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A New History of Banking Panics in the United States

By

Andrew Javed Jalil

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University of California, Berkeley

Committee in charge:

Professor Barry Eichengreen, Co-chair

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## Abstract

### A New History of Banking Panics in the United States

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Doctor of Philosophy in Economics

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There are two major problems in identifying the output effects of financial panics of the pre-Great Depression era. First, it is not clear when panics occurred because prior panic series—lists of when panics occurred—combine panics with other developments in financial markets, fail to distinguish among different types of financial panics, and employ unreliable strategies to identify panics. Second, even if the timing of when panics occurred is consistent with panics having real output effects, establishing the direction of causality is tricky: are panics causing downturns or are downturns causing panics? The first chapter of my dissertation address these two problems (1) by developing a new panic series for the 1825-1929 period—one that rectifies many of the problems of earlier series—and (2) by studying the output effects of major banking panics that the reports of contemporary observers suggest were the result of idiosyncratic disturbances, as opposed to declining output conditions. My paper derives four major empirical findings: (1) major banking panics have large and strongly negative effects on both output and prices, (2) panics were a substantial source of economic instability prior to the founding of the Federal Reserve, (3) on average, downturns with major banking panics were more severe than downturns without them and output recoveries were longer for downturns with major banking panics than output recoveries for downturns without them and (4) panics can have persistent level and trend effects. Moreover, using my new series, I find that much of the conventional wisdom on the causes, effects and frequency of panics of the pre-Great Depression era was based on unreliable evidence—and in particular, on biased and inconsistent panic series.

The second chapter of my dissertation argues that monetary intervention alleviated banking panics during the early stages of the Great Depression. Throughout the course of the depression, only two Federal Reserve Districts—Atlanta and New York—aggressively intervened to stabilize their banking systems. To assess the effectiveness of

these policies, I analyze the performance of banks along counties straddling the borders of the Atlanta and New York Federal Reserve Districts. My results indicate that expansionary initiatives designed to inject liquidity into the banking system reduced the incidence of bank suspensions by 37 to 45% in some regions. Moreover, an analysis of the balance sheets of individual Federal Reserve Districts suggests that liquidity intervention did not expend large resources and that a concerted, system-wide interventionist policy response was feasible during the first half of the depression. Thus, the Federal Reserve System committed a major policy mistake by not acting as a lender of last resort to stabilize the country's banking system in 1929 and 1930.

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## Introduction

When did banking panics occur in the United States? What are the macroeconomic effects of banking panics? What is the appropriate policy response to banking panics?

Chapter one of my dissertation, *A New History of Banking Panics in the United States, 1825-1929: Construction and Implications*, accomplishes two main goals. First, it derives a new series on banking panics for the pre-Great Depression era. Second, it presents a new empirical test of the macroeconomic effects of major banking panics of that era. In the process, I discover that much of the conventional wisdom on the causes, effects and frequency of financial panics of the pre-Great Depression era was based on unreliable evidence—and in particular, on biased and inconsistent series.

Chapter one begins by noting that there are many contradictions in the literature regarding the causes, effects, and frequency of financial panics of the pre-Great Depression era. Much of this is a result of the fact that we do not entirely know when all of the financial panics occurred before 1929. I document in chapter one that there is substantial disagreement across earlier panic series regarding the timing, incidence, and frequency of financial panics throughout much of US history. Some series document panics occurring at a rate of more than one per year, whereas other series identify recurring periods of ten to twenty years without a panic.

These discrepancies across panic series matter because many of the leading studies on the causes and effects of panics of the pre-Great Depression era critically depend on the panic series to identify when panics occurred. In particular, two leading studies on the output effects of the financial panics of the pre-Great Depression era—DeLong and Summers (1986) and Miron (1986)—arrive at contradictory conclusions regarding whether panics have real output effects entirely because they relied on different panic series to identify when panics occurred.

Why do these panic series differ so dramatically? By analyzing the methodologies of each of these earlier series on a case-by-case basis, I find that methodological problems behind the development of some of these earlier series can account for these major discrepancies. Specifically, I discover two common problems. First, many of these earlier series do not provide definitions of panics, making it unclear exactly what kind of financial disturbances is being recorded as a panic. Second, most of the earlier series do not adopt a rule to identify panics, raising the possibility that some important panic episodes might be omitted or that non-panic episodes might be mistakenly classified as panics.

Given these numerous inconsistencies across series and these potentially serious methodological problems behind the development of some of these earlier series, I construct a new panic series for the pre-Great Depression. In developing the new series, however, I restrict attention to a key type of financial panic: banking panics.

I search through more than one hundred years of contemporary financial and economic newspapers to identify banking panics. Specifically, I employ three leading contemporary financial and economic newspapers from the 19<sup>th</sup> and early 20<sup>th</sup>

centuries—the *Niles Weekly Register*, the *Hunt's Merchants' Magazine*, and the *Commercial and Financial Chronicle*—to identify banking panics. The financial press of that era devoted substantial resources to covering banking panics, with particular attention placed to reporting incidences of bank runs, suspensions and failure, regardless of place of origin. Banking disturbances occurring in the less populated regions of the interior, as well as those occurring in more populated urban centers, received significant attention by the press. Consequently, these newspapers contain a comprehensive, detailed record of when and where banking panics occurred.

Moreover, the newspapers that I employ contained detailed index pages. Of particular importance, the index pages provided information regarding banking panics. Reports of bank runs, suspensions, and failures, along with general entries for banking panics and financial crises were listed in the index pages. Since the index pages of these newspapers provided comprehensive lists of economic, financial, and banking news, a careful examination of these pages locates banking panics reported in these newspapers. Thus, to identify banking panics, I read the index pages of contemporary newspapers—from 1825 to 1929—for key terms that are likely to signal a banking panic. When I find such a term, I read the referenced article to see if any bank runs, suspensions or failures occurred. I identify banking panics in these articles by the occurrence of a cluster of bank runs and suspensions. To scale banking panics according to degree, I implement the following rule. A banking panic is classified as major if it meets two conditions: (1) it spans more than one geographic unit—defined as a state and its bordering states—and (2) it appears on the front page of the newspaper. All other banking panics are minor.

In this manner, I derive a new series on banking panics for the pre-Great Depression era. The new series on banking panics identifies seven major banking panics—1833, 1837, 1839, 1857, 1873, 1893, and 1907—as well as nineteen minor banking panics between 1825 and 1929—twelve of which are not listed in any of the earlier series.

Using my new series, I then assess the reliability of earlier series. By comparing my new series to earlier series and by reading contemporary news reports surrounding every panic episode on all eight series, I show that earlier series have some severe problems. Some series combined panics with other developments in financial markets. Others failed to distinguish among different types of financial panics. Indeed, several series lumped together different types of financial disturbances—banking panics, stock market disturbances, spikes in interest rates—under the common heading of panic. Moreover, a few series even went so far as to incorrectly identify foreign banking panics as domestic ones.

Next, I document the frequency of banking panics prior to the Great Depression. The orthodox view in the literature is that the frequency of financial panics was high before 1914 and that the frequency dramatically decreased between 1914 and 1929—that is, during the first fifteen years of the existence of the Federal Reserve. Using my new series, however, I show that contrary to the conventional wisdom, there is no evidence of a decline in the frequency of panics during the first fifteen years of the existence of the Federal Reserve. Why do my findings differ from those of the literature? As it turns out,



prior studies used the Kemmerer series—a series that the analysis in this dissertation shows to be severely flawed—to document the pre-1914 frequency of panics, leading to spurious conclusions regarding the historical frequency of panics.

Equipped with the new panic series, I conduct an empirical test to identify the macroeconomic effects of major banking panics. I find that major banking panics have large and strongly significant effects on both output and prices. My results indicate that major banking panics cause declines of 9 to 13 percentage points in output growth in the year following a panic and declines of 11 to 13% in the price level within one year. The results are robust to a variety of specifications.

Armed with a reliable listing of when panics occurred, I then investigate whether banking panics were a significant source of output volatility prior to the founding of the Federal Reserve. I find that nearly half of all business cycle downturns between 1825 and 1914 contained major banking panics. This suggests that banking panics were a substantial source of economic instability throughout much of US history and that major banking panics either caused or amplified nearly half of all business cycle downturns between 1825 and 1914. These results contradict those of DeLong and Summers (1986), who argue—using their panic series—that financial panics were not a principal cause of economic instability before the Second World War.

Equipped with an accurate listing of when panics occurred, I then examine how downturns with major banking panics differed from downturns without major banking panics. I find that in the post-Civil War era, downturns with major banking panics were slightly longer and substantially more severe than downturns without major banking panics on average, and that output recoveries for downturns with major banking panics were two-to-three times the length of output recoveries for downturns without them.

Chapter one concludes by analyzing the dynamics of output following banking panics. I find that major banking panics can have persistent level and trend effects. Following three of the four major banking panics of the post-Jacksonian period, output did not revert back to its pre-panic trend. Moreover, following two of these panics, trend output growth declined substantially. These results are consistent with the growing consensus in the literature that banking crises can have lasting effects on output.

Whereas chapter one focuses on identifying when banking panics occurred throughout US history and quantifying the macroeconomic effects associated with major banking panics, chapter two addresses the appropriate policy response to banking panics. To accomplish this, chapter two exploits quasi-random variation in monetary regimes to identify the effects of liquidity intervention on banking stability during the early stages of the Great Depression.

The causes of bank failures during the Great Depression remain one of the most important, unresolved issues scholars face in attempting to explain the severity of the contraction of 1929-1933. Two schools of thought dominate the debate. Friedman and Schwartz (1963), the leading proponents of one of these views, argue that the massive waves of banking panics reflected liquidity crises. As fear spread throughout the country, deposit withdrawals accelerated and bank runs became self-fulfilling panics, forcing many solvent but illiquid institutions to fail or suspend operations. In contrast, advocates

of the second school of thought, such as Peter Temin (1976) and Calomiris and Mason (2003), contend that the banking panics were crises of fundamental solvency. Mounting default rates, deteriorating bank loan portfolios, and a significant downward trend in the value of bank assets contributed to a decline in the fundamental health of banks, undermining the solvency of financial institutions throughout the country. According to this view, banks failed because they were insolvent, rather than simply illiquid.

This debate is particularly relevant for policymakers. If the banking crises were liquidity crises, then more interventionist monetary policy would have mitigated banking panics. Friedman and Schwartz argue that the Federal Reserve committed a catastrophic policy mistake by failing to act as a lender of last resort to stabilize the nation's banking system. Alternatively, if the banking crises were solvency crises, then the Federal Reserve could not have contained banking panics by simply acting as a lender of last resort.

Between 1929 and 1933, policies differed across individual Federal Reserve Districts. In particular, two Federal Reserve districts, Atlanta and New York, stand out for their aggressive interventionist policies. They acted as lenders of last resort, extending credit and rushing money to ailing financial institutions, whereas the other Federal Reserve Districts adhered to the Real Bills Doctrine—a liquidationist ideology that characterized monetary intervention as counterproductive.

To assess the effectiveness of monetary intervention and to determine whether the banking panics of the Great Depression were liquidity or solvency crises, chapter two conducts a new test. Specifically, I focus on bank performance along counties within fifty miles of the Atlanta and New York Federal Reserve District borders. Due to geographical proximity, neighboring counties should share a similar underlying propensity to suffer from a panic by depositors. By restricting my analysis to counties located close to the Atlanta or New York Federal Reserve border, I isolate counties that share a similar susceptibility to experience a bank run, with one major distinction—some counties are under the authority of different monetary regimes. The Atlanta Federal Reserve District shared its border with the Cleveland, Richmond, St. Louis and Dallas Federal Reserve Districts, while the New York Federal Reserve District shared its border with the Boston and Philadelphia Federal Reserve Districts.

To determine whether monetary intervention mitigated banking panics, I estimate a panel regression model, where I index observations by county and year. I interact region and year dummies to capture region-year fixed effects. These interaction terms measure the average level of bank suspension rates among counties in a region in a given year. I also interact monetary regime and year dummies to capture monetary regime-year fixed effects. These interaction terms measure the average effect on bank suspension rates of being in the Atlanta or New York Federal Reserve district in each year. They provide yearly estimates of the effectiveness of monetary intervention in mitigating banking panics.

The results of my model reveal that monetary intervention had large effects. In 1929 and 1930, the early stages of the depression, the coefficients on the Atlanta Fed fixed effects are negative and statistically significant. They indicate that a typical county

located in the St. Louis, Richmond, Cleveland, or Dallas district had an additional 10.5 percent of banks suspending by the end of 1930 compared to a typical county across the border in the Atlanta district. My results also suggest that expansionary initiatives reduced the incidence of bank suspensions by 37 to 45% in some regions. Hence, monetary intervention had strongly significant effects during the early stages of the Depression. As a consequence, the Federal Reserve committed a catastrophic policy mistake by not acting as a lender of last resort to stabilize the banking system in 1929 and 1930.

## Chapter 1

### A New History of Banking Panics in the United States, 1825-1929: Construction and Implications

What are the macroeconomic effects of banking panics? How long do the effects last? How might the downturn of 2008-2009 differ from other postwar recessions in the U.S.? Is this time really different?

The general absence of banking panics in the United States since the Great Depression means that there are few modern day equivalents to the unfolding crisis today. Indeed, there is a growing sense that this downturn may more closely resemble the downturns of the 19<sup>th</sup> and early 20<sup>th</sup> centuries that accompanied banking crises than the recessions of the postwar period. As Paul Krugman recently speculated, “this may be your great-great-grandfather’s recession.”<sup>1</sup>

Surprisingly, the effects of financial panics of this era are not very well understood. Economists have recently arrived at contradictory conclusions. DeLong and Summers (1986), in studying the period 1890-1910, do not find a link between panics and real recessions, leading them to conclude that “the effects of financial panic upon the rest of the real economy are smaller than is usually realized.”<sup>2</sup> By contrast, over roughly the same period, Miron (1986) finds a clear correlation between panics and downturns. However, even with this finding, Miron cautions that his results do not prove that panics have real output effects since “panics might be the result of negative output shocks”<sup>3</sup> rather than direct causes of downturns.

The inconclusive nature of this debate reflects the two major problems in identifying the effects of financial panics of the pre-Great Depression era. First, it is not clear when panics occurred because prior panic series—lists of when panics occurred—differ in their identification of panic episodes. Some series document panics occurring at a rate of more than one per year, whereas other series identify recurring periods of ten to twenty years without a panic. Methodological flaws in the development of these series account for these major discrepancies. Some series combine panics with other developments in financial markets. Others fail to distinguish among different types of panics. Many series employ inconsistent strategies to identify panics. Indeed, DeLong and Summers (1986) and Miron (1986) arrive at contradictory conclusions because they rely on different panic series to identify when panics occurred.

Second, even if the timing of when panics occurred is consistent with panics having real output effects, establishing the direction of causality is inherently difficult. Are panics causing downturns or are downturns causing panics? There are two schools of thought. According to one view, panics are shocks to the real economy that cause downturns, but according to the alternate view, panics are consequences of major recessions. Under this latter specification, even if a correlation between downturns and

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<sup>1</sup> Krugman, Paul. “Who’ll Stop the Pain?” *New York Times*. Feb 19, 2009.

<sup>2</sup> Page 689.

<sup>3</sup> Page 137.

panics exists, it would be misleading to attribute output declines to panics since panics would be products of downturns rather than causes.

