE ENEMY AND HE IS US

The current crisis resembles previous banking panics in as much as its source is to be found in the collapse of a large insolvent (investment) financial intermediary – Lehman Brothers. This panic accelerated just as prior panics took turns for the worse after a large intermediary failure: Jay Cooke and Co. in September 1873, Knickerbocker Trust in October 1907, and Caldwell and Company in November 1930 or (arguably) the Bank of United States in December 1930. In these antecedents, the crisis spread to the interior affecting solvent banks as well but the channels of transmission were different. In the National Banking Era crises, the suspension of convertibility made interior bank deposits held in New York City national banks temporarily inaccessible creating a liquidity problem for some banks. But for the case of the Great Depression, the contagion effects were transmitted to interior correspondent banks mainly through liquidity channels – i.e., inability to access liquidity in the form of *deposits* with a failed correspondent. In contrast, the current financial disturbance is different; the unrest seems to be mainly confined to the largest investment banks, commercial banks, and nonbank financial institutions, having virtually no effects on retail depositor confidence or on hoarding. FDIC took away the incentives for depositors to run banks.

A major departure from past practice in quelling financial crises is the acknowledgement that megabanks -- large complex financial institutions (LCFIs) and other mega financial institutions -- large complex nonbank financial institutions (LCNFIs) -- may warrant support even if they are insolvent or at least face a real chance of insolvency. The failure of Lehman Brothers – and more dramatically in the bail out of

American International Group (AIG) – demonstrates that the interconnections between large intermediaries in the current crisis have substantial bearing on the solvency of counterparties.¹³

There is an explicit doctrine known as “too big to fail” that has received widespread attention in the banking literature as well as the public policy literature.¹⁴ In the analysis of recent crises, several researchers have examined whether the protection of creditors of large financial institutions has limited the spread of financial distress at the expense of the public sector balance sheet and of increased moral hazard going forward. The most contentious issues surrounding “too big to fail” are those related to the measurement of the probable transmission from the failure of a large bank to other institutions and the financial markets in general. Spillovers can be considered a measure of systemic risk, namely the cost to the financial system (and the economy more generally) of the failure of a LFCI or LFNCI.¹⁵

Chairman of the Federal Reserve System, Ben Bernanke, has stated publicly that he perceived the bankruptcy of AIG, which wrote credit default swaps on about \$75 billion of AAA-subprime mortgage backed securities, would have caused the failure of several important LFCIs overseas as well as in the US.¹⁶ The perceived interconnectedness of bank balance sheets far exceeds the degree of interconnectedness that was observed throughout past crises, and the magnification of credit exposure may be due largely to the use of off-balance sheet items in the form of financial derivatives.

¹³ Lewis 2009 describes the operations of American International Group Financial Products and the developments that led to the massive government bailout.

¹⁴ See Gup 2004, Stern and Feldman 2004.

¹⁵ Stern and Feldman 2004 propose that the compelling motivation for policymakers to engage in “too big to fail” policies is to avoid the consequences of potentially costly “spillover” effects passing from the failure of one large banking organization to the financial market in general.

¹⁶ Bernanke Town Meeting, July 26, 2009.

Managing Systemic Risk

The key to eliminating banking crises lies in the management of systemic risk. Type I systemic risk is reflected in a sudden and unexpected loss of depositor confidence, leading to a widespread run on banks resulting in bank suspensions. The classic remedy proposed by Bagehot (1885) was for the central bank to inject reserves by lending freely to *solvent banks* at a high (penalty) rate. He recognized that the policy might fail for lack of resources but the alternative was the breakdown of the banking system, which was worse. So here we have a situation in which a shock occurs, bank depositors infer a shock has reduced the value of banking system assets to a degree that threatens the solvency of the system. Bank depositors make the reasonable inference that it is safer to remove their deposits from the banking system before they get caught holding depreciated claims on the assets of the failed bank. The information gap between depositor and the bank results from the obscurity of asset valuation; it is part of the depositor relationship with the bank.

The Banking Acts of 1935 created the Federal Deposit Insurance Corporation (FDIC) with the authority to guarantee within bounds bank deposits. Depositor confidence would respond if the FDIC was credible. And there have been no national or regional banking panics of this type since 1935. We can conclude that type one systemic risk has been successfully managed without recurrence of destabilizing bank runs.