This paper seeks to identify the macroeconomic effects of a main class of financial panics of the pre-Great Depression era: banking panics. It accomplishes this by addressing these two major concerns. To address the first concern, this paper develops a new series on banking panics for the pre-Great Depression era. To address the second concern, this paper studies the output effects of major banking panics that the reports of contemporary observers suggest were the result of idiosyncratic disturbances, as opposed to declining output conditions. In the process, I find that much of the conventional wisdom on the causes, effects and frequency of panics of the pre-Great Depression era was based on unreliable evidence—and in particular, on biased and inconsistent panic series.

Section 1 begins by asking: when did the financial panics of the pre-Great Depression era occur? I show that—perhaps, somewhat surprisingly—answering this question is not a straightforward task. I document eight leading panic series—the (1) Bordo-Wheelock, (2) Thorp, (3) Reinhart-Rogoff, (4) Gorton, (5) Sprague, (6) Wicker, (7) Kemmerer, and (8) DeLong-Summers series—and demonstrate that each of these series would arrive at a different answer to this question. Indeed, these series differ dramatically in their identification of panic episodes. Some series—such as the Kemmerer and DeLong-Summers series—document panics occurring at a rate of roughly one per year, whereas other series—such as the Thorp and Wicker series—identify recurring periods of ten to twenty years without a panic.

Why do these series differ so dramatically? By describing each of the panic series on a case-by-case basis, I show that methodological flaws in the development of earlier series are the likely source of these extreme variations. Many panic series do not explicitly define a panic, making it unclear exactly what kind of financial disturbance is being recorded. Other series employ inconsistent strategies to identify panics, raising the possibility that some panic episodes are omitted or that non-panic episodes are mistakenly classified as panics. A few series do not even provide any rationale for how they identify panics, rendering the reliability of those series questionable.

Due to the numerous contradictions across these series and the serious flaws that underpin the methodology behind many of these series, Section 2 develops a new panic series—one that rectifies many of the problems of earlier series. I begin by providing a definition of financial panic—one that distinguishes among different types of financial panics. Specifically, I define a financial panic as occurring when there is a widespread rush by private agents to liquidate assets, e.g., deposits in the banking sector (a banking panic), stocks in equity markets (a stock market panic), or currency in foreign exchange markets (a currency panic). In developing the new series, however, I restrict attention to a key type of financial panic: banking panics.

Due to data limitations, quantitative sources are not sufficient to identify banking panics. Comprehensive data on bank suspensions and bank failures are not readily available throughout much of the 19<sup>th</sup> century. Therefore, I employ other sources to identify banking panics: financial and economic newspapers from the 19<sup>th</sup> and early 20<sup>th</sup>

centuries. The press of that era devoted substantial resources to covering banking panics. Incidents of bank runs, suspensions and failures were regularly reported in contemporary newspapers, regardless of place of origin. Moreover, the newspapers that I employ contained detailed index pages. Of particular importance, the index pages provided information regarding banking panics. Reports of bank runs, suspensions, and failures, along with general entries for banking panics and financial crises were listed in the index pages.

Since the index pages of these newspapers provided comprehensive lists of economic, financial, and banking news, a careful examination of these pages locates banking panics reported in these newspapers. Thus, to identify banking panics, I read the index pages of contemporary newspapers—from 1825 to 1929—for key terms that are likely to signal a banking panic. When I find such a term, I read the referenced article to see if any bank runs, suspensions or failures occurred. I identify banking panics in these articles by the occurrence of a cluster of bank runs and suspensions. To scale banking panics according to degree, I implement the following rule. A banking panic is classified as major if it meets two conditions: (1) it spans more than one geographic unit—defined as a state and its bordering states—and (2) it appears on the front page of the newspaper. All other banking panics are minor.

Section 3 presents the results of the new series and its implications. The new series on banking panics identifies seven major banking panics—1833, 1837, 1839, 1857, 1873, 1893, and 1907—as well as twenty minor banking panics between 1825 and 1929—twelve of which are not listed in any of the earlier series.

Using my new series, I then assess the reliability of earlier series. By comparing my new series to earlier series and by reading contemporary news reports surrounding every panic episode on all eight series, I show that earlier series have some severe problems. Some series combined panics with other developments in financial markets. Others failed to distinguish among different types of financial panics. Indeed, several series lumped together different types of financial disturbances—banking panics, stock market disturbances, spikes in interest rates—under the common heading of panic. Moreover, a few series even went so far as to incorrectly identify foreign banking panics as domestic ones.

Next, I document the frequency of banking panics prior to the Great Depression. The orthodox view in the literature is that the frequency of financial panics was high before 1914 and that the frequency dramatically decreased between 1914 and 1929—that is, during the first fifteen years of the existence of the Federal Reserve. Using my new series, however, I show that contrary to the conventional wisdom, there is no evidence of a decline in the frequency of panics during the first fifteen years of the existence of the Federal Reserve. Why do my findings differ from those of the literature? As it turns out, prior studies used the Kemmerer series—a series that the analysis in this paper shows to be severely flawed—to document the pre-1914 frequency of panics, leading to spurious conclusions regarding the historical frequency of panics.

Equipped with the new panic series, section 4 presents the empirical test I conduct to identify the real output effects of major banking panics. I begin by documenting a

correlation between major banking panics and downturns. However, the primary problem in identifying the output effects of banking panics is the possibility that panics might be consequences—rather than causes—of downturns. The existence of a correlation between panics and downturns, by itself, does not prove that panics have real output effects. If panics are products of recessions, then deteriorating economic conditions might be causing panics, rather than vice versa. Under this specification, it would be misleading to attribute output declines to panics since panics would be products of downturns rather than causes.

This identification problem is made even more complicated for the panics of the pre-Great Depression era due to data limitations. Many of the output series dating back to the 1800s are available at only a yearly frequency, making it difficult to identify whether panics preceded downturns or occurred in the midst of downturns. If time series data on output were available at a greater frequency, it might be possible to identify the timing of panics in relation to the timing of output declines. If, for example, panics precede output declines, then it might be possible to conclude that panics caused the output declines, rather than vice versa. But in the absence of such data, this is not possible. This complicates efforts to disentangle the effects of a panic from those on an ongoing downturn and to establish a clear direction of causality.

Consequently, I develop a new test of the output effects of banking panics—one that circumvents many of these concerns by drawing on additional evidence. Financial and economic newspapers from the 1825-1929 period contain detailed commentaries by contemporary observers that clarify many of these issues. In particular, I read the newspaper records surrounding every major banking panic between 1825 and 1929 to identify those banking panics that (1) did not break out in the midst of a major downturn and that (2) were caused by events unrelated to movements in output—for example, political decisions, international contagion, or the failure of a mismanaged bank. I then use these episodes to empirically identify the output effects of banking panics.

Section 4.1 describes in greater detail how I use the reports of contemporary observers to separate banking panics that may have been caused by downturns from those that were the result of other disturbances. I place particular emphasis on how the newspaper records can help identify the causes of panics and how they can help reveal whether a panic broke out in the midst of a major downturn. Descriptions of events leading up to panics and reports by contemporary observers help to pinpoint the forces that precipitated depositor anxiety and that led to a panic. Descriptions of the state of the economy in the period immediately preceding the panic clarify whether there were indications of a major recession on the eve of the outbreak of panic. Both pieces of information are helpful in determining whether a panic was caused by a downturn or by some other disturbance. Did depositors panic because there were growing signs of a depression or did they panic in response to some other disturbance?

Since I rely on qualitative evidence to separate banking panics that may have been caused by downturns from those that were caused by other events, there are varying degrees of certainty across episodes. In some cases, the causes of a panic are clear and obvious, whereas in other cases, the causes are more ambiguous. To reflect these varying

degrees of certainty and to make my methodology as transparent as possible, I classify panics on a scale. Section 4.1 presents the algorithm I use to classify panics on this scale, whereas section 4.2 describes on a case-by-case basis the classification of panics on this scale.

Section 4.3 presents the empirical findings. Equipped with a listing of panics that did not break out in the midst of a major downturn and that were caused by events unrelated to movements in output, I examine the macroeconomic effects of banking panics. I find that major banking panics have large and strongly significant effects on both output and prices. My results indicate that major banking panics cause declines of 9 to 13 percentage points in output growth in the year following a panic and declines of 11 to 13% in the price level within one year. The results are robust to a variety of specifications.

Armed with a reliable listing of when panics occurred, Section 4.4 investigates whether banking panics were a significant source of output volatility prior to the founding of the Federal Reserve. I find that nearly half of all business cycle downturns between 1825 and 1914 contained major banking panics. If wartime cycles are excluded, then 58% of business cycle downturns contained major banking panics. According to the estimates I derive in section 4.3, banking panics have large output effects. Thus, even if banking panics did not initiate all of these downturns, they amplified them. These findings suggest that banking panics were a substantial source of economic instability throughout much of US history and that major banking panics either caused or amplified nearly half of all business cycle downturns between 1825 and 1914. These results contradict those of DeLong and Summers (1986), who argue—using their panic series—that financial panics were not a principal cause of economic instability before the Second World War.

Then, equipped with an accurate listing of when panics occurred, section 4.5 examines how downturns with major banking panics differed from downturns without major banking panics. I find that in the post-Civil War era, downturns with major banking panics were slightly longer and substantially more severe than downturns without major banking panics on average, and that output recoveries for downturns with major banking panics were two-to-three times the length of output recoveries for downturns without them.

Section 4.6 concludes by analyzing the dynamics of output following banking panics. I find that major banking panics can have persistent level and trend effects. Following three of the four major banking panics of the post-Jacksonian period, output did not revert back to its pre-panic trend. Moreover, following two of these panics, trend output growth declined substantially. These results are consistent with the growing consensus in the literature that banking crises can have lasting effects on output. The results of this section have implications for what might happen to output following the banking crisis of 2007-2009. Furthermore, these results underscore the stakes of the current crisis.

## **Part I. Prior Panic Series**



### **1.1. When did Financial Panics Occur?**

When did financial panics occur? Surprisingly, answering this question is not a simple task. Table 1 presents eight different panic series: the (1) Bordo-Wheelock, (2) Thorp, (3) Reinhart-Rogoff (two versions), (4) Gorton, (5) Sprague, (6) Wicker, (7) Kemmerer, and (8) DeLong-Summers series.<sup>4</sup> Each panic series comes from a different study and covers a different period, noted in the first and third rows of Table 1, respectively. A perusal of table 1 quickly reveals that there is substantial disagreement across these series regarding the timing, incidence, and frequency of panics throughout U.S. history. Each empty cell represents a panic noted in at least one series that is not contained in the series corresponding to that column.

Consider first the period between 1825 and the end of the Civil War. The three series that span the 1825-1864 period, the Thorp, Bordo-Wheelock, and Reinhart-Rogoff series, identify 1825 and 1857 as panics.<sup>5</sup> However, there is significant disagreement regarding other episodes. The Bordo-Wheelock and Thorp series identify 1833 as a panic, while both versions of the Reinhart-Rogoff series omit 1833. The Bordo-Wheelock and Thorp series identify 1837 and 1839 as two distinct panics, whereas one version of the Reinhart-Rogoff series combines the financial disturbances of the late 1830s into one panic, beginning in 1836, while the other version identifies a sole panic from March 1837 to 1838. The Thorp series identifies 1847 as a panic, whereas the other series do not identify 1847 as a panic. One version of the Reinhart-Rogoff series identifies December 1861 and April 1864 as banking crises, whereas the other series do not contain these episodes.

From 1864 to 1914, the series concur in classifying 1873, 1893 and 1907 as panics, with the exception of one version of the Reinhart-Rogoff series, which omits the 1893 panic, and the Sprague series, which labels these three episodes crises rather than panics. However, there is significant disagreement on the disturbances of 1884 and 1890. The Reinhart-Rogoff, Gorton, and Kemmerer series identify 1884 and 1890 as panics.<sup>6</sup> The DeLong-Summers series, which begins in 1890, also identifies 1890 as a panic. However, the Wicker series classifies 1884 and 1890 as incipient panics, rather than full-scale panics. The Bordo-Wheelock series also makes a distinction for these two episodes, classifying them as ‘financial distress’ rather than panics. The Sprague series distinguishes 1884 and 1890 from the crises of 1873, 1893 and 1907 by classifying 1884 as a panic and 1890 as financial stringency. The Thorp series omits 1884 and 1890. Moreover, there is little consensus for the other panics of this period. The Bordo-Wheelock series classifies 1878 as “financial distress,” whereas the other series omit this

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<sup>4</sup> The series come from the following studies: (1) Bordo and Wheelock (1988), (2) Thorp (1926), (3) Reinhart and Rogoff (2008c), (4) Gorton (1988), (5) Sprague (1910), (6) Wicker (2000), (7) Kemmerer (1910), DeLong and Summers (1986). Reinhart and Rogoff (2008c) provide two versions of their panic series. They list one version in Table A3 and another version in Table A5. The two versions occasionally contradict one another. As a consequence, I provide both versions in Table 1.

<sup>5</sup> The Reinhart-Rogoff series uses the term crisis rather than panic.

<sup>6</sup> One version of the Reinhart-Rogoff series omits the 1890 episode. Both versions, however, contain the 1884 episode.

episode. The Gorton series classifies October 1896 as a panic, the DeLong-Summers series identifies two panics in 1896, one in the first quarter and a second in the third quarter of the year, and the Kemmerer series identifies two panics in 1896, one from June to July and another in December. By contrast, the Bordo-Wheelock, Thorp, Reinhart-Rogoff, Sprague and Wicker series do not classify 1896 as a panic. The Reinhart-Rogoff and Gorton series classify 1914 as a panic, while the Bordo-Wheelock, Thorp, and Wicker series omit 1914. Furthermore, the Kemmerer series includes three additional major panics—Dec 1899, May 1901, and Mar-Aug 1903—and twenty-one minor panics. None of the other series contain any of Kemmerer’s minor panics and only one series—the DeLong-Summers series—contains Kemmerer’s additional major panics. Moreover, the DeLong-Summers series contains three additional panic quarters—none of which are noted in any of the other series.

The series that extend to the 1930s contain the panics of the Great Depression. The Bordo-Wheelock series also identifies episodes of financial distress in the 1920s and 1980s. Both versions of the Reinhart-Rogoff series identify 1984 as a banking crisis and one version of the Reinhart-Rogoff series identifies 2007 as a banking crises.

## 1.2 **Studies on the Output Effects and Causes of Panics Depend on the Panic Series**

An understanding of when panics occurred is critical to studies on the real output effects and causes of panics. Studies on the real output effects of panics depend on the panic series to identify the timing of panics in relation to changes in output. Studies on the causes of panics depend on the panic series to identify the timing of panics in relation to forces that may have increased the susceptibility of the financial system to a panic.

First, consider studies that examine the real output effects of panics of the pre-Federal Reserve era. DeLong and Summers (1986) do not find a link between panics and downturns. They compare the behavior of output surrounding their twelve panic periods with the behavior of output in non-panic periods from 1890-1910. They conclude that no more than a small portion of the variance in output from 1890-1910 can be attributed to these panics, and that as a consequence, panics did not have significant real output effects. DeLong and Summers write,

this suggests that financial and monetary shocks are less important sources of depression than we had suspected...Is there any way to rationalize the apparent lack of strong links between financial uproar and real recession? We believe that the conclusions of the exercise above are reasonable, because the effects of financial panic upon the rest of the real economy are smaller than is usually realized.<sup>7</sup>

On this basis, DeLong and Summers conclude that the real output effects of panics are small.

However, their results critically depend on their panic series to identify the timing of panics in relation to changes in output. If the DeLong-Summers series is accurate in identifying twelve panics from 1890 to 1910 that had little impact on output fluctuations,

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<sup>7</sup> Page 689.

then their conclusion that there is not a strong link between financial panics and real downturns might be well supported. However, if their series mischaracterizes non-panic episodes as panics, then they would be attributing the behavior of output in non-panic episodes to the behavior of output in panic episodes, rendering their conclusions regarding the output effects of panics spurious. That the DeLong-Summers series includes panics not noted in other series raises this concern.

By contrast, Miron (1986) comes to a different conclusion using the Kemmerer series of major panics for the 1890-1908 period—roughly the same period studied by DeLong and Summers. Miron notes that the average level of GNP growth almost doubles when panic years are excluded—a finding much more consistent with panics having real effects. Romer (1999), also using the Kemmerer series, reaches a similar conclusion, noting a strong correlation between recessions and panics. However, the Kemmerer series also includes many episodes not noted in other series, rendering its reliability questionable.

Studies on the causes of panics also depend on the panic series. In particular, one of the leading studies on the causes of panics of the pre-Fed era—Miron (1986)—hinges on its choice of panic series. Miron argues that seasonal monetary forces generated recurring panics prior to the founding of the Federal Reserve. Increased demand from the agricultural sector for currency and credit in the spring planting season and fall-crop moving season caused seasonal “stringencies” in the money market, forcing interest rates up and bank reserve-to-deposit ratios down. These forces weakened the nation’s banking system and caused a contraction in the money supply in the fall and spring, precisely when the demand for money increased. This fundamental flaw in the operation of the nation’s monetary system—known as ‘the perverse elasticity’ of the money supply—produced seasonal, recurring panics, according to Miron. He uses the Kemmerer series to conclude that panics of the pre-Fed era had a tendency to recur during those seasons characterized by stringent monetary conditions—that is, the fall and spring. Miron’s analysis of the pre-Fed era covers 1890 to 1908, and he notes that two-thirds of Kemmerer’s 21 panics of this period occurred during the fall or spring, with seven occurring in the spring months of March, April or May and seven occurring in the fall months of September, October or November.

Miron then claims that there were no panics between 1914 and 1929, the first fifteen years of the existence of the Federal Reserve. This stark contrast—twenty-one panics between 1890 and 1908, compared to zero panics between 1914 and 1929—leads him to the conclusion that the Federal Reserve caused a dramatic reduction in the frequency of panics after 1914. He cites the establishment of an elastic currency—one that could expand and contract when needed—as the policy action that mitigated seasonal stringencies in the money market, thereby reducing the frequency of panics. However, since Miron uses the Kemmerer series to document the incidence of panics before 1914, Miron’s conclusions—in terms of both the seasonality of panics prior to 1914 and the reduction in the frequency of panics between 1914 and 1929—hinge on the Kemmerer series.

### **1.3 Methodology Behind the Eight Panic Series**

Why do these panic series differ so dramatically? This section describes the methodologies behind each of the eight panic series on a case-by-case basis.

#### Kemmerer

Kemmerer (1910) identified financial panics by reading the *Commercial and Financial Chronicle*, the leading economic newspaper of the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, from 1873 to 1908. He found eight major and twenty-one minor panics. However, he provided almost no explanation for his methodology. He did not provide a clearly defined criterion for selecting major and minor panic episodes, nor did he provide a definition of panic. For the major panics, he chose periods that were “financial disturbances”<sup>8</sup> without explaining what that term encompassed, and for minor panics, he did not provide any rationale for his selection process.

Moreover, when describing his panics, Kemmerer wrote, “the word panic has been used here to cover several financial disturbances for which many would not use so strong a word, i.e., the disturbances of 1884, 1890, 1899, and 1901” (p. 223). In this quote, he openly acknowledged that his decision to classify several of these episodes as panics was questionable. Furthermore, in a footnote, Kemmerer provided a cautionary message regarding the methodology he used to identify his minor panics, noting that such a list was created after “a rather hasty perusal of the [*Commercial and Financial*] *Chronicle*” (p.223) and that “this list is probably not complete, and there may be room for doubt as to the inclusion of some of the dates mentioned” (p. 223).

#### Thorp

Thorp (1924), in his classic work *Business Annals*, one of the early pioneering studies on the history of business cycles, identified twelve panics in his yearly headings of major economic events from 1790 to 1925. He assembled his list by reading newspapers; however, he failed to explain his rationale in identifying those twelve episodes as panics. He provided no explanation of his methodology, nor did he provide a definition of panic.

#### DeLong and Summers

DeLong and Summers (1986) identified twelve panics from 1890 to 1910, with a panic being defined as a period when the commercial paper rate increases by one percentage point from quarter-to-quarter or when banks stop paying deposits at par. Eight of these panics satisfy the first criterion, a quarter-to-quarter increase in the commercial paper rate of more than one percentage point. They are 1890:4, 1893:2, 1893:3, 1896:1, 1896:3, 1898:2, 1899:4, and 1905:4. The remaining four episodes were, presumably, classified as panics on the basis of the second criterion. DeLong and Summers likely chose to classify panics accordingly because spikes in the commercial paper rate suggest tight monetary conditions, while the cessation of paying out deposits at

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<sup>8</sup> Page 223.

par indicates a degree of caution on the part of banking authorities. However, such conditions do not necessarily translate into bank failures, bank runs or stock market crashes, making it unclear whether the episodes identified by DeLong and Summers were in fact panics.

To illustrate this point, consider extending the DeLong-Summers series beyond the 1890-1910 period to the 1875-1889 and 1911-1983 periods on the basis of the first criterion, which identifies a panic by a quarter-to-quarter increase of one point or more in the commercial paper rate. This methodology finds the following additional panics: 1875:4, 1876:4, 1877:3, 1878:4, 1881:1, 1886:4, 1887:3, 1889:4, 1914:3, 1931:4, 1958:4, 1973:2, 1974:2, 1974:3, 1978:4, 1979:4, 1980:1, and 1980:4. This list omits several of the banking panics of the Great Depression—the banking panic in the fall of 1930, the banking panic in the spring of 1931, and the banking panic of 1933—as well as the Stock Market Crash of 1929. Given that a quarter-to-quarter spike of one point or more in the commercial paper rate fails to identify several of the major financial panics of the Great Depression, it is unlikely that this criterion is an effective way to identify panics. Moreover, this criterion also would not have identified the panic of 1907.<sup>9</sup>

### Sprague

Sprague (1910) described five episodes of financial unrest during the National Banking era—three crises (1873, 1893, 1907), one panic (1884), and one episode of monetary stringency (1890). His classification suggests that he regarded the disturbances of 1884 and 1890 as of a different nature from the disturbances of 1873, 1893 and 1907, and yet he did not explicitly describe why he labeled each episode accordingly, nor did he provide a precise definition of crisis, panic or monetary stringency.

### Gorton

Gorton (1988) defined a banking panic as follows:

A bank panic occurs when depositors demand such a large-scale transformation of deposits into currency that, at the contracted for exchange rate (of a currency dollar for a dollar deposit), the banking system can only respond by suspending convertibility of deposits into currency, issuing clearinghouse loan certificates, or both... To be clear, a bank run refers to a situation in which depositors at a single bank seek to exchange their deposits for currency. A banking panic refers to the situation in which depositors at *all* banks want to withdraw currency.<sup>10</sup>

Using this definition, Gorton found seven disturbances from 1863 to 1914 that fit this definition: suspension of convertibility occurred in five episodes (1873, 1890, 1893, 1907 and 1914) and the issuance of loan certificates occurred in six episodes (1873, 1884, 1890, 1893, 1907 and 1914). To this list, Gorton added 1896, writing that the issuance of Clearing House loan certificates was authorized even though none were actually issued.

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<sup>9</sup> The commercial paper rate data come from Table 2 - Appendix B of Gordon (1986).

<sup>10</sup> Page 223.

However, Gorton does not describe how he identified his seven panics. Indeed, a potential concern with Gorton’s listing of panics is that he does not provide an explanation of how he assembled this listing of panics. Did he adopt a systematic methodology to study newspapers or to analyze macroeconomic variables to identify panic episodes or was he more selective in his approach, choosing panics that he already knew existed and thereby potentially missing other important episodes?<sup>11</sup>

### Reinhart and Rogoff

Reinhart and Rogoff (2008c) identified banking crises if one of two events occurred:

- “(1) bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions
- (2) if there are no runs, the closure, merging takeover, or large-scale government assistance of an important financial institution (or groups of institutions), that marks the start of a string of similar outcomes for other financial institutions” (p. 58)

To find banking crises from 1800 to 2008, they “rely on existing studies of banking crises and on the financial press.”<sup>12</sup> A potential weakness of their methodology involves their dependence on previous studies.<sup>13</sup> Any errors embedded in earlier studies would simply be transplanted over to their series. Moreover, while Reinhart and Rogoff mention that they used the financial press, it is unclear how they used it.

Even putting these issues aside, Reinhart and Rogoff provide two—at times, contradictory—versions of their series on banking crises. One version of their series is presented in Table A3 of their paper, whereas the other version is presented in Table A5. While the two versions agree on many crises, they disagree on several episodes.

### Bordo and Wheelock

Bordo and Wheelock (1988) identified banking panics on the basis of previous studies by Schwartz (1988), Thorp (1926), Sprague (1910), and Friedman and Schwartz (1963). The main concern with the Reinhart-Rogoff series reappears with the Bordo-Wheelock series. Any errors embedded in earlier studies would simply be transplanted over to their series.

### Wicker

Between the end of the Civil War and the founding of the Federal Reserve, Wicker (2000) identifies three major banking panics—1873, 1893, and 1907—and two incipient

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<sup>11</sup> For example, according to the December 1899 edition of the *Commercial and Financial Chronicle*, the Boston Clearing House issued loan certificates to the Globe National Bank in the midst of a minor disturbance. Gorton failed to classify that episode as a panic even though clearinghouse loan certificates were issued, raising the possibility that Gorton may have missed other episodes.

<sup>12</sup> Page 57.

<sup>13</sup> Specifically, Conant (1915), Bordo and Eichengreen (1999), Bordo et al. (2001), Bernanke and James (1991).

banking panics—1884 and 1890. He classifies 1884 and 1890 as incipient rather than full banking panics because, he argues, policy intervention—on the part of the New York Clearing House—acted to “forestall a banking panic.”<sup>14</sup> However, the counterfactual—whether a panic would have occurred in the absence of policy intervention and hence, whether these disturbances really were incipient panics—is unobservable. Moreover, it also seems likely that Wicker intended his work as a set of individual case studies on the five most cited banking disturbances of this era, rather than as a complete series that lists when every banking panic occurred between 1865 and 1914.

#### **1.4 Necessity of a New Panic Series**

The numerous contradictions across these series and the potential flaws that underpin the methodology behind many of these series necessitate the development of a new panic series and a reexamination of many of the leading arguments on the effects and causes of financial panics that have been formulated using these series. Do panics have significant real output effects? Are panics associated with declining real economic activity or are they associated with relatively stable economic performance? Can panics account for a significant fraction of the volatility in output in the 1800s and early 1900s? Were panics of the pre-Federal Reserve era caused by seasonal agricultural shocks? Or did other forces cause them? Is the claim that the frequency of financial panics decreased following the founding of the Fed accurate? Or is it a spurious conclusion drawn from a biased panic series?

The development of a new, consistent series on panics will be more than an important exercise in taxonomy; it will serve as a crucial tool for analyzing the causes, effects, and frequency of panics throughout US history.

### **Part II. Development of a New Series on Banking Panics**

This section develops a new series on banking panics. I begin by providing a definition of financial panic—one that distinguishes among different types of financial panics. I then describe the methodology I use to compile the new series on banking panics. In particular, I develop a clearly defined rule to identify banking panics from 1825 to 1929.

#### **2.1 Definition of Financial Panic**

A financial panic occurs when there is a widespread rush by private agents to liquidate assets, e.g., deposits in the banking sector (a banking panic), stocks in equity markets (a stock market panic), or currency in foreign exchange markets (a currency panic). The principal characteristic of any financial panic—the rush to liquidate assets—is driven out of fear that a particular type of asset will suddenly decline in value or be rendered illiquid.

My definition of financial panic distinguishes among different types of financial panics: banking panics, stock market panics, and currency panics. A banking panic

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<sup>14</sup> Page xv.

occurs when there is an increase in the demand for currency relative to deposits that sparks bank runs and bank suspensions. A stock market panic occurs when there is a rush to liquidate stocks in equity markets, resulting in sharp declines in stock prices. A currency panic occurs when agents sell currency in foreign exchange markets out of fears of devaluation. In each of these types of financial panics, there is a rush by private agents to dispose of a particular kind of asset—bank deposits in the case of banking panics, stocks in the case of stock market panics, and currency in the case of currency panics.

In developing a new panic series, however, I restrict my attention to one type of financial panic: banking panics. I leave the development of a series on stock market or currency panics for later work.

## **2.2 Identifying Banking Panics**

Quantitative sources are not sufficient to identify banking panics. Consistent data on bank suspensions and failures are not readily available throughout much of the 19<sup>th</sup> century. Beginning in 1865, a consistent series on national bank failures—provided by the Comptroller of the Currency—exists. However, the data on national bank failures are only available at a yearly frequency, making it difficult to determine whether bank failures were clustered together—as would be the case in a banking panic—or whether they were spread out over the course of a year. Furthermore, even if one were to overlook this shortcoming, the Comptroller’s series on national bank failures omits state banks, private banks, and trust companies, making the series unrepresentative of the overall banking system.<sup>15</sup> Lastly, data on bank failures or suspensions, by itself, does not reveal whether there was a panic by depositors since a cluster of bank suspensions or failures can occur without runs by depositors.

To overcome these limitations, I employ other sources to identify banking panics: financial and economic newspapers from the 19<sup>th</sup> and early 20<sup>th</sup> centuries. The press of that era devoted substantial resources to covering banking panics. Incidents of bank runs, suspensions and failures were regularly reported in contemporary newspapers, regardless of place of origin. Indeed, disturbances occurring in the less populated regions of the interior as well as those occurring in more populated urban centers received significant attention by the press. Consequently, contemporary newspapers contain a detailed, comprehensive record of when and where banking panics occurred.

Therefore, to identify banking panics, I utilize contemporary newspapers. In particular, I use three newspapers: the *Niles Weekly Register*, *The Merchants’ Magazine and Commercial Review*, and *The Commercial and Financial Chronicle*. These three newspapers were among the leading economic and financial newspapers of their day. Most importantly, they provided comprehensive coverage of developments in the banking sector, with special attention placed to reporting incidents of bank runs, suspensions and failures. I use the *Niles Weekly Register* for the period 1825 to 1849,

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<sup>15</sup> Grossman (1993) reports that the Comptroller of the Currency provided a series on both national and state bank failures. Due to regular inspections and uniform reporting rules, the Comptroller’s series on national bank failures is reliable. However, the same level of consistency in reporting did not apply to the Comptroller’s series on state bank failures, rendering the reliability of that series questionable.



*The Merchants' Magazine and Commercial Review* for the period 1842 to 1869, and *The Commercial and Financial Chronicle* for the period 1865 to 1929.<sup>16</sup>

These newspapers were printed on a regular basis and were bound in volumes for preservation. The *Niles Weekly Register* and *The Commercial and Financial Chronicle* were published on a weekly basis, and *The Merchants' Magazine and Commercial Review* on a monthly basis. Editions of the *Niles Weekly Register* and *The Merchants' Magazine and Commercial Review* were bound in six-month volumes. Editions of *The Commercial and Financial Chronicle* were bound in six-month volumes from 1865 to 1916 and three-month volumes from 1917 to 1929.