Type two systemic risk is a different matter. It was late in coming to prominence, and we are still identifying and learning to respond to it much less managing it. But it was already clear that managing systemic risk required enlarged responsibilities for the Federal Reserve System and a new regulatory framework for keeping track of derivative

trading (e.g., a clearing house or an exchange, or both, and some means to measure volume of contracts outstanding). It may also be necessary to reduce the aggregate size of megabanks (LCFIs). It is too early to know which path bank regulatory reform will follow. More must be revealed about the nature of systemic risk arising from the ‘too big to fail’ doctrine applied to large complex financial intermediaries. This kind of systemic risk reflects counterparty risk – that is, the risk of making transactions with other banks. This is a loss of confidence between banks (and other intermediaries). But also type two systemic risk implies that the credit exposures between intermediaries may be large enough such that the failure of one institution may threaten insolvency of one or more LCFIs.

Voluntary membership in the Clearing House organization effectively limited type 2 systemic risk *among members*, implying that self-monitoring worked. Counterparty risk arose from outside the membership in 1907. During the National Banking Era, membership in the New York Clearing House provided a credible seal of approval for a bank. Members were monitored providing internal assurance to other members of credit worthiness. Now, such monitoring is left to the regulatory agency that supervised the intermediary type. Recent experience suggests that substantial regulatory reform is necessary.

Too Big to Fail and the Lack of a Plan

There is an explicit doctrine associated with all of the banking panics of the National Banking Era and the Great Depression. Distressed banks were only eligible for financial support if the institutions were perceived as solvent. This doctrine applied to support offered by the New York Clearing House, by J.P. Morgan and his associates and

the Federal Reserve. Insolvent banks should be allowed to fail. Morgan denied aid to the Knickerbocker Trust Company in 1907. Neither public nor private entities offered support to the Bank of United States in 1930. Systemic risk either was not associated with the insolvency or threat of insolvency of a large (or mega- for its time) bank or the risk was regarded as minimal.

. A major departure from past practice is the acknowledgement that the mega bank may warrant support even if it is insolvent or it faced a threat of insolvency. The U.S. Treasury and the Federal Reserve System have replaced the “old school” doctrine with “too big to fail.” “Too big to fail” is not new; we have seen it in numerous bank failures since the 1970s, including the failure of Continental Illinois National Bank and Trust Company in 1984. At that time, the failure of Continental Illinois was deemed too large to declare insolvent and liquidate quickly; the condition of its counterparties was among the central reasons for the plan to support the institution (the Federal Reserve and the FDIC provided substantial funding to maintain bank operations for a time).¹⁷

Too big to fail is a euphemism for “fear that systemic risk is too excessive to allow failure.” The belief that the suspension (or failure) of a financial institution will expose the financial system to an excessive risk of systemic failure suggests that we are dealing with another type of systemic risk. The systemic risk of the national banking era, and even of the Great Depression, was Type I -- one that surrounded the loss of depositor confidence, runs on banks, liquidity shortages, and bank suspension. When such financial panics were observed, panics would be symptoms that the banking system

¹⁷ The equity shareholders eventually lost their investment, but it was not as rapid as the shareholder losses at Washington Mutual in 2008.

displayed excessive systemic risk. We may do well to differentiate between the two forms of systemic risk.

The two types of systemic risk require a different set of responses by the authorities to observations of each type. The Bagehot's rules represent the standard response of the central bank to type one systemic risk: lend freely at a penalty rate (high price) to solvent banks. Injections of liquidity then allay the panic. So on one level the current crisis is entirely different from the banking panic episodes from 1929-1933 – the current problem is bank insolvency [or the perception or threat of bank insolvency]. Bagehot's rule does not apply. There are no rules for a central bank to follow about how to bail out insolvent banks or *whether or not* they should be bailed out. When type two systemic risk is prevalent, the remedy lies elsewhere, e.g., shoring up the bank capital, removal of the toxic assets from the balance sheet of the insolvent bank, and perhaps restricting the size of the banking institution.

The current crisis

The difference between the current financial crisis and those that preceded it is the increasing importance attached to the second kind of systemic risk. In earlier crises, the second source of systemic risk, the interconnections between banks, was confined to correspondent relationships, holding company affiliates and chain banking networks. The nature of interconnectedness was mainly standing deposits at correspondents, and loans between banks. The hub of the financial market was New York City, and trouble at the center spread almost instantly to the periphery in most cases.

In the current crisis, systemic risk has been magnified by the existence of LCFIs -- megabanks with more sophisticated and complex interconnections – and the complicated

contracts that comprise structured financial products. Contract exposures, like Credit Default Swaps (CDS), allegedly caused some intermediaries to be more virulent “liabilities” to the financial system if they failed than if they continued as ongoing entities. Hence, capital injections by the government were deemed a preferable path of action than failure and liquidation. The insolvency or threatened insolvency of a megabank has given rise to the doctrine of “too big to fail” signaling excessive systemic risk from such a failure. The old doctrine described above – ‘let insolvent banks fail’ – prevailed prior to World War II. Restoring financial system integrity in the current setting requires actions to improve perceptions of bank solvency -- a markedly different solution from restoring liquidity.