The bound volumes of all three newspapers contained index pages. The index pages provided detailed lists of specific information found in each volume, arranged alphabetically. Each item listed in the index was matched to its respective page number, permitting readers to quickly identify its precise location in the volume. Of particular importance, the index pages provided information regarding banking panics. Reports of bank runs, suspensions, and failures, along with general entries for banking panics and financial crises were listed in the index pages.<sup>17</sup>

Since the index pages of these newspapers provided comprehensive lists of economic, financial, and banking news, a careful scanning of these pages locates banking panics reported in the *Niles Weekly Register*, the *Merchants' Magazine and Commercial Review*, and the *Commercial and Financial Chronicle*. Therefore, to identify banking panics, I read the index pages of these newspapers—from 1825 to 1929—for key terms that are likely to signal a banking panic. In particular, I search for any of the following terms: bank failure, bank suspension, bank run, bank closure, bank crisis, bank panic, bank disturbance, crash, crisis, financial crisis, financial disturbance, financial revulsion, panic, revulsion, run, suspension, suspension of payments and suspension of specie

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<sup>16</sup> *The Merchants' Magazine and Commercial Review* was first published in July 1839, but it did not contain the “Monthly Commercial Chronicle” section—the key section that covered contemporaneous economic news—until April 1842. During its early years, from July 1839 until March 1842, *The Merchants' Magazine and Commercial Review* devoted little coverage to current news.

<sup>17</sup> The index pages are consistent over the 1825 to 1929 period in that they comprehensively report incidents of bank runs, suspensions and failures. However, the structure of these index pages changed somewhat over time and across different newspapers. For example, *The Merchants' Magazine and Commercial Review* split its listing of articles into an Index page and a Contents page. Even though it is not officially labeled an index page, the Contents page serves in that capacity and consequently, I treat it as such. Also, the *Commercial and Financial Chronicle* split its index into several different index pages that varied across years.

payments.<sup>18</sup> When I find one of these terms in an index page, I read the referenced article to see if any bank runs, suspensions or failures occurred.<sup>19</sup>

Since a banking panic occurs when there is a loss of depositor confidence that sparks runs on financial institutions and bank suspensions, I identify banking panics in these newspaper articles by the occurrence of a cluster of bank suspensions and runs. The presence of both runs and suspensions is a necessary criterion. A wave of bank suspensions without runs would not be classified as a banking panic because a key feature of a banking panic is a rush by depositors to convert deposits into currency.<sup>20</sup> Similarly, runs on institutions that did not produce bank suspensions would not be classified as a banking panic.

Moreover, to separate isolated bank runs and suspensions from banking panics, which are more generalized disturbances that extend beyond the confines of individual bank-specific problems, I identify banking panics by a cluster of bank suspensions and runs. To avoid any ambiguity, I define a cluster as three or more banks.<sup>21</sup> Lastly, to partition banking panics, I implement the following rule: a panic ends if there are no reports of any bank runs or suspensions for one full calendar month.

### **2.3 Scaling Banking Panics**

To reflect varying degrees, I classify each banking panic as major or minor. A banking panic is classified as major if it meets two conditions: (1) it spans more than one geographic unit and (2) it appears on the front page of the newspaper. All other banking panics are minor. I define a geographic unit as a state and its bordering states. For example, bank runs and suspensions that occur in Ohio, Indiana and Illinois would be contained in one geographic unit, whereas bank runs and suspensions that occur in Ohio, Indiana, Illinois and Pennsylvania would not be contained in one geographic unit.

Scaling banking panics according to geographic extent serves two useful purposes. First, it separates more localized disturbances from more widespread disturbances. A banking panic that occurs in one part of the country, but does not spread to other regions

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<sup>18</sup> In compiling this list, I chose words that describe key features of banking panics—failure, suspension, run, crisis, panic, disturbance, crash. One of the terms—revulsion—was widely used in the 19<sup>th</sup> century to denote financial panics even though it has fallen out of use today. Moreover, in scanning indexes for key terms, I take into consideration the possibility of a rearrangement of words. For example, suspension of payments could be listed as “payments, suspension of” and suspension of specie payments could be listed as “specie payments, suspension of.”

<sup>19</sup> To facilitate the process, the index pages of all three newspapers are alphabetical. The contents page of the *Hunt’s Merchants’ Magazine and Commercial Review* is chronological, and as a consequence, I read every entry. One of the index pages contained in the *Commercial and Financial Chronicle*—the Current Events and Discussion Page—is alphabetical, but occasionally, it listed banking panics under region; therefore, I read every entry.

<sup>20</sup> The newspapers do not need to use the word “run” if the action is described in other terms. For example, “heavy withdrawals” or “a depletion of reserves by depositors”—alternative ways of describing a sharp increased demand for currency by depositors—would be considered runs.

<sup>21</sup> For a bank run or suspension to be treated as part of a cluster, the report containing the bank run or suspension must contain a reference to other bank runs or suspensions or there must be reports of a general panic. This avoids classifying scattered, unconnected bank runs and suspensions as a cluster.

would seem to be a more minor disturbance than a banking panic that involves a generalized loss of depositor confidence throughout many parts of the nation. Separating more localized disturbances from more widespread disturbances clarifies the degree of the panic. Second, geographic extent is measurable and hence, not susceptible to personal discretion. Given the lack of bank-specific data throughout the 1800s, geographic extent provides a measurable criterion for classifying panics according to degree.

However, scaling banking panics according to geographic extent is not a flawless measure of degree. It is entirely plausible that a banking panic could have spanned more than one geographic unit, but have remained a minor disturbance. Consider for example, a banking panic that spanned more than one geographic unit, but that remained confined to a few states with small banking sectors. While such a disturbance might have seriously affected the local economy of those states, a panic of that nature might have been a minor disturbance from the perspective of the overall banking system. To overcome this potential problem, I require that all major banking panics be reported on the front page of the newspaper—the *Niles Weekly Register* for 1825-1849, the *Merchants' Magazine and Commercial Review* for 1842-1879, and the *Commercial and Financial Chronicle* for 1865-1929—to ensure that only the most serious episodes of banking distress are classified as major banking panics.<sup>22</sup>

### **Part III. The New Panic Series and Its Implications**

This section presents the results of the new series on banking panics and its implications. I begin by documenting the incidence of banking panics between 1825 and 1929. I then assess the reliability of earlier series by comparing them to my new series and by reading contemporary news reports surrounding every panic episode on all eight series. Next, equipped with my new series, I document the historical frequency of banking panics. Lastly, I investigate whether banking panics displayed a seasonal tendency prior to 1914 and I examine whether banking panics were correlated with downturns.

#### **3.1 Results**

Table 2 presents the new banking panic series. The new series identifies seven major banking panics and twenty minor banking panics between 1825 and 1929. The seven major banking panics are the following: (1) Nov 1833 – Apr 1834, (2) Mar – May 1837, (3) Oct 1839, (4) Aug – Oct 1857, (5) Sep 1873, (6) May – Aug 1893, and (7) Oct – Nov 1907.

The twenty minor banking panics are the following, with location in brackets: (1) Jan-Apr 1841 [PA, DE, MD, NC, VA], (2) Mar 1842 [PA], (3) May – Jun 1842 [New Orleans], (4) Oct 1851 [NY, NJ, MD], (5) Sep 1854 – Feb 1855 [OH, IN, MI, WI, IA, MO, NY, CA], (6) Nov 1860 [suspension of specie payments by banks in the South,

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<sup>22</sup> By front page, I refer to the first page of the newspaper, with the exception of Index or Contents pages. If the first page of the newspaper is an Index or Contents page, then I treat the first page following the Index or Contents page as the front page.

citywide suspensions in Philadelphia and Baltimore], (7) Dec 1861 [generalized suspension of specie payments], (8) May 1884 [NYC, PA, NJ], (9) Nov 1890 [NYC], (10) Dec 1896 [MN, IL], (11) Dec 1899 [Boston and New York City], (12) Jun – Jul 1901 [Buffalo and NYC], (13) Oct 1903 [PA, MD], (14) Dec 1905 [Chicago], (15) Jan 1908 [NYC], (16) Aug – Sep 1920 [Boston], (17) Nov 1920-Feb 1921 [ND], (18) Jul 1926 [FL, GA], (19) Mar 1927 [FL], and (20) Jul – Aug 1929 [FL]. Documentation of each of these banking panics—with citations to the contemporary news articles reporting them—is contained in section A.1 of the appendix.<sup>23</sup>

The new series contains many banking panics not noted in earlier series. While most of the major banking panic episodes from the new series are noted in earlier series, thirteen of the twenty minor banking panics are not listed in any of the earlier series. Moreover, the new series differs from earlier series in another notable respect: it classifies two of the most commonly cited banking panics—1884 and 1890—as minor. Both the 1884 and 1890 banking panics were localized disturbances confined primarily to New York City.

### **3.2 Inconsistencies in Earlier Series**

A comparison of my new series with earlier series reveals some major inconsistencies. Some series combined panics with other developments in financial markets. Others failed to distinguish among different types of financial panics. A few series even went so far as to incorrectly identify foreign banking panics as domestic ones.

To demonstrate this, consider table 3, which presents the new series on banking panics alongside the eight earlier series for the period 1825-1929. This is a particularly useful comparison since four of the panic series—Bordo-Wheelock, Reinhart-Rogoff, Gorton, and Wicker—explicitly refer to themselves as series on banking panics or banking crises. Entries with strikes through them are panic episodes noted in one of the eight panic series not included in the new series on banking panics. These episodes do not contain banking panics. I consider them one at a time.

1825 and 1847: In both 1825 and 1847, a banking panic occurred in England—not in the United States. The Bordo-Wheelock, Thorp, and Reinhart-Rogoff series list 1825 as a U.S. panic date and the Thorp series lists 1847 as a U.S. panic date. While serious banking panics did occur, they were confined to England in both cases. The reporting of the *Niles Weekly Register* in 1825 contains only a few reports of isolated bank failures in the U.S and the reporting of the *Merchants' Magazine and Commercial Review* in 1847

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<sup>23</sup> Because I am using three different newspapers over the 1825 to 1929 period, a useful check to make sure that the reporting is consistent across newspapers is to see if different newspapers in overlapping periods—periods in which more than one newspaper were in operation—identify the same banking panics. There are two overlapping periods: (1) April 1842 to 1849 (*Niles Weekly Register* and *Merchants' Magazine*) and (2) 1865 to 1869 (*Merchants' Magazine* and *Commercial and Financial Chronicle*). In the two overlapping periods, I arrive at the same results, regardless of which newspaper I use. Between April 1842 and 1849, both the *Niles Weekly Register* and the *Merchants' Magazine* identify just one minor banking panic: the minor banking panic in New Orleans in 1842. Between 1865 and 1869, both the *Merchants' Magazine* and the *Chronicle* do not identify any banking panics.

does not contain any accounts of bank runs, suspensions or failures in the U.S. There was no generalized panic in the U.S. in either year.

April 1864: One version of the Reinhart-Rogoff series lists April 1864 as a banking crisis; however, no banking panic occurred. Instead, a serious disturbance on stock markets erupted following the passage of a law in the U.S. senate designed to force a reduction in the price of gold.<sup>24</sup> According to the press, the measure “excited the liveliest fears...the stock market, under the immense pressure...underwent a severe revulsion.”<sup>25</sup> In reporting the events of April 1864, the editors of the *Merchants’ Magazine* described “one of the most severe revulsions of late years in the stock market.”<sup>26</sup> However, the crisis appears to have been confined entirely to the stock market: there were no reports of any bank runs, suspensions, or failures in April of 1864.

Oct 1896: The Gorton series lists October 1896 as a banking panic; however, no banking panic occurred then. The *Commercial and Financial Chronicle* did not report any banking panics in October 1896. Instead, a minor banking panic—confined entirely to St. Paul, Minnesota and Chicago, Illinois—occurred in December of that year. The panic was small in scope; only 4 banks suspended.

1914: Even though serious financial instability occurred, the events of the summer of 1914 do not constitute a banking panic—according to my definition—since bank runs, suspensions, and failures were avoided. The outbreak of war in Europe dramatically increased the demand for specie and caused a worldwide rush to liquidate stocks, resulting in the closing of the New York Stock Exchange on July 31, 1914. A few days later in early August, fears of a run on the U.S. banking system led to the issuance of emergency currency under the Aldrich-Vreeland Act. The Act flooded the country’s banking system with additional currency to ward off a panic. The measure appears to have been successful: no banking panic materialized in 1914.<sup>27</sup>

Five DeLong-Summers Panics: Five of the twelve DeLong-Summers panic quarters do not contain banking panics: 1896:01, 1896:03, 1898:02, 1903:02, and 1909:04. To verify this, I read the *Commercial and Financial Chronicle* during all of the DeLong-Summers panic quarters. Since no banking panics occurred, why were these five episodes classified as panics? Several of them satisfy the DeLong-Summers panic criterion of a quarter-to-quarter increase of more than one percentage point in the commercial paper rate—a potentially important development in financial markets, but not necessarily an indicator of a financial panic.<sup>28</sup>

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<sup>24</sup> Due to increased borrowing to finance wartime expenditures, the price of gold had seriously increased.

<sup>25</sup> *Merchants’ Magazine and Commercial Review*, May 1864, “Commercial Chronicle and Review,” p. 364.

<sup>26</sup> Page 363.

<sup>27</sup> This episode is contained on the Gorton and Reinhart-Rogoff series. However, Reinhart and Rogoff acknowledge in a brief summary of the episode that a banking crisis was avoided in 1914: “a banking crisis was avoided by flooding the country with emergency currency to prevent hasty withdrawals” (Reinhart and Rogoff, p. Table A5-18).

<sup>28</sup> Three of these five episodes—1896:1, 1896:3, 1898:2—satisfy the criterion of a quarter-to-quarter increase in the commercial paper rate of more than one percentage point. Presumably, they were classified as panics on that basis. The other two panic quarters—1903:2 and 1909:4—do not satisfy the DeLong-Summers criterion of a quarter-to-quarter increase of one percentage point in the commercial paper rate.

Twenty-One Kemmerer Panics: Table 3 makes it clear that the Kemmerer series should never be used or interpreted as a series on banking panics: more than two-thirds of Kemmerer's panic episodes do not contain banking panics. Eight of the twenty-nine Kemmerer panic episodes contain banking panics—Sept 1873, May 1884, Nov 1890, May-Aug 1893, Dec 1896, July 1901, and Oct 1907—whereas the remaining twenty-one do not contain banking panics. To verify this, I read the *Commercial and Financial Chronicle*—Kemmerer's source in identifying panics—during all of Kemmerer's panic episodes. Since no banking panics occurred, why did Kemmerer classify these twenty-one episodes as panics? A reading of the *Chronicle* provides a hint: many of Kemmerer's episodes coincided with reports of instability in the stock market. This raises the possibility that Kemmerer combined banking panics with stock market disturbances in one series or that Kemmerer's panic series was intended to serve as a series on stock market panics, with these eight banking panic episodes simply coinciding with stock market panics. However, because Kemmerer never clearly explained what kind of financial disturbance he included as a panic, it is unclear which of these two interpretations most accurately applies to his series. Moreover, even if Kemmerer had intended his series as a series on stock market panics, it is unlikely that he constructed it in a consistent way. Kemmerer relied on the reporting of the *Chronicle*—rather than on stock market indices or other quantitative evidence—to identify his episodes. Deciphering the magnitude of declines in stock prices or the magnitude of instability in stock markets from the qualitative reporting of the *Chronicle* is likely to be highly unreliable. This might, in part, explain the cautionary messages—outlined in section 1.3—that Kemmerer provided regarding the accuracy of his series.

### **3.3 Frequency of Banking Panics**

Table 4 presents the frequency of banking panics. Frequencies are calculated by dividing number of years by number of panics. To differentiate the pre-Federal Reserve era from the post-Federal Reserve era, I calculate pre-1914 and 1914 to 1929 frequencies.

Before 1914, major banking panics occurred at a rate of one major banking panic every 12.9 years and minor banking panics occurred at a rate of one minor banking panic every 6 years. It should be noted, however, that the occurrence of three major banking panics during the 1830's increases the rate of major banking panics—by contrast, the median number of years separating major banking panics is sixteen. Between 1914 and 1929, minor banking panics occurred at a rate of one every 3.5 years. No major banking panics occurred between 1914 and 1929.

The conventional wisdom on the historical frequency of panics is that the frequency of panics was high before 1914 and that the frequency dramatically decreased between 1914 and 1929—that is, during the first fifteen years of the existence of the Federal Reserve. However, as it turns out, much of this was based on an unreliable panic series. According to my new series on banking panics, there is no evidence of a decline in the frequency of panics during the first fifteen years of the existence of the Federal Reserve.

The perception in the literature that panics before 1914 were frequent and recurring comes from the Kemmerer series. Using the Kemmerer series, Miron (1986) argues that

major panics occurred at a rate of one every three years. If minor panics are included, then the rate—according to Miron—increases to more than one panic per year.<sup>29</sup> Romer (1999)—also relying on Kemmerer’s listing of panics—concludes, “financial panics were ubiquitous before World War I.”<sup>30</sup> Meltzer (2003), drawing on the findings of these earlier studies, writes in his *History of the Federal Reserve*, “financial panics...were much too frequent [before 1914].”<sup>31</sup> However, for reasons previously described, the Kemmerer series presents an unreliable listing of panics, rendering any conclusions formulated on the basis of that series highly questionable.

Moreover, the perception in the literature that the frequency of financial panics decreased between 1914 and 1929 is also based on the Kemmerer series. It originates with Miron (1986), who used the Kemmerer series to document the incidence of panics prior to 1914. Between 1890 and 1908, Kemmerer identified six major panics, permitting Miron to conclude that the probability of having a major panic in a given year was 0.316. By contrast, Miron then claims that between 1915 and 1929, the banking system did not experience any financial panics.<sup>32</sup> Using the pre-1914 frequency of major panics derived from the Kemmerer series, Miron calculates that the probability of going fourteen years—from 1915 to 1929—without a major panic was 0.005. On the basis of this evidence, Miron concludes that the Federal Reserve’s policies of furnishing an elastic currency—one that could expand during seasons of high money demand and contract during seasons of low money demand—strengthened the nation’s banking system to ward off panics, resulting in this purported dramatic reduction in the frequency of panics between 1914 and 1929. This claim has subsequently been picked up by others and is now widely circulated in the literature.<sup>33</sup>

However, Miron’s claim hinges on the Kemmerer series. According to my new series on banking panics, it was not uncommon for fifteen consecutive years to elapse without a major panic. Eighteen years separated the major banking panics of 1839 and 1857, sixteen years separated the major banking panics of 1857 and 1873, twenty years separated the major banking panics of 1873 and 1893, and fourteen years separated the major banking panics of 1893 and 1907. Moreover, the median number of years separating major banking panics between 1825 and 1914 was 16. Therefore, the absence of a major panic for fifteen consecutive years—from 1914 to 1929—provides no support

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<sup>29</sup> Miron writes, “If only major panics are included, the frequency was slightly more than one every three years. Including minor panics raises the frequency to more than one per year” (p. 131).

<sup>30</sup> Page 38.

<sup>31</sup> Page 9.

<sup>32</sup> “Between 1915 and 1933, the banking system experienced financial panics only during the subperiod 1929-33” (Miron, page 131).

<sup>33</sup> For example, Bordo (1989) writes, “financial panics in the United States before 1914 generally occurred at seasonal peaks in nominal interest rates...After 1914, however, the Fed extended reserve bank credit to accommodate seasonal credit demands, thereby considerably reducing the amplitude of the seasonal interest rate cycle and preventing any panics from occurring between 1914 and 1929” (page 40). Meltzer (2003) also references this: “In the 1920s, the Federal Reserve received credit for improving economic performance...Although the economy continued to experience relatively large cyclical fluctuations and many banks failed, old style financial panics did not return in the three recessions from 1920 through 1927” (page 9).

for the claim that the frequency of panics decreased during the first fifteen years of the existence of the Federal Reserve.<sup>34</sup> Prior to 1914, recurring periods of 14 to 20 years without a major banking panic were the norm.

Broadening the analysis to incorporate minor banking panics does not provide support to the claim of a reduction in the frequency of panics between 1914 and 1929. Between 1825 and 1914, minor banking panics occurred at a rate of one every 6 years. By contrast, between 1914 and 1929, minor banking panics occurred at a rate of one every 3.5 years. If anything, these results indicate that there was an increase—rather than a decrease—in the frequency of minor banking panics between 1914 and 1929.

### **3.4 Seasonality of Major Banking Panics**

An additional result of the new series is the seasonality of major banking panics. Consider Table 5, which documents the seasonality of banking panics before the founding of the Federal Reserve. There is a strong tendency for major banking panics of this era to break out during the fall or spring. Six of the seven major banking panics—or 86%—began in a fall or spring month. Four broke out during the fall—the Panic of 1833 (November), the Panic of 1839 (October), the Panic of 1873 (September), and the Panic of 1907 (October)—and two broke out during the spring—the Panic of 1837 (March) and the Panic of 1893 (May). The sole exception—the Panic of 1857—began during the last week of August, but became more intense during the fall months of September and October. Thus, there is strong evidence that major banking panics were more likely to occur during particular seasons: six of the seven major banking panics began during the spring or fall.<sup>35</sup>

These results support the hypothesis that the Federal Reserve's policies to eliminate seasonal stringencies in the money market—the establishment of an elastic currency that could expand and contract when needed—had a stabilizing influence on the nation's banking system between 1914 and 1929. Even though it was noted in the previous section of this paper that the frequency of panics did not decline during the first fifteen years of the existence of the Federal Reserve, its policies still might have helped strengthen the nation's banking system to ward off panics. The true counterfactual—the incidence of panics from 1914 to 1929 without the Federal Reserve's policies—is unobservable. Nevertheless, the general tendency of major banking panics to occur during those seasons characterized by stringent monetary conditions before 1914 suggests that the establishment of an elastic currency following the founding of the Federal Reserve likely helped stabilize the banking system. Miron (1986), however, overstated the evidence in support of this hypothesis by employing the Kemmerer series to document the frequency and seasonality of panics before the founding of the Federal Reserve.

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<sup>34</sup> The next major banking panic—the first one of the Great Depression—occurred in 1930, sixteen years after the founding of the Fed.

<sup>35</sup> Minor banking panics were not much more likely to occur during the fall or spring: 53% broke out during the fall or spring, whereas 47% broke out during the summer or winter. See table 6.



### **3.5 Correlation with Downturns**

A final trend that merits attention is the strong correlation between major banking panics and downturns. Table 6 presents the behavior of the Davis Index of Industrial Production surrounding every major banking panic between 1825 and 1914. The Davis Index is the only consistent output series that spans the entire pre-WWI U.S. economy. Davis (2004) used 43 quantity-based annual series in the mining and manufacturing sectors to compile his index. According to Davis, these series “indirectly represent close to 90 percent of the value added produced by the U.S. industrial sector during the nineteenth century” (p. 1179). Consequently, it serves as a reliable measure of real economic activity. Its chief limitation is that it is available at only a yearly frequency.

Table 6 shows that the Davis index declines surrounding each panic episode. The correlation between major banking panics and downturns is clear. These results stand in stark contrast to those of DeLong and Summers (1986) who do not find a strong link between downturns and panics using their series.

However, the existence of a correlation between panics and downturns does not prove that panics have real output effects since panics might be consequences—rather than causes—of downturns. To identify the output effects of panics, a stronger test is required.

## **Part IV. The Macroeconomic Effects of Banking Panics**

Equipped with the new panic series, this section conducts a test to identify the output effects of major banking panics. The main problem in identifying the output effects of panics is the possibility that panics might be consequences—rather than causes—of downturns. To overcome this concern, I study the output effects of major banking panics that the reports of contemporary observers suggest were the result of idiosyncratic disturbances, as opposed to declining output conditions. I then investigate three related issues: (1) the role of panics as a source of economic instability before the founding of the Fed, (2) how downturns with major banking panics differed from downturns without them, and (3) whether the effects of panics persist over time.

### **4.1 Development of the Empirical Test**

#### **Restriction of Test to Major Banking Panics**

To begin, I limit my test on the real output effects of banking panics to major banking panics. I exclude minor banking panics due to data limitations. The existing historical series on real economic activity are available at a national level, making an assessment of the effect of major banking panics on aggregate output feasible. By contrast, an assessment of the real effects of minor banking panics, which tend to be more localized disturbances, would require regional data on output. Unfortunately, such data are unavailable throughout most of U.S. history. This does not mean that localized banking panics did not have significant real effects for the U.S. economy. However, any evidence of the output effects of localized panics would likely be muddled in national

statistics on output, making a statistical analysis of the real effects of localized panics very noisy. As a consequence, I confine my test to major banking panics.

### The Identification Problem

Table 6, which presents the behavior of the Davis Index of Industrial Production surrounding every major banking panic between 1825 and 1914, shows that there is a clear correlation between major banking panics and output declines. However, as noted earlier, this information by itself does not prove that panics have real output effects. If panics are products of recessions, then deteriorating economic conditions might be causing panics, rather than vice versa. Mitchell (1941) and Fels (1959) provide the main articulation of this hypothesis.<sup>36</sup> They argue that major recessions cause panics. During downturns, business failures and declining fundamentals cause depositors to become alarmed that banks will suspend or fail. This precipitates a run to convert deposits into currency, thereby generating a panic. Under this specification, it would be misleading to attribute output declines to panics since panics would be products of downturns rather than causes.<sup>37</sup>

Unfortunately, data limitations for the pre-Great Depression era make this identification problem even worse. Many of the output series dating back to the 1800s are available at only a yearly frequency, making it difficult to identify whether panics preceded downturns or occurred in the midst of downturns.<sup>38</sup> If time series data on output were available at a greater frequency, it might be possible to identify the timing of panics in relation to the timing of output declines. If, for example, panics precede output declines, then it might be possible to conclude that panics caused the output declines, rather than vice versa. But in the absence of such data, this is not possible.<sup>39</sup>

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<sup>36</sup> Gorton (1988) terms this the Recession Hypothesis.

<sup>37</sup> These issues are particularly relevant in the debate on the causes of the Great Depression. Friedman and Schwartz (1963) argue that a wave of banking panics turned a relatively normal downturn into a much more severe depression. However, Temin (1976) challenges the Friedman and Schwartz view, distinguishing between two possibilities:

“The assertion is that the banking panics turned a short depression into a sustained decline in national income. The question to be examined here is whether the banking panics were independent of the fall in income or a result of this fall” (p. 83)

Friedman and Schwartz place special emphasis on the banking panic of October 1930, the first major banking panic of the Great Depression, arguing that “in October 1930, the monetary character of the contraction changed dramatically” (p. 308). As a result, Temin focuses his analysis on this panic episode. He concludes that agricultural distress—which was, he argues, a component of the depression—caused the banking panic of 1930. In Temin’s view, the banking panics of the Great Depression were consequences—rather than causes—of the depression.

<sup>38</sup> The Miron-Romer Index of Industrial Production, the first, reliable monthly series of industrial production, begins in 1884. Monthly data on pig iron production begin in 1877. Monthly data on bank clearings begin in 1854 and have often been used as an indicator of business activity. However, they are not useful for the purposes of this paper since bank clearings are a measure of banking activity, rather than a direct measure of output. Using bank clearings to draw conclusions regarding the output effects of banking panics could therefore lead to spurious results.

<sup>39</sup> Moreover, while the availability of output data at a greater frequency would certainly be helpful in determining whether panics preceded downturns, such information, by itself, might not be enough to solve

As a consequence, to assess whether panics have real output effects, other evidence is required. If panics are caused by recessions, then it might be difficult to disentangle the output effects, if any, of a panic. However, if panics are caused by idiosyncratic disturbances, as opposed to declining output conditions, then it would be straightforward to identify the output effects of a panic. Under this latter scenario, a test of whether panics have real output effects is simply to see if real economic activity declines following the outbreak of these panics.

When a purely statistical analysis falls short, the potential benefits of drawing on other sources become especially useful. Of particular relevance, financial and economic newspapers from the 1825 to 1914 period contain detailed commentaries by economic observers that clarify many of the issues left unanswered by a strictly quantitative analysis. In many instances, the economic press isolate the panic's primary causes, making it easier to determine whether the panic was caused by a downturn or by some other disturbance.

Moreover, in the absence of more frequent time series data on output, the newspaper records are helpful in shedding light on the appropriate ordering of events. Did panics predate downturns or did they occur in the midst of declining economic conditions? According to the Mitchell and Fels framework, major recessions cause panics because depositors become alarmed by declining fundamentals. In this framework, newspaper reports should reflect these deteriorating economic conditions and serve as a signal to depositors that fundamentals are declining. An examination of the news reports of economic conditions provides an assessment of how the public viewed the state of the economy surrounding each panic episode. According to the press, were economic conditions prosperous on the eve of the panic? Or were they declining? Did the press describe deteriorating economic fundamentals? Or was the state of the economy described as strong?

### The Test

To overcome this identification problem, I conduct the following test. I read the newspaper records surrounding every major banking panic between 1825 and 1914 to identify those panics that were caused by idiosyncratic disturbances, as opposed to declining output conditions. I then use these episodes to empirically identify the output effects of panics. The test of whether panics have real output effects is simply to see if real economic activity declines following the outbreak of these panics.<sup>40</sup>

The newspapers used in this study are contemporary financial and economic periodicals from the 1825-1914 period. In particular, I employ the following newspapers: *Niles Weekly Register* (1825-1849), *The New York Commercial Advertiser* (1825-1857), the *Merchants' Magazine and Commercial Review* (1839-1869) and *The Commercial and*

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the identification problem since bad news about future output conditions could generate a panic even before output begins to decline.

<sup>40</sup> The test is similar in spirit to the "narrative approach" of Romer and Romer (1989) that seeks to identify the real effects of monetary policy.

*Financial Chronicle* (1865-1914). These periodicals were among the leading economic and financial newspapers of their day.

I read the newspaper records surrounding major banking panics to accomplish two goals: (1) to identify the causes of panics and (2) to identify the state of the economy when the panic broke out. The reasons for this are simple. In assigning causes to panics, contemporary observers may be able to pinpoint the forces that precipitated depositor anxiety and that led to a panic. In reporting the state of the economy, the press may be able to clarify whether there were indications of a major recession on the eve of the outbreak of panic. Both pieces of information are helpful in determining whether a panic was caused by a downturn or by some other disturbance.

The newspaper records are incredibly useful in identifying the causes of panics. Descriptions of events leading up to panics and reports by contemporary economic observers help to identify a panic's primary causes. Moreover, these records provide a gauge of market participants' contemporaneous beliefs regarding the causes that led to a panic. Did depositors panic because there were growing signs of a depression or did they panic in response to some other disturbance?