Because of the unwise investments in complex financial structures driven by questionable assets, certain investment banking houses (and large and complex financial institutions like Citigroup and Merrill Lynch) were threatened with insolvency. These LCFIs or mega banks were excessively leveraged, which is really the crux of the systemic risk. When the asset values declined precipitously, the LCFIs were having difficulty in refinancing their speculative operations. In fact, banks lost confidence in each other. The banks simply stopped lending after the failure of Lehman Brothers; the commercial paper market essentially shut down. There was a credit blockade.

The fundamental problem was one of insolvency or threatened insolvency, a problem to which conventional central bank policies had no answers. Bagehot’s rules spelled out how a central bank should respond to a panic generated by a loss of depositor confidence: lend freely to solvent banks at a penalty rate. But insolvent banks get no loans. In 1933-35, the Reconstruction Finance Corporation (RFC) made large injections

of capital into banks, but presumably only to solvent banks. Even in the national banking Era, the New York Clearing House was supposed to give support to its member banks, but only if they were solvent.

“Old school” central banking acknowledged that insolvent banks, if it could be shown that it was insolvent, should be allowed to fail. The tremendous growth in bank size and increased complexity of interconnectedness among bank balance sheets of large institutions have subjected the “let insolvent banks fail” doctrine to serious question. So on one level the current crisis is entirely different from the banking panic episodes from 1929-1933 – the current problem is bank insolvency [or the perception or threat of bank insolvency]. Bagehot's rule does not apply. There are no rules for a central bank to follow about how to bail out insolvent banks or *whether or not* they should be bailed out.

V SUMMARY AND PRELIMINARY CONCLUSIONS

We have had eight major banking crises in 137 years. Four of these occurred during the national banking era and three during the Great Depression. And then we have the current financial crisis. Banking instability characterized the first 60 years. The last 75 years have been stable with the only exception being the current crisis, that is, if we treat the Savings and Loan debacle separately. This fact alone should be occasion for surprise. What could have changed in more recent years to have abruptly interrupted this long interval when a banking crisis has been absent?

Major changes in the structure of the U. S. banking system have increased its vulnerability to banking crises. First, bank consolidation has produced a small number of mega banks controlling a disproportionate share of total U. S. banking resources.

Second, there has been an explosion in the creation of new and highly complex bank products, which may obfuscate a bank's financial exposure implied by the contracts.

Third, the globalization of banking markets has magnified the interconnections between large banking and bank-like institutions across borders, requiring greater coordination among central banks and regulatory agencies worldwide.

We found the origin of banking disturbances in the existence of systemic risk, and we have identified two broad classifications of those risks: type one characterized by runs on banks and type two involving counter-party interconnections and encompassed by the "too big to fail" doctrine. Banking panics of the National Banking Era and the Great Depression exhibit a predominance of "type one" systemic risk. The banking system suffered a shock in the form of a loss of depositor confidence. Depositors then ran the banks. Banks that were unable to meet depositor demands were forced to suspend; bank failures accelerated; hoarding of cash outside the banking system increased, and the money supply contracted. Further, industrial production and real GDP contracted as well. This is a thumbnail description of what happened in the banking panics of the National Banking Era and in the Great Depression. During the national banking era, the suspension of cash payment by the local clearing houses (restrictions on the convertibility of bank deposits into cash) was usually capable of stopping the sequence of bank suspensions. The connections between banks were through correspondent balances, interbank loans, or shared exposure to assets that trade in an external market.

The interdependence of these large firms threatened the solvency of other firms as well, which we defined as type two systemic risk, reflecting the risk that counterparties could fail and default on payment. Too big to fail is a policy that addresses this risk and

captures this alleged network of interconnections among financial institutions. It is decidedly different from type one systemic risk, and requires a full evaluation of the extenuating circumstances when the evidence on bank solvency is fully available. Policy prescriptions for type two systemic risk represent a radical departure from standard central bank remedies for banking panics. There had been universal agreement that the remedy for earlier banking panics was to support only solvent banks. Since it was no easy task to determine whether a bank was solvent or not, many insolvent banks came under the umbrella unintentionally. “Too Big To Fail” implies support for insolvent banks or those threatened by insolvency.