In addition, it is straightforward to determine how the press perceived the state of the economy when a panic broke out. Many of the newspapers used in this study contained sections that described general macroeconomic trends on a regular basis: "The Commercial Epitome" in the *Commercial and Financial Chronicle*, "The Commercial Chronicle and Review" in the *Merchants' Magazine and Commercial Chronicle*, and "Review of the Market" in the *New York Commercial Advertiser*. Given the lack of data available to the economic press of the 19<sup>th</sup> and early 20<sup>th</sup> centuries, reporting of general macroeconomic trends clearly lacked the precision to which we are accustomed today. However, the economic press did have correspondence with the leading industrial and manufacturing centers of the country, allowing them to make broad generalizations regarding macroeconomic developments. Most importantly, the reporting by the press reveals the kinds of signals being sent to the public regarding the overall health of the economy. If depositors became alarmed that a recession would cause banks to fail, then such signals would have been present in the news reporting.

Therefore, I employ newspaper records to separate banking panics that were caused by downturns from those that were caused by other disturbances. However, since I will be relying on newspaper accounts, there may be varying degrees of certainty across panic episodes. In some cases, the causes of a panic might be clear and obvious, whereas in other cases, the causes might be more ambiguous. Hence, to reflect these varying degrees of certainty, I will be classifying panics along a two-dimensional scale. The scale ranges from 1 to 3. Figure 1 presents a visual representation of this scale.

On the first dimension, I classify panics according to reported causes. I read the newspaper records surrounding banking panics to identify the events or forces that contemporary observers cited as primary causes of the panic. If the newspaper records identify an event unrelated to output fluctuations as the primary cause of the panic, then I assign the panic a 3. Examples of events that might precipitate a panic, but that are likely to be unrelated to output fluctuations include political decisions, the failure of a

mismanaged bank, and international contagion. A political decision that causes a change in market expectations regarding the stability of the banking sector, the failure of a mismanaged bank and a subsequent contagion of fear generated in the aftermath of such a failure, or a panic abroad that triggers financial instability at home are all events that might generate a panic, but that are likely to be unrelated to movements in domestic output conditions. If the newspaper records identify any of these events—political decisions, failure of a mismanaged bank, or international contagion—as the primary cause of the panic, then I assign the panic a 3.

By contrast, if the newspaper records identify output fluctuations as the primary cause of the panic, then I assign the panic a 1. A banking panic caused by depositor anxiety that a major recession will cause banks to fail or suspend would be a prime example of a panic that would receive a 1 on the first dimension of the scale.

On the second dimension of the scale, I classify panics according to the state of the economy when the panic broke out. I read the descriptions of economic conditions on the eve of the outbreak of panic.<sup>41</sup> If the newspaper records characterize economic conditions as “prosperous” on the eve of the outbreak of panic, then I assign the panic a 3. If the newspaper records characterize the state of the economy as in “depression” or in “recession” on the eve of the outbreak of panic, then I assign the panic a 1.<sup>42</sup>

Moreover, on both dimensions, there is an intermediate category 2, which is reserved for ambiguous situations in which the newspaper records are not definitive in assigning causes or in characterizing the state of the economy. If the newspaper records identify both a downturn as well as other events that are unrelated to output fluctuations as primary causes of the panic, then the panic is assigned a 2 on the first dimension. If the newspaper records do not clearly characterize economic conditions either as “prosperous” or as in “depression/recession,” then the panic is assigned a 2 on the second dimension.

Lastly, in situations where the newspaper records are uninformative in identifying causes or in characterizing the state of the economy, I simply exclude the panic from the ranking. This occurs when the newspaper records do not seem to know what caused the panic and are in widespread disagreement or when the newspaper records simply do not contain descriptions of the state of the economy on the eve of the outbreak of panic.

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<sup>41</sup> To determine whether the press reported positively or negatively on the state of the economy before the outbreak of panic, I read the following articles for the two months immediately preceding the panic: “The Commercial Epitome” in the *Commercial and Financial Chronicle*, “The Commercial Chronicle and Review” in the *Merchants’ Magazine and Commercial Chronicle*, and “Review of the Market” in the *New York Commercial Advertiser*.

<sup>42</sup> The reason for classifying panics on this second dimension is simple: it provides an additional filter to separate panics that may have been caused by downturns from those that were not. For example, consider a panic that broke out in the midst of declining economic conditions. If contemporary observers attributed the panic to an event unrelated to these declining output conditions, then the panic would receive a 3 on the first dimension of the scale. However, the panic’s occurrence in the midst of declining economic conditions calls into question whether contemporary observers were accurate in dismissing the role of deteriorating economic activity in aggravating depositor unrest. Therefore, classifying panics according to the state of the economy when the panic broke out provides an additional criterion to weed out panics that may have been caused by output fluctuations from those that were not.

## **4.2 The Classification**

Between 1825 and 1929, there were seven major banking panics: 1833, 1837, 1839, 1857, 1873, 1893, and 1907. Table 7 presents the classification of these major banking panics on the scale. Three important observations should be noted. First, three banking panics—the panics of 1833, 1857, and 1873—received a 3 on both dimensions of the scale—that is, they did not break out in the midst of a downturn and they were not caused by output fluctuations, according to the newspaper records. These episodes serve as ideal candidates to identify the output effects of banking panics.

Second, no banking panics received a 1 on the first dimension of the scale—that is, none were attributed exclusively to a downturn. However, that should not be interpreted to mean that none of these banking panics were caused by downturns. Panics that received a 2 on the first dimension—the Panic of 1907—fell on the median category, meaning that the newspaper records identified both a downturn and another disturbance as causes. Moreover, even though the Panic of 1893 received a 3 on the first dimension of the scale, it received a 1 on the second dimension because the newspaper records reported deteriorating economic conditions when the panic broke out, raising the possibility that declining output conditions played a role in the outbreak of that panic.

Third, the newspaper accounts were particularly unhelpful in classifying two of the major banking panics—the panics of 1837 and 1839. Contemporary observers were in widespread disagreement regarding the causes of these panics. In addition, the press failed to provide descriptions of economic conditions on the eve of the outbreak of these panics. For these reasons, I omit these two panics from the scale.

In this section, I describe the classification of panics on this scale. Due to space constraints, I present a condensed version. For a more detailed treatment of each panic and for more extensive documentation, see section A.2 of the appendix.

### **Dimension 1: Reported Causes**

#### **Panic of 1833: Political Decision**

According to the newspaper records, a political decision—the withdrawal of the government deposits from the Bank of the United States—caused the Panic of 1833. Chartered in 1816, the Bank of the United States served as the country’s fiscal agent, promoted a more uniform national currency, and aided the economy in times of distress. Accordingly, many historians view the Bank of the United States as a quasi-central bank. However, for ideological reasons, President Andrew Jackson was a consistent opponent of the Bank of the United States throughout the course of his presidential administration. As a consequence, Jackson decided to remove the government deposits from the Bank of the United States, beginning on October 1, 1833. Shortly thereafter, confidence in the Bank of the United States and in the overall banking system became impaired, precipitating runs. Fears that the country’s quasi-central bank would be weakened and that the nation’s banking system might be destabilized were widely reported by the press.

The newspaper records attribute the panic's origins to the destruction of "aggregate individual confidence"<sup>43</sup> following the removal of the government deposits from the Bank of the United States.

#### Panic of 1837 and Panic of 1839: Records in Widespread Disagreement

The newspaper records were in widespread disagreement regarding the causes of the Panics of 1837 and 1839. Indeed, a range of causes was provided for both panics. For the Panic of 1837, some reports identified political decisions of the Jackson administration as causes, whereas others identified years of unstable activity in the banking sector as the primary cause. For the Panic of 1839, some reports identified misguided decisions of banking authorities as the cause of the panic, whereas others identified the weak economic conditions prevailing since the prior panic as the primary cause. In 1839, the editors of the *Niles Weekly Register* described the uncertainty they felt regarding the causes of the panic, "we are too much in the dark as to the immediate cause of the catastrophe, to venture a decided opinion on the causes which produced it."<sup>44</sup>

#### Panic of 1857: Failure of Mismanaged Bank

The catalyst for the Panic of 1857 was the failure of the Ohio Life Insurance Company. Its failure was attributed to mismanagement and fraudulent activities.<sup>45</sup> The collapse of this banking firm triggered the panic. The Ohio Life was considered one of the most reputable firms in the nation and initially, the cause of its failure was unknown. Its demise shocked the financial community and sparked runs on banks throughout the country. Over the succeeding weeks, fear spread and the panic gained in intensity. The news reports identify this contagion of fear following the failure of the Ohio Life as the cause of the panic.

#### Panic of 1873: International Contagion

The panic of 1873 had its origins abroad. In May, a stock market crash in Vienna caused European investors to dispose of their holdings of American securities, and especially, their holdings of railroad bonds, the leading American security traded internationally. As a consequence, domestic markets became overloaded with railroad bonds to such a large degree that new bond sales could no longer be realized, cutting off the resources of many railroad companies and forcing several of them to default on interest payments. Over time, this precarious financial situation, along with the failure of some minor firms associated with the railroad sector, generated a feeling of distrust toward the railroad industry. On September 18, 1873, the failure of Jay Cooke and

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<sup>43</sup> *New York Commercial Advertiser*, Jan 6, 1834, "Correspondence for the Commercial Advertiser".

<sup>44</sup> *Niles Weekly Register*, Oct 26, 1839, "Suspension of Specie Payments," p. 139.

<sup>45</sup> Edward Ludlow, the director of its New York office, loaned \$2 million, an amount that equaled the firm's capital, to several railroad companies, with a significant proportion being loaned to the struggling Cleveland & Pittsburgh road. Following the bank's suspension, Charles Stetson, the president of the company, seemed to be unaware of Ludlow's activities and immediately launched an investigation. The extent of Ludlow's mismanagement is still unclear—charges that his activities involved fraud and that he stole money for his own devices were leveled against him.

Company, a prominent banking company with connections to several railroad companies, unleashed the panic. The newspaper records identify international contagion as the cause of the panic: international forces—the unloading of American railroad securities abroad—produced financial instability at home, resulting in a panic.<sup>46</sup>

#### Panic of 1893: Political Decision

The *Commercial and Financial Chronicle* attributed the outbreak of panic in 1893 to the Sherman Silver Purchase Act of 1890, a measure passed by pro-silver forces in the U.S. Congress. The Act's intended objectives centered on curbing deflation to improve the plight of debt-laden farmers; however, according to the press, it failed to achieve its goals and instead, served primarily to weaken the U.S. commitment to the gold standard. The Sherman Silver Act mandated that the U.S. government purchase 4.5 million ounces of silver bullion every month with notes that could be subsequently redeemed in either gold or silver—a requirement that over time, impaired the government's gold reserves and sparked doubts at home and abroad that the U.S. would remain on the gold standard. Fears that the U.S. would be forced onto a silver standard became self-fulfilling as foreign investors began withdrawing gold from the country in large quantities. Gold exports, coupled with growing anxiety over the U.S. commitment to the gold standard, undermined confidence in the nation's banking system, resulting in runs by nervous depositors that led to a panic. The newspaper records identify the Sherman Silver Purchase Act—a political decision—as the cause of the panic.<sup>47</sup>

#### Panic of 1907: Mixed Causes (Downturn or Mismanagement/Fraudulent Banking Activity)

The actions of a group of New York City financiers, with controlling interests over several banks, triggered the panic of 1907. The group misappropriated bank funds to speculate on rising copper prices. The gamble proved to be a mistake. Copper prices collapsed and news of these events triggered runs on the banks implicated in the speculation. Rumors that other banks and trust companies might be connected to the speculators unsettled public confidence and a panic quickly spread throughout the city. Within a few days, the panic spanned most of the country. What caused the panic? The *Commercial and Financial Chronicle* identified two causes. For one, the *Chronicle* identified this fraudulent banking activity as a cause. But for another, the *Chronicle* also identified growing signs of a recession as an additional force that undermined confidence. The editors of the *Chronicle* wrote, “The more immediate causes for the upheaval deserve narration here...There were...multiplying evidences of a reaction in the iron and steel trades and of recession in general business.”<sup>48</sup>

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<sup>46</sup> “Report of the Comptroller of the Currency” in the *Commercial and Financial Chronicle*, Dec 6, 1873, p. 767-768. See the appendix for more details.

<sup>47</sup> *Commercial and Financial Chronicle*, Aug 12, 1893, “The Financial Situation,” p. 232; *Commercial and Financial Chronicle*, Aug 5, 1893, “Is It the Balance of Trade or the Silver Law,” p. 199.

<sup>48</sup> *Commercial and Financial Chronicle*, Nov 2, 1907, “Review of October,” p. 22.



## **Dimension 2: State of the Economy**

### Panics of 1833, 1857, and 1873: Prosperity

Prior to the outbreak of the Panics of 1833, 1857, and 1873, economic conditions were prosperous, according to the newspaper records. On the eve of the Panic of 1833, commentators were describing “the unexampled prosperity of the year”<sup>49</sup> and were reporting, “every thing has the appearance that an early and extensive fall business will be done.”<sup>50</sup> On the eve of the Panic of 1857, the *Merchants’ Magazine* noted, “the country continues prosperous,”<sup>51</sup> and the *New York Commercial Advertiser* reported, “The general business of the country is in a good condition, presenting both present and prospective, a most healthy appearance.”<sup>52</sup> On the eve of the Panic of 1873, the newspaper records noted, “business has been large and a cheerful tone pervades mercantile circles,”<sup>53</sup> and the Comptroller of the Currency reported, “there were in almost every direction evidences of prosperity.”<sup>54</sup> Indeed, by all accounts, economic conditions were prosperous prior to the outbreak of these panics.<sup>55</sup>

### Panics of 1893 and 1907: Depression/Recession

Prior to the outbreak of the Panics of 1893 and 1907, economic conditions were declining, according to the newspaper records. On the eve of the outbreak of the Panic of 1893, there were reports of many business and mercantile failures and the *Commercial and Financial Chronicle* made general references to an “existing depression.”<sup>56</sup> On the eve of the outbreak of the Panic of 1907, there were reports of large increases in commercial failures and the press made frequent references to an “existing depression”<sup>57</sup> and to a “recession in business.”<sup>58</sup> The newspaper records suggest that these two panics occurred in the midst of a downturn.

### Panics of 1837 and 1839: No Clear Descriptions

In contrast to the reporting of other panics, the press failed to provide descriptions of economic conditions on the eve of the outbreak of these two panics. The section in the

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<sup>49</sup> *New York Commercial Advertiser*, Wed Oct 2, 1833, p. 2.

<sup>50</sup> *New York Commercial Advertiser*, Aug 17, 1833, “Review of Market.

<sup>51</sup> *Merchants’ Magazine and Commercial Review*, “Commercial Chronicle and Review,” September 1857, p. 325.

<sup>52</sup> “Cincinnati Gazette of Tuesday, Aug 25” in *New York Commercial Advertiser*, August 27, 1857.

<sup>53</sup> Sept 13, 1873, *Commercial and Financial Chronicle*, “Commercial Epitome,” p. 358.

<sup>54</sup> “Report of Comptroller of the Currency” in the *Commercial and Financial Chronicle*, Dec 6, 1873, p. 767-768.

<sup>55</sup> For more accounts, see the appendix.

<sup>56</sup> *Commercial and Financial Chronicle*, June 10, 1893, “The Financial Situation,” p. 946 and *Commercial and Financial Chronicle*, May 13, 1893, “The Depression in the Iron and Steel Trades,” p.775.

<sup>57</sup> *Commercial and Financial Chronicle*, Oct 5, 1907, “The Financial Situation,” p. 826-8.

<sup>58</sup> *Commercial and Financial Chronicle*, Nov 2, 1907, “Review of October,” p. 22.

*New York Commercial Advertiser* that described economic conditions—the “Review of the Market”—was discontinued in 1837 and in 1839.

### **4.3 The Effect of Banking Panics on Output and Prices**

Equipped with my classification of panics, I analyze the impact of banking panics on output. I estimate the relationship between banking panics and output under a variety of restrictions. Then, I investigate the impact of banking panics on inflation and the price level.

#### **Output**

*Methodology.* To determine how output behaves following banking panics, I regress output growth on a constant, lagged values of output growth, a panic dummy and lagged panic dummies. I include lagged values of output growth to model the normal behavior of output. I include contemporaneous and lagged panic dummies to measure the direct impact of a panic on output growth. To measure output, I use the Davis Index of Industrial Production.

I estimate the following regression:

$$\Delta y_t = a_0 + \sum_{k=0}^3 b_k P_{t-k} + \sum_{j=1}^3 c_j \Delta y_{t-j} + e_t$$

where  $y$  is the log of the Davis Index of Industrial Production and  $P$  is a panic dummy.<sup>59</sup> I estimate three different specifications of the above regression, with each specification corresponding to a distinct restriction on the panic dummy variable. In the first specification, I include panics that received a 3 on the first dimension of the scale in the panic dummy, in the second, I include panics that received a 2 or a 3 on the first dimension and in the third, I include only those panics that received a 3 on both dimensions of the scale. The first specification presents the baseline case in which all panics that received a 3 on the first dimension of the scale—those that the newspaper records attribute to events unrelated to output fluctuations—are included in the panic dummy variable. The second specification takes into account the possibility that panics that received a ranking of 2 on the first dimension of the scale were, in fact, not caused by output fluctuations. The third specification presents the most restrictive case in which only panics that received a 3 on both dimensions of the scale—those that did not break out in the midst of a downturn and that were not caused by output fluctuations, according to the newspaper records—are included in the panic dummy. The sample period is 1825 to 1915, the final year of the Davis Index of Industrial Production.

*Results.* Table 8 presents the estimates. In all three specifications, the coefficients on the first lag of the panic dummy are negative and statistically significant. The

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<sup>59</sup> This empirical framework can be thought of as a VAR with a single variable (log change in output) and with an exogenous variable (the panic dummy). It is similar to the framework used by Romer and Romer (1989, 2004) to identify the effects of monetary policy and to the framework used by Ramey (2008), Ramey and Shapiro (1998), and Romer and Romer (2008) to identify the effects of fiscal policy.

coefficient is -0.102 in specification 1, -0.130 in specification 2, and -0.091 in specification 3, indicating that output growth declines by approximately nine to thirteen percentage points in the year following a major banking panic. The respective t-statistics are -2.86 (p-value = 0.005), -4.30 (p-value < 0.001), and -2.14 (p-value = 0.035).

The impulse response functions implied by the estimated regressions are shown in figure 2. They map out the implied response of output to a unit shock in the panic dummy variable. The figures contain one standard error bands. The impulse response functions show that panics have large and significant effects on output. In the contemporaneous year, output remains roughly constant: it increases slightly in the third impulse response function—an increase that is statistically insignificant from zero—and decreases modestly in the first and second impulse response functions. However, in the year following the panic—year 1, there is a large decline in output: 13.3 percent according to the first impulse response function, 15.5 percent according to the second, and 8.3 percent according to the third. The impact remains fairly constant in years 2 and 3, decreasing slightly in year 2, but then increasing again in year 3. The results are robust across all three specifications.<sup>60</sup>

*Case Studies: The Panics of 1893 and 1907.* The first reliable monthly series of industrial production—the Miron-Romer Index of Industrial Production—is available beginning in 1884.<sup>61</sup> It permits an assessment of how output behaves in the months surrounding a panic—an assessment that is not possible using an annual index.

The Miron-Romer index spans two major banking panics: the panics of 1893 and 1907. Tables 9 and 10 present the seasonally adjusted Miron-Romer index of industrial production for the six months surrounding these two panics. The panic months are in bold. According to the newspaper records documented in section 4.2, there were reports in the press of declining economic conditions on the eve of the outbreak of both of these panics. There is some evidence of this in Tables 9 and 10. In April 1893, the month before the panic of 1893, industrial production declined by 0.97% and in August and September of 1907, the two months prior to the panic of 1907, industrial production declined by 1.27% and 2.02%, respectively.

However, in both 1893 and 1907, there was a sharp increase in the rate of decline in industrial production during the panic months. During the panic of 1893, industrial production declined by 2.01% in May, 1.22% in June, 4.13% in July, and 2.89% in August. During the panic of 1907, industrial production declined by 3.45% in October and 4.45% in November. Moreover, following both of these panics, there was a

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<sup>60</sup> To ensure that these results hold across a variety of specifications, I conduct several additional robustness checks. First, including the Panic of 1837 and the Panic of 1839—the two panics excluded from my ranking—in the panic dummy does not change the results in any of the three specifications. If anything, the results become more significant with their inclusion. Second, using a VAR with two variables—panic dummy and log change in output—as opposed to the regression framework specified above produces the same results. The impulse response functions of output to a shock in the panic dummy are similar to those in Figure 2—that is, they show large, statistically significant declines in output in year 1, with the impacts remaining fairly constant in years 2 and 3. By contrast, the impulse response functions of the panic dummy to a shock in log output are insignificant.

<sup>61</sup> The Index comes from Miron-Romer (1990).

relatively continuous decline in industrial production for the next six months, with the exception of one or two months. Furthermore, the cumulative declines were large. From April 1893 to February 1894, industrial production declined by 16% and from September 1907 to May 1908, industrial production declined by 17.4%.<sup>62</sup>

*A Monthly Measure of Output.* A monthly output series—the Long Index of Urban Construction—is available beginning in 1868. It measures building construction in thirty-five major cities. In his work *Building Cycles and the Theory of Investment*, Long (1940) argues that building was a leading investment goods industry in the 19<sup>th</sup> and early 20<sup>th</sup> centuries and as a consequence, that his series can be used as a proxy for investment.<sup>63</sup> At the very least, the index is a reliable measure of construction, an important indicator of real economic activity.

The regression I use to estimate the monthly impact of banking panics on output is:

$$\Delta \text{LongIndex}_t = a_0 + \sum_{k=0}^{24} b_k P_{t-k} + \sum_{i=1}^{24} c_i \Delta \text{LongIndex}_{t-i} + \sum_{j=1}^{11} d_j D_{jt} + e_t$$

where LongIndex is the log of the Long Index of Urban Construction, the  $D_j$ 's are monthly dummies, and P is a dummy variable that equals one in the month in which a banking panic breaks out. I include 24 lags of the panic dummy to measure the lagged effects of the panic. I estimate two different specifications of the regression. In the first specification, I include panics that received a 3 on the first dimension of the scale, and in the second specification, I include panics that received a score of 2 or 3 on the first dimension of the scale. I do not include a regression that restricts the dummy variable to panics that received a 3 on both dimensions of the scale since only one banking panic satisfies this criterion between 1868 and 1914.

The estimates are presented in table 11. In both regressions, the coefficients of the first several lags of the panic dummy are negative, large, and in most cases, significant. In the first regression, the coefficients for the contemporaneous month and lags 1, 2, 3, and 4 are -0.283 (t-stat = -1.68), -0.335 (t-stat = -1.99), -0.849 (t-stat = -5.04), -0.454 (t-stat = -2.63), and -0.224 (t-stat = -1.29), respectively. In the second regression, the coefficients are -0.218 (t-stat = -1.61), -0.278 (t-stat = -2.05), -0.649 (t-stat = -4.76), -0.339 (t-stat = -2.43), and -0.312 (t-stat = -2.23), respectively.

Figure 3 presents the impulse response functions. They show the cumulative impact of a major banking panic, along with one standard error bands. The impulse response functions show that panics have rapid effects. Output declines to its lowest level two months after the panic: a 65.5% decline according to the first specification and a 55.8% decline according to the second. Output then increases slightly for a few months, but then hovers at roughly the same level for the remainder of the period, fluctuating within a relatively narrow band.

## Prices

<sup>62</sup> These basic results hold with non-seasonally adjusted data.

<sup>63</sup> Grossman (1993) adopts this interpretation.

In addition to the output effects of panics, I evaluate the impact of a banking panic on inflation and the price level. My methodology for prices is similar to the one for output. In particular, I estimate the following regression:

$$\Delta price_t = a_0 + \sum_{k=0}^{12} b_k P_{t-k} + \sum_{i=1}^{12} c_i \Delta price_{t-i} + \sum_{j=1}^{11} d_j D_{jt} + e_t$$

where price is the log of the USA Annalist Wholesale Price Index, P is a panic dummy variable, and the D's are monthly dummies. The sample period is 1854, the first year included in the USA Annalist Wholesale Price Index, to 1914.<sup>64</sup> I estimate three different specifications of the above regression, with each specification corresponding to a distinct restriction on the panic dummy variable. In the first specification, I include panics that received a 3 on the first dimension of the scale, in the second, I include panics that received a 2 or 3 on the first dimension, and in the third, I include only those panics that received a 3 on both dimensions.

The estimates are shown in table 12. Eight of the twelve coefficients of the lagged panic dummies are negative in the first specification, nine are negative in the second, and seven are negative in the third. The coefficient of the panic dummy is largest and most significant in month two in all three specifications: -0.041 (t-stat = -3.47), -0.033 (t-stat = -3.24), and -0.048 (t-stat = -3.25), respectively.

Figure 4 shows the cumulative impact of a banking panic on the wholesale price index, along with one-standard error bands. There is a rapid decline in the price level in the immediate months succeeding the panic. The decline slows down over time, but continues over the course of a year. The impacts at month 12 are -13.1%, -11.2%, and -12.5% for the three specifications, respectively.

#### **4.4 Panics as a Source of Output Volatility, 1825-1914**

In assessing the determinants of historical changes in output variability, DeLong and Summers (1986) conclude that financial panics were not a significant source of economic instability prior to World War II:

“The view that financial panics were a principal cause of economic instability before World War II does not seem to be strongly supported. This finding weakens the monetarist argument linking output variability to erratic monetary growth by showing that relatively little of the variability in output observed before World War II can be linked to exogenous changes in the money stock” (DeLong and Summers, p. 692-3)

They base this conclusion on their finding that no more than a small portion of the variance in output between 1890 and 1910 can be attributed to financial panics. However, their findings depend on their panic series.

According to my new series, how important were panics as a source of economic instability? First, consider the pre-WWI period. The Davis Chronology of Business Cycle Turning Points provides a useful indicator for this period. Davis (2006) isolates

<sup>64</sup> The price data come from globalfinancialdata.com. The Index incorporates the wholesale prices of twenty-five commodities. It begins in 1854 and ends in 1940.

fifteen turning points—fifteen downturns—between 1825 and 1915 using the Davis Index of Industrial Production. Table 13 presents the Davis Chronology.

Seven of these fifteen cycles—or 47 percent—contained major banking panics: 1833-1834, 1836-1837, 1839-1840, 1856-1858, 1873-1875, 1892-1894, and 1907-1908. This suggests that banking panics either caused or—at the very least—seriously aggravated nearly half of all business cycle downturns between 1825 and 1914. If I exclude the three cycles contained within a major war—the two Civil War cycles from 1860 to 1861 and 1864 to 1865 and the World War I cycle from 1913 to 1914, then seven of the twelve non-war downturns—or 58 percent—contained major banking panics.

An alternative measure of the role of panics as a source of output volatility is the  $R^2$  in a regression that includes a panic dummy equal to one in the year in which a major banking panic breaks out, three lagged panic dummies, and three lagged log changes in output (measured using the Davis Index) as right-hand side variables and that uses the log change in output as the left-hand side variable. The  $R^2$  in such a regression is 0.28, indicating that roughly 28% of the variation in the growth rate of output can be explained by the right-hand side variables. By contrast, the  $R^2$  in a regression that excludes the contemporaneous and lagged panic dummies—but otherwise remains the same—is 0.01.

These results suggest that banking panics were a substantial source of output volatility in the 85 years prior to the founding of the Federal Reserve. DeLong and Summers are not justified in dismissing the role of financial panics as a cause of economic instability before World War II. If anything, the presence of major banking panics in nearly half of all business cycle downturns prior to WWI and their reoccurrence during the Great Depression—the sharpest downturn in U.S. history—suggest that panics were a significant source of economic instability throughout much of U.S. history.<sup>65</sup>

#### **4.5 Downturns with Major Banking Panics versus Downturns without Major Banking Panics**

Equipped with an accurate listing of when major banking panics occurred and with the Davis Chronology, I am also able to examine how downturns with major banking panics differed from downturns without them. Table 14 compares downturns with major banking panics from downturns without major banking panics on three dimensions: severity (the percentage decline in output from peak-to-trough), the length of the downturn (the length of time from peak-to-trough), and the length of recovery (the length of time output took to recover from its trough back to its pre-downturn peak level). The table reports averages for the entire 1825-1914 period. It also presents averages for the pre-Civil war and post-Civil war sub-periods. Because wartime conditions represent special economic circumstances that may have their own unique features, the table omits the three downturns that occurred in the midst of major wars—that is, the two downturns during the Civil War (1860-1861 and 1864-1865) and the downturn at the beginning of World War I (1913-1914).

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<sup>65</sup> These results also indicate that the avoidance of banking panics after 1933 deserves some credit for improved macroeconomic stability in the postwar period.

Between 1825 and 1914, on average, downturns with major banking panics were more severe and slightly longer than downturns without major banking panics and output recoveries were longer for downturns with major banking panics than output recoveries for downturns without major banking panics. For downturns with major banking panics, the average percentage decline in output was 7.9%, the average length of time from peak-to-trough was 1.4 years, and the average length of recovery was 1.7 years. For downturns without major banking panics, the average percentage decline in output was 4.8%, the average length of time from peak-to-trough was 1.2 years and the average length of recovery was 1 year.

However, closer inspection of Table 14 reveals that these results are driven almost entirely by the post-Civil War period. Before the Civil War, downturns with major banking panics were not, on average, more severe than downturns without them and the average length of recovery was the same for both downturns with major banking panics and downturns without them. By contrast, after the Civil War, downturns with major banking panics were on average more than twice as severe as downturns without major banking panics and output recoveries for downturns with major banking panics were two-to-three times the length of output recoveries for downturns without major banking panics. Indeed, in the post-Civil War era, for downturns with major banking panics, the average percentage decline in output was 12.3% and the average length of recovery was 2.7 years, whereas for downturns without major banking panics, the average percentage decline in output was 4.5% and the average length of recovery was 1 year.

Why do these strong differences exist in the post-Civil War era and not in the pre-Civil War era? One hypothesis is that structural changes to the U.S. economy over time—the transformation of an agricultural economy to a more industrial one or a greater reliance on bank credit—rendered the U.S. economy more vulnerable to disruptions in the banking sector. The hundred years prior to the Great Depression was a period of dramatic economic transformation; it is highly plausible that changes to the U.S. economy increased the susceptibility of the real economy to banking panics over time.

#### **4.6 Trend and Level Effects**

How long do the effects of panics last? Are panics shocks to the economy that get rapidly undone? Does output quickly revert back to trend? Or do panics disrupt the normal dynamics of output in ways that persist over time? There appears to be a growing consensus in the literature that banking crises can have long-term effects on output. Several recent studies—primarily confined to banking crises over the past half-century—have arrived at this conclusion. Using a panel data set for a large number of countries in the post-1960 period, Cerra and Saxena (2008) find that following financial crises, output does not, on average, revert back to its pre-crisis trend. In an analysis of 88 banking crises since 1970, The IMF's October 2009 World Economic Outlook concludes that output typically does not recover to its pre-crisis trend over the medium term—that is, within the first seven years after the crisis. In a study of 40 banking crises since 1980,

Cecchetti, Kohler, and Upper (2009) find that many banking crises have lasting effects on output and that trend reversion—when it occurs—tends to be a slow process.<sup>66</sup>

Do similar patterns hold for the banking panics of the pre-Great Depression era? The impulse response functions in figure 2 provide some insight into this question. The impacts on output in year 1 are large. But rather than weaken in subsequent years, the impacts hover at roughly the same level they did in year 1—there is no reversion back to zero, suggesting that the effects of panics persist over time.<sup>67</sup> The relatively constant level of the impact in subsequent years indicates that there may be a persistent level effect associated with panics. Even after output growth resumes, in other words, the level of output at any point in time may be lower than where it would have been had the panic never occurred.