The recent financial crisis lends support to the idea that counterparty exposures have increased, and that perhaps financial derivatives have magnified those counterparty exposures. Then, “too big to fail” is really an outcome of the rapid financial innovation and the willingness of LCFIs to expose each other to increased credit risk through the use of the financial derivatives. The use of off balance sheet vehicle and complex financial products was a means of magnifying risk; the underlying source of the risk was that the LCFIs employed high leverage ratios and held assets that lost value rapidly.

What we have learned about banking crises in the US since the Civil War is how they differed from the current financial crisis, but it is more important to recognize that the “old school” remedies for those banking crises are not the relevant cure for the current crisis. Bagehot’s rules need some updating. That does not mean, however, that the central bank refrain from injecting liquidity to forestall a loss of depositor confidence. Rather, we suggest that in the presence of “too big to fail” policies, managing type two systemic risk requires a new research agenda. Our understanding of type two systemic

risk – interconnectedness and the transmission of insolvency -- is still in the early stage. And evidence to support the type two systemic risk hypothesis must await the availability of bank records (how insolvent were the LCFIs and LCNFIs?).

Our brief review of the panics of the National banking Era and the Great Depression supports our general description of type one systemic risk. In the current crisis, there has been no general shock to depositor confidence, no widespread bank runs, no increase in hoarding, and no decline in measured money stock. There was, however, a tremendous shock to confidence in structured financial products and securitized assets more generally. The collapse of the housing bubble was a shock to the solvency of certain large, complex non-depository financial institutions (LCNFIs) in the central money market (New York City) as well as some outside NYC. In the current crisis systemic risk has been magnified by the existence of megabanks with more sophisticated and complex interconnections. Fear of negative spillovers from a mega bank failure generates motives to forestall failure. The insolvency or threatened insolvency of a megabank has given rise to a new doctrine "too big to fail" or another way of putting it - excessive systemic risk. The old doctrine that we described earlier -- "let insolvent banks fail" prevailed during the national banking era and the Great Depression. Restoring bank solvency today requires a markedly different solution for restoring liquidity.

Data Appendix

Real GNP data, quarterly, from 1875 to 1940 are taken from Balke and Gordon (1987).

Data for the following series:

- 1) call loan interest rate
- 2) the commercial paper rate
- 3) the currency held by public
- 4) adjusted demand deposits of commercial banks

are taken from the NBER Macro History Database, listed in the references.

Appendix 1

National Banking Era Institutions

As in subsequent National Banking Era financial crises, the clunky structure of the banking system played a part in the haphazard response to a financial collapse. That being said, the private market participants used a variety of procedures to take prompt and effective action to ameliorate the noxious effects of the financial crisis. The primary assault on the financial market brought down the “investment-bank-like” brokerage houses first, and the most important ones failed in New York City. The ensuing panic arose from a generalized fear that brokerage failures, stock market declines, interest rate spikes, and abrupt interruption in overall economic activity threatened the durable solvency of the banking system. This source of the banking panic was an entirely reasonable assessment of the economic situation given recent past experiences (banking problems arose intermittently throughout the Civil War) and incomplete information about the solvency of banks. The asymmetry of information between depositors and bankers has been an important idea in the explanation of banking panics.¹⁸ Depositors have no clear knowledge about the solvency of banks, and do not know the borrowers or the status of the loans on bank balance sheets. Further, the depositors do not know for sure whether the failure of a railroad firm would have a material effect on the solvency of the bank. Taken to the aggregate, depositors generally would not be able to determine whether the failure of railroad firms would threaten the solvency of the banking system. Given such a description, news about widespread railroad firm failures as well as the failures of other industrial firms would provide compelling reasons for depositors to withdraw his or her deposits from a bank and the banking system. Also, a banking

¹⁸ See Calomiris and Gorton (1991) for a description of the asymmetric information approach to banking crises.

institution need not fail for depositors to spur a widespread desire to withdraw their deposits from the banking system.

The modern solution to banking panics – credible deposit insurance and a reliable “official” lender of last resort -- was unavailable in 1873. Further, there was also no central banking institution in operation in the United States, which has often been viewed as the glaring flaw in the design of the National Banking System. As a result, there was no existing mechanism that allowed a rapid increase in the supply of base money – that is, currency, legal tender, and bank reserves. In a banking panic, depositors generally demanded their deposits to be converted to cash; this action – a widespread transformation of deposits into currency, and/or legal tender – could not be satisfied. The lack of a central bank, it was believed, prevented an orderly satisfaction of depositor withdrawal demands. It was perceived that a central bank-like institution could potentially allow a bank to re-discount some of its assets with the central bank in exchange for currency, so that the bank could satisfy the withdrawal demands of its depositors. In the absence of a central bank, the banking system was incapable of satisfying the withdrawal demands, and had to renege on its obligations to exchange deposits for currency (and legal tender).

In New York City, the private association of banks – the New York Clearing House Association – engaged in two activities to alleviate the crisis. The first technique was to implement restrictions on convertibility of deposits into cash; the restrictions were typically limits on withdrawals to dollar amounts, like \$25 to \$100 per week. The restrictions limited the depletion of aggregate deposits (and especially, aggregate bank reserves). The implementation of restrictions on convertibility required the cooperation

of all the banks in an area, so the effective dates for “restrictions” would align with the announcement by the New York Clearing House (NYCH) Association of such restrictions. Restrictions often led to a premium on cash relative to deposit balances, reflecting the excess demand for cash.

Secondly, the NYCH association initiated the issuance of Clearing House Loan Certificates, which provided a temporary increase in the supply of currency and legal tender.¹⁹ Member banks would offer collateral securities (and loans) to the Clearing House Loan Committee of the NYCH and the Clearing House Loan Committee would issue Clearing House Loan Certificates in the amount of 75 percent of the face value of the collateral. The banks could then use the clearing house loan certificates among themselves as substitutes for cash and legal tender, thereby increasing the cash available to the public. Despite the issuance of Clearing House Loan Certificates, the restrictions on convertibility (often referred to as “suspension of convertibility”) were also crucial for the attenuation of the financial distress, especially in the most serious crises. It was important for the Clearing House to moderate the demands of depositors to remove their deposits from the banking system. No fractional reserve banking system can exist if depositors pulled all their money out of the banking system (to dis-intermediate). In fact, it was to become a “lost art” -- to implement such restrictions – after the creation of the Federal Reserve System in 1913, and the recent financial crisis raises questions about whether a modern equivalent of the “restrictions” would help moderate the downswings of asset prices during a financial crisis.

Both elements – the restrictions on convertibility and the issuance of clearing

¹⁹ See Andrew 1908 and Cannon 1910 for more detail on the characteristics of clearing house loan certificates. See Tallman and Moen 2007 for details on issuance during the Panic of 1907.

house loan certificates – were important for the survival of the banking system. There were additional actions, perhaps more subtle than the two key mechanisms, taken by the clearing house that further assuaged the Panic of 1873 in particular. For one thing, the New York Clearing House withheld individual bank reports and instead issued only a statement of the aggregate balance sheet for the membership of the clearing house. This action prevented depositors from targeting banks that appeared to have weak balance sheet elements (for example, a low level of cash reserves, depleted capital base, small amount of high quality, low risk assets, etc.). Secondly, the New York Clearing House pooled the remaining reserves of member banks. This latter action was not repeated in the responses to subsequent financial crises of the National Banking Era. The pooling of reserves (or “equalization” of reserves as discussed in Sprague 1910) allowed the largest national banks in New York City to continue delivering currency to its bank depositors from the interior of the country (Wicker 2000, page 31).

New York City national banks were the key repository for the reserves of banks located in the interior of the country. In fact, the largest seven national banks in New York City held 80 percent of interior bank reserve deposits. These banks, therefore, also faced the risk of withdrawal by interior bank depositors, and the concentration of reserves in these seven banks became a risk for interior banks. Sprague (1910) praised the New York Clearing House for its management of the Panic of 1873, as does Wicker (2000). The NYCH tried to satisfy the withdrawal demands of depositors (both bank and individual) and delayed imposing restrictions on convertibility of deposits into currency until its reserve levels, already far below legal/regulatory requirements, became dangerously close to any reasonable minimum.

The aggregate amount of clearing house loan certificates issued was \$27M; further aid came from the Treasury. The Treasury bought \$13 M in bonds and re-issued \$26 M in greenbacks (legal tender notes). Combining all forms of base money substitutes issued in 1873, the total amount of additional currency was around \$67 M, which represented slightly more than 12 percent of the total stock of currency held by the public.

Appendix 2 Systemic Risk

Type One Systemic Risk	Type Two Systemic Risk
<p>Loss of depositor confidence leads to widespread liquidation of deposits</p> <p style="text-align: center;">Spillover effects are external –</p> <p style="text-align: center;">Examples:</p> <p>Depositors at other banks infer that bank run implied problems at their bank</p> <p>To satisfy liquidity demands, a bank is forced to liquidate assets at “fire sale” prices</p> <p>Fire sale prices imply weakness in banks that hold assets in same market</p>	<p>Perceived risk that failure of large complex financial institution (LCFI) would generate huge losses at other LCFIs as a result</p> <p>Counterparty exposures between banks are large</p> <p>Exposures may involve use of complex financial products that magnify losses (spillover effects through internal two party contracts)</p> <p>Failure of counterparty in Credit Default Swap may cause an LCFI to face huge losses because of a disappearance of a key hedge contract.</p> <p>Replacement of CDS in the market (during crisis) may not have been possible (or at a price that would imply insolvency)</p>

The financial sector performs two indispensable functions for the efficient operation of the macroeconomy: first, as a critical cog in the payments mechanism and second, as a chief intermediary in the savings-investment process. Depositors facilitate the exchange of goods and services and credit facilitates the transfer of funds from surplus to deficit spending units. A financial crisis may be defined as a serious disruption in these dual functions.

Systemic risk attaches to the performance of both functions in the guise of loss of depositor confidence in the banks to pay on demand, and the loss of confidence of banks in each other. A disruption of credit flows can contribute to the loss of confidence. An over-leveraged mega bank with an inter-connected network to other banks and financial institutions when in difficulty can transmit fear and uncertainty to the entire network. The

“too big to fail” doctrine reflects the fear of allowing a large financial failure to magnify systemic risk. The collapse of a large bank may affect depositor confidence; the failure of Lehman Brothers was a recent case in point.²⁰

²⁰ Not all large bank failures produce a perception of insolvency that reflects a systemic problem. Friedman and Schwartz (1963) have argued that the failure of one of the largest banks in New York City in December 1930 affected depositor confidence throughout the U.S.. But there were no direct effects on other banks either in the US or elsewhere.

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Chart 1: Real GNP - Comparing Contractions

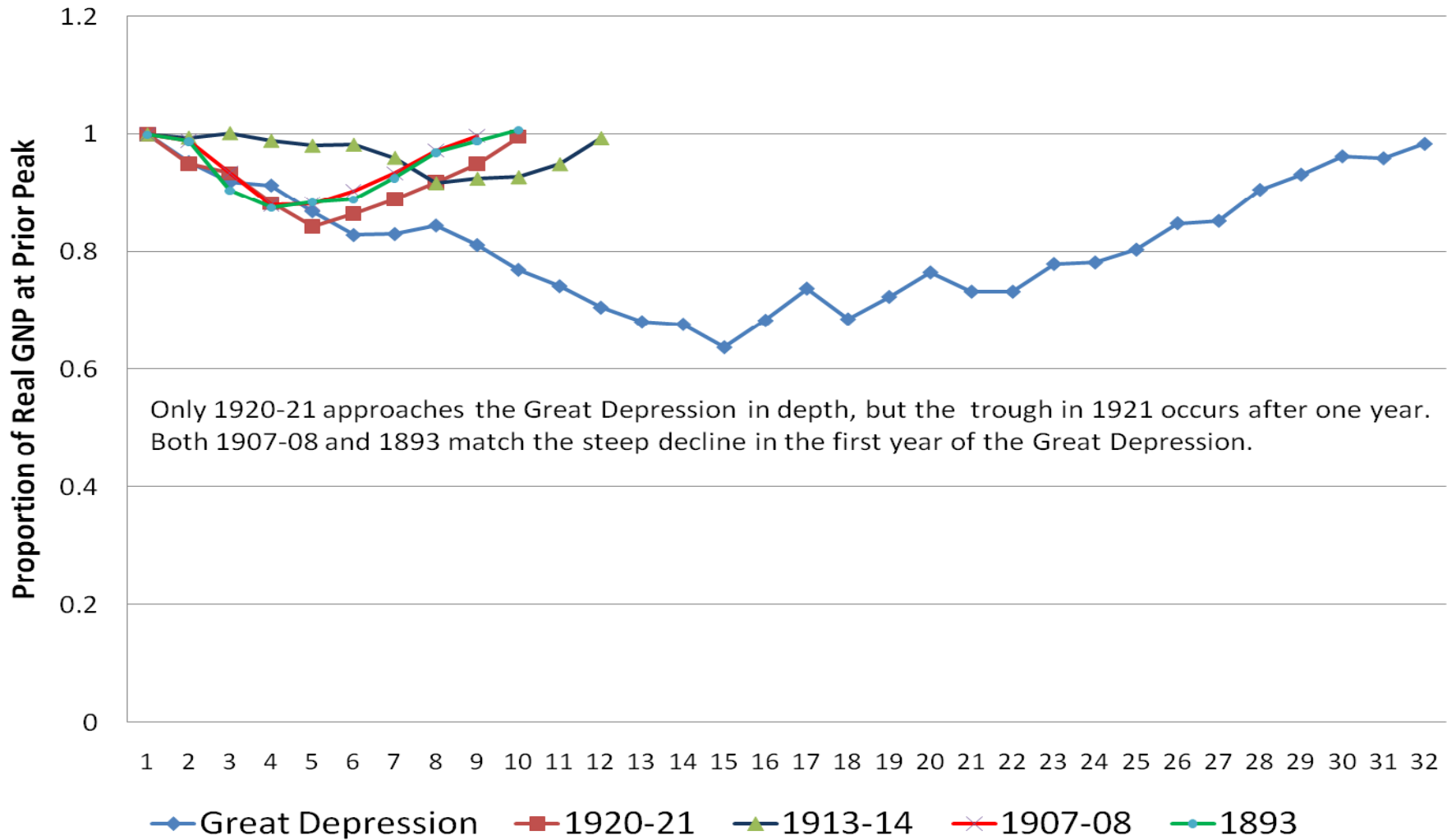


Chart 2: Call Money Interest Rate and Commercial Paper Rate

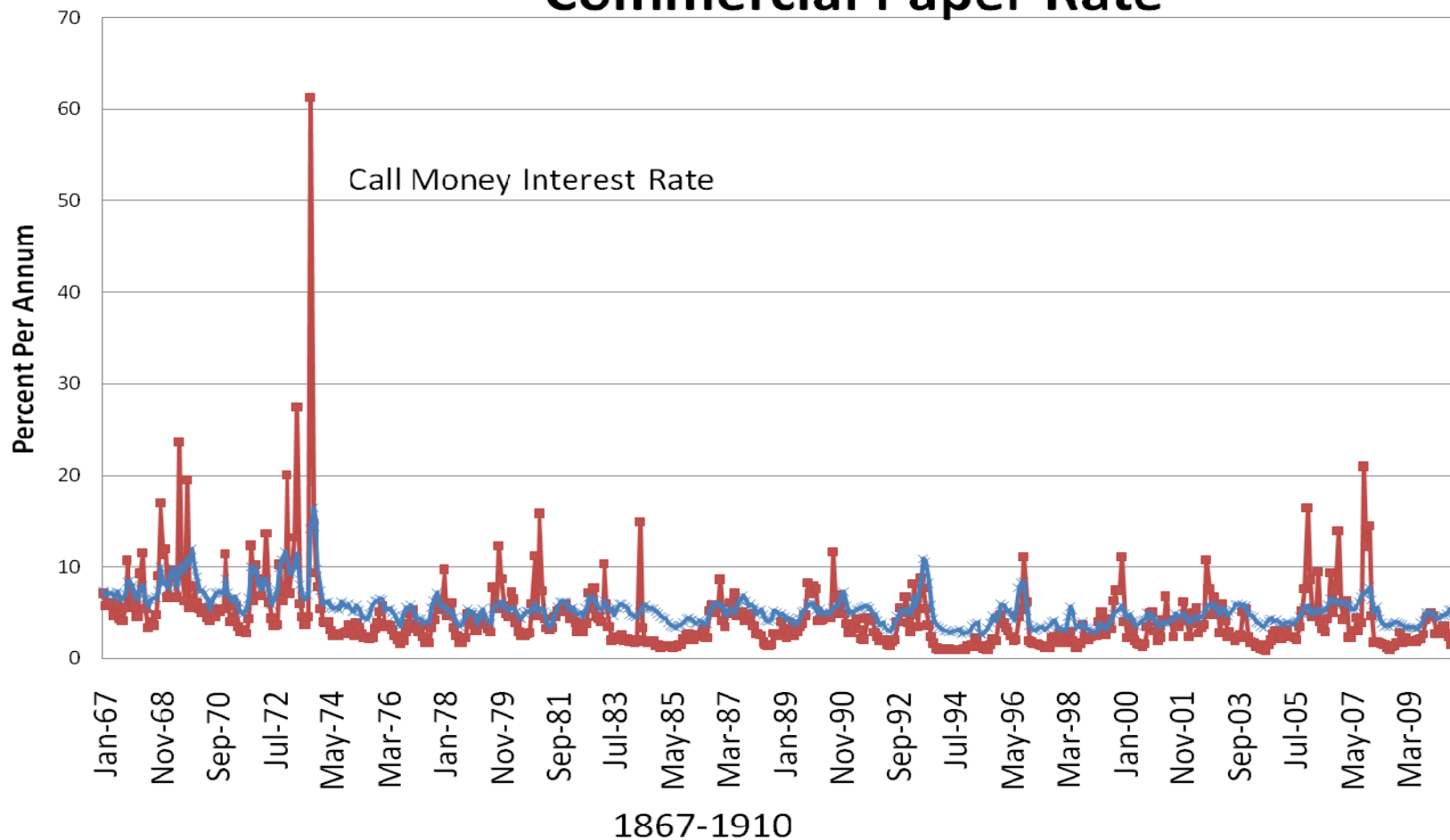
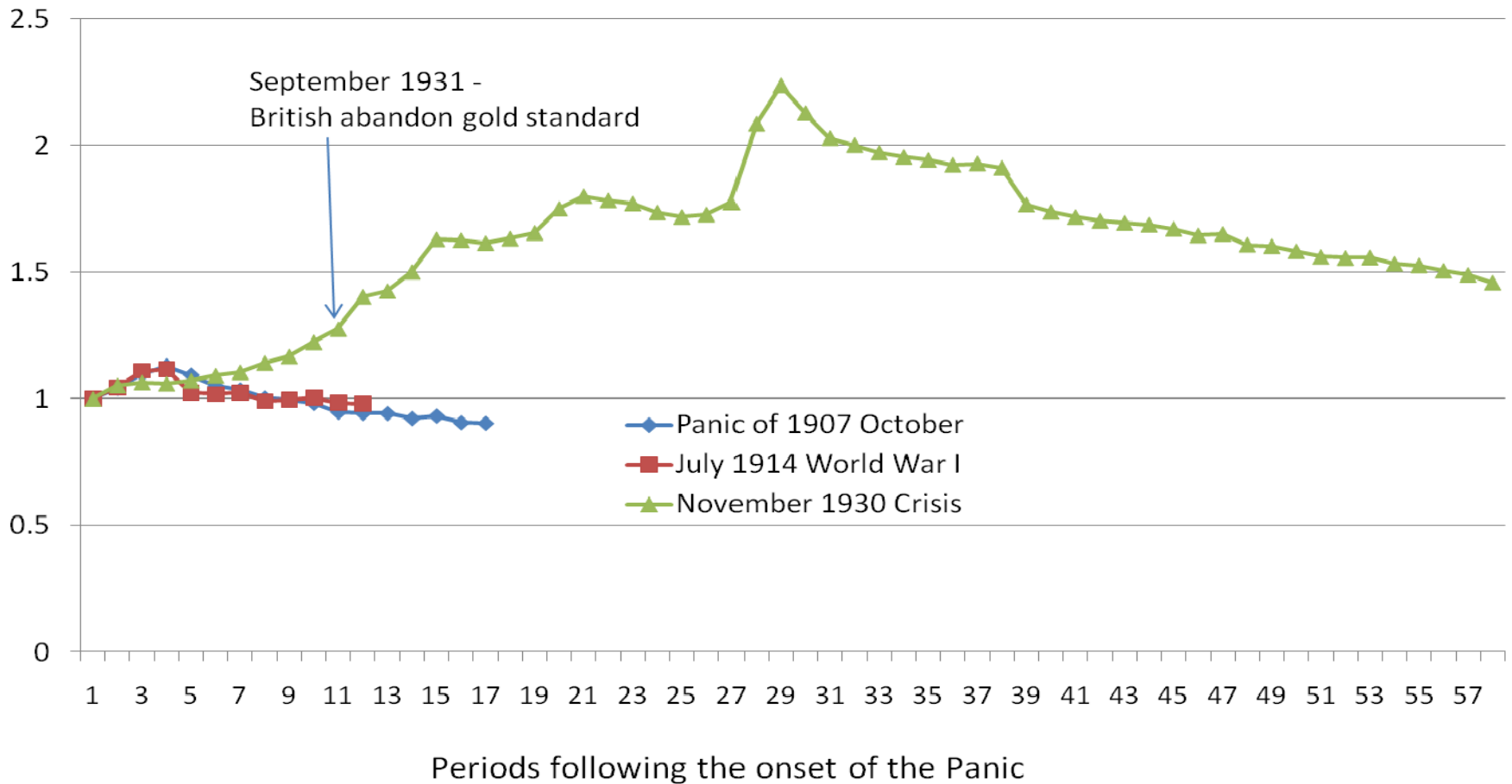


Chart 3: Currency to Deposit Ratio Taken Relative to Ratio Observed at Beginning of the crisis



**Chart 4: Ratio of Currency to Deposits
At All Commercial Banks in the United States**