To further investigate whether the banking panics of the pre-Great Depression era might have had long-term effects on trend output growth, I estimate a trend regression for each major banking panic. The regression takes the following form:

$$\ln y_t = \alpha_0 + \alpha_1 D_t + \beta_0 t + \beta_1 D_t t + \varepsilon_t,$$

where  $y_t$  is the Davis Index of Industrial Production in year  $t$  and  $D_t$  is a dummy variable that equals 1 if year  $t$  is in the post-panic period and 0 if year  $t$  is in the pre-panic period. I include the dummy variable to identify changes in trend following the panic. Since the Davis Index is available at an annual frequency and since I want to come as close as possible to separating periods by banking panics, I implement a specific criterion for panic years. If the panic broke out in the first half of the year, then I include that year in the post-panic period. If the panic broke out in the second half of the year, then I include that year in the pre-panic period. For uniformity across panics, I restrict each pre-panic period to the fifteen years prior to the panic. To avoid contaminating the behavior of output following the panic with the behavior of output following a subsequent panic, each post-panic period ends before the next major banking panic. Because there were three major banking panics during the 1830's—1833, 1837, and 1839, I begin my analysis in 1840, rather than try to estimate shifts in trend between the panics of 1833 and 1837, which only spans four years, and between the panics of 1837 and 1839, which only spans two years. Thus, I run four separate regressions, corresponding to each of the four major banking panics of the post-Jacksonian period: 1857, 1873, 1893, and 1907.<sup>68</sup>

Table 15 presents the results. The estimates of  $\alpha_1$  and  $\beta_1$  represent level and trend breaks at the beginning of the post-panic period. Figure 5 presents these estimates with 95% confidence intervals. The estimates of  $\alpha_1$  are negative, large, and statistically

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<sup>66</sup> Specifically, Cecchetti and Kohler (2009) find that the behavior of output varies widely following financial crises. In some instances, both the level of output and the trend rate of output growth decline following the crisis. In others, the level of output declines following the crisis, but trend output growth resumes its pre-crisis growth rate. In some cases, trend reversion occurs. However, in these latter cases, trend reversion tends to take a substantial number of years.

<sup>67</sup> Extending the model to include more lags finds that the estimated impacts are still below zero ten years out in all three specifications. However, the standard errors grow considerably over time, making the impacts in later years less precisely estimated.

<sup>68</sup> This approach is similar to the framework used by Cecchetti, Kohler, and Upper (2009) to identify breaks in trend output growth following financial crises in the post-1980 period.



significant across all four panics, indicating that there is a substantial decline in the level of output at the beginning of the post-panic period. By contrast, the estimates of  $\beta_1$  differ across the four panics. For two panics—the panics of 1857 and 1873, the estimates of  $\beta_1$  are -0.028 and -0.031 respectively, indicating that trend output growth declines following these panics. Trend effects are associated with these two panics—that is, output grows at a slower trend rate following these panics. For the panic of 1893, the estimate of  $\beta_1$  is statistically indistinguishable from zero, suggesting that trend output resumes its pre-panic growth rate. However, because there is a large initial decline in the level of output following the panic, a level effect is associated with this panic—that is, the level of output is permanently below where it would have been had output continued to follow its pre-panic trend. For the panic of 1873, the estimate of  $\beta_1$  is 0.017, indicating that trend output growth increases following the panic and that output eventually crosses its pre-panic trend path.<sup>69</sup>

Figure 6 presents a graphical representation of these breaks in trend. It contains four graphs, with each graph corresponding to a different banking panic. Each graph plots the log of the Davis Index of Industrial Production on the vertical axis and year on the horizontal axis. Pre-panic and post-panic trends—based on the above regressions—are contained in each graph. To show where output would have been had it continued to follow its pre-panic trend, I project each pre-panic trend line out into the subsequent period. The solid lines represent actual trends whereas the dashed lines represent projected trends. Following the panics of 1857, 1893, and 1907, the actual trend line falls below the projected trend line. In these three instances, output does not revert back to its pre-panic trend. For the panic of 1893, the projected and actual trends are parallel, suggesting that a level effect is associated with this panic. For the panics of 1857 and 1907, the actual trend is significantly flatter than the projected trend, indicating that trend output growth declines following these panics. In the remaining projection—the one corresponding to the 1873 panic episode, the actual trend line crosses the projected trend line, indicating that output reverts back to its pre-panic trend.

These results for the pre-Great Depression era are consistent with the growing consensus in the literature that banking crises can have lasting effects on output. Several papers have recently attempted to explain why banking crises might have persistent effects on output. Cecchetti, Kohler, and Upper (2009) speculate that increased risk aversion in the aftermath of banking crises could lower capital accumulation in the long run and that sharp increases in the size of government debt—the result of fiscal stimulus measures and bank stabilization policies—could lead to crowding out effects that dampen economic growth for years.<sup>70</sup> Ramirez (2008) presents evidence that before the advent of

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<sup>69</sup> What explains these differences in the behavior of output across these four panics? The 19<sup>th</sup> century was a period of dramatic economic transformation. Technological advances or institutional changes over this period could have had an impact on trend output growth as well. Thus, some of the variation in the behavior of output across these panics might reflect these other forces.

<sup>70</sup> The latter possibility—crowding out effects brought on by sudden increases in the size of government debt—can be ruled out for the panics of the pre-Great Depression era since government intervention was minimal surrounding these panics.

deposit insurance, banking panics reduced trust in the banking system and induced depositors to keep their money out of the banking system, thereby impairing an economy's ability to conduct effective financial intermediation services over time. The IMF's October 2009 World Economic Outlook speculates that banking panics are associated with declines in potential output—the level of output consistent with stable inflation and full employment. In a recent empirical study, Furceri and Mourougane (2009) find some evidence of this: according to their results, financial crises reduce potential output by 2% on average.

What do these results predict for the path of output following the 2007-2009 banking crisis? While it is impossible to precisely predict how output will behave in the aftermath of this crisis, the results of these studies and the findings of this paper suggest that reversion to the pre-crisis trend is far from certain. Moreover, it is plausible that forces beyond the scope of this paper—policies designed to stimulate economies, avoid deflation and stabilize banking systems—might have a significant impact on the trajectory of output following the current crisis.

## **Part V. Conclusions**

There are two major problems in identifying the real output effects of financial panics of the pre-Great Depression era. First, it is not clear when panics occurred because prior panic series differ in their identification of panics. Second, even if the timing of when panics occurred is consistent with panics having real output effects, establishing the direction of causality is tricky: are panics causing downturns or are downturns causing panics?

This study sequentially addresses these two problems. It accomplishes this (1) by developing a new series on banking panics for the 1825-1929 period—one that rectifies many of the problems of earlier series—and (2) by studying the output effects of major banking panics that the reports of contemporary observers suggest were the result of idiosyncratic disturbances, as opposed to declining output conditions.

In the process, I discover some major misconceptions in the history of American financial panics. First, prior panic series presented flawed lists of when panics occurred. Several series lumped together different types of financial disturbances—banking panics, stock market disturbances, spikes in interest rates—under the common heading of panic. Some series omitted important panic episodes. In a few series, foreign panics were listed as domestic ones. These inconsistencies are the result of methodological flaws in the development of earlier series. Many panic series did not explicitly define a panic and most series did not adopt a consistent rule to identify panics.

Second, contrary to the conventional wisdom, there is no evidence of a decline in the frequency of financial panics during the first fifteen years of the existence of the Federal Reserve. The orthodox view in the literature—that the frequency of panics was high before 1914 and that the frequency dramatically decreased between 1914 and 1929—was based on an unreliable panic series.

Third, prior studies on the causes and effects of panics based their conclusions on inconsistent panic series. While my findings support the general conclusions of Miron

(1986) that major financial panics—in particular, major banking panics—were more likely to occur during particular seasons prior to the founding of the Federal Reserve, Miron overstated the evidence in support of his hypothesis by using an unreliable panic series—the Kemmerer series—to document the incidence of panics before 1914. Moreover, DeLong and Summers (1986), in an influential work on historical changes in business cycle variability, concluded that (1) the real output effects of panics are smaller than generally realized and (2) there is little support for the hypothesis that panics were a substantial source of economic instability prior to WWII. However, my results show the exact opposite: major banking panics have large and significant real output effects and they were a significant source of economic instability before WWII. DeLong and Summers missed the link between panics and downturns because they relied on a flawed panic series.

As for the results of my empirical test, I find that major banking panics have large effects. My results indicate that banking panics have strongly significant effects on output. According to the baseline regressions, output growth declines by approximately 9 to 13 percentage points in the year following a major banking panic. In addition, using monthly data on real economic activity, I show that panics have immediate effects on output, with large declines beginning in the month in which the panic breaks out. These results are robust to a variety of specifications.

My results also indicate that banking panics have significant effects on inflation and the price level. According to the empirical findings, banking panics cause declines in the price level of 11 to 13 percent within one year, depending on the specification. The decline is most rapid in the immediate months following the panic, but continues over the course of a year.

These findings shed important insights into the causes of the Great Depression. Banking panics cause large declines in output, suggesting that the banking panics of the Great Depression can account for a significant portion of the output losses occurring between 1930 and 1933. These results are consistent with the view of Friedman and Schwartz (1963) that a wave of banking panics converted a normal downturn into a severe depression. They also support the work of Bernanke and James (1991) who find that countries with banking panics had more severe downturns between 1929 and 1933 than countries without banking panics.

Moreover, these results have several implications for today's current banking crisis. First, banking panics produce deflationary shocks, making the avoidance of deflation a well-justified goal of policy today. Policymakers have recently expressed concerns about the potential deflationary consequences of the 2007-2009 banking crisis. Recently released minutes of the Federal Open Market Committee meetings reveal that Fed officials are closely monitoring for any signs of deflation, with many officials already seeing “significant risks that inflation could decline and persist for a time at uncomfortably low levels.”<sup>71</sup> That the banking panics of the pre-Federal Reserve era were followed by large declines in prices legitimizes these concerns.

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<sup>71</sup> Minutes of the Federal Open Market Committee, December 15-16, 2008.

Second, if historical trends continue, the current downturn is likely to be longer and substantially more severe than the typical postwar recession in the United States. Output recovery—defined as the length of time it takes output to recover back to its pre-trend peak—is likely to be substantially longer than the typical output recovery following other postwar recessions. In the post Civil War era, downturns with major banking panics were slightly longer and substantially more severe than downturns without them on average, and output recoveries for downturns with major banking panics were two-to-three times the length of output recoveries for downturns without them.

Third, the effects of major banking panics can persist over time. This is important both from the perspective of adopting policies to mitigate output losses and from the perspective of forecasting what might happen to output when the economy begins to turn around. Output does not necessarily revert back to trend following a major banking panic. Indeed, output did not revert back to its pre-panic trend following three of the four major banking panics between 1857 and 1914. These findings underscore the stakes of today's current banking crisis and should raise warnings that the U.S. economy could end up on a lower output trajectory or that it could take many years for output to catch up to its pre-crisis trend. It is highly plausible that forces beyond the scope of this study—policies designed to stimulate economies, avoid deflation and stabilize banking systems—could have a significant impact on the path of output in the aftermath of this banking crisis.

## Chapter 2

### Monetary Intervention Really Did Mitigate Banking Panics During the Great Depression: Evidence Along the Atlanta and New York Federal Reserve District Borders

“Why was monetary policy so inept?...The monetary system collapsed, but it clearly need not have done so....pursuit of the policies outlined by the System itself in the 1920’s, or for that matter by Bagehot in 1873, would have prevented the catastrophe”

[Friedman and Schwartz, *A Monetary History of the U.S., 1867-1960*, 1963, p. 407)

#### **Part I. Introduction**

The causes of bank failures during the Great Depression remain one of the most important, unresolved issues scholars face in attempting to explain the severity of the contraction of 1929-1933. Two schools of thought dominate the debate. Friedman and Schwartz (1963), the leading proponents of one of these views, argue that the massive waves of banking panics reflected liquidity crises. As fear spread throughout the country, deposit withdrawals accelerated and bank runs became self-fulfilling panics, forcing many solvent but illiquid institutions to fail or suspend operations. In contrast, advocates of the second school of thought, such as Peter Temin (1976) and Calomiris and Mason (2003), contend that the banking panics were crises of fundamental solvency. Mounting default rates, deteriorating bank loan portfolios, and a significant downward trend in the value of bank assets contributed to a decline in the fundamental health of banks, undermining the solvency of financial institutions throughout the country. According to this view, banks failed because they were insolvent, rather than simply illiquid.

This debate is particularly relevant for policymakers. If the banking crises were liquidity crises, then more interventionist monetary policy would have mitigated banking panics. Friedman and Schwartz argue that the Federal Reserve committed a catastrophic policy mistake by failing to act as a lender of last resort to stabilize the nation’s banking system. Alternatively, if the banking crises were solvency crises, then the Federal Reserve could not have contained the banking panics by simply acting as a lender of last resort.

This paper seeks to clarify this debate by exploiting quasi-random variation in monetary regimes. Between 1929 and 1933, policies differed across individual Federal Reserve Districts. Two Federal Reserve districts—Atlanta and New York—aggressively intervened to stabilize their banking systems. They acted as lenders of last resort, extending credit and rushing money to ailing financial institutions. By contrast, the other Federal Reserve Districts adhered to a liquidationist ideology known as the “Real Bills Doctrine.” These districts did not intervene to stabilize their banking systems. Therefore, to assess the effectiveness of monetary intervention and to determine whether the banking panics of the Great Depression were liquidity or solvency crises, I analyze bank performance along counties straddling the borders of the Atlanta and New York Federal Reserve District.

Section 1 begins by describing the benefits and limitations of prior studies in this area and by making the case for a new test. Section 2 formulates this new test and section 3 presents the raw results. Specifically, I find that banks suspended at far lower rates in counties under the jurisdiction of the Atlanta Fed than neighboring counties across the border during the first half of the depression. By contrast, bank performance did not differ across districts in counties along the New York Fed border—a reflection of the fact that this region did not experience banking panics during the first half of the depression.

Section 4 presents the empirical model I develop to identify the effects on bank performance of being under the jurisdiction of an interventionist monetary regime. I estimate a panel regression with bank suspension rate as the dependent variable. I index observations by county and year. I interact region and year dummies to measure the average level of bank suspension rates among counties in a region in a given year. I interact monetary regime and year dummies to measure the average effect on bank suspension rates of being in the Atlanta or New York Federal Reserve district in each year. These latter interaction terms provide estimates of the effectiveness of monetary intervention in mitigating banking panics.

My results indicate that monetary intervention had large effects. In 1929 and 1930, the coefficients on the Atlanta Fed fixed effects are negative and statistically significant. By the end of 1930, the percentage of bank suspensions in counties located in the St. Louis, Richmond, Cleveland, or Dallas district were on average 10.5 percentage points higher than the percentage of bank suspensions in neighboring counties located in the Atlanta district. Moreover, the magnitudes of the Atlanta Fed and region fixed effects indicate that expansionary initiatives reduced the incidence of bank suspensions by 37 to 45% in some regions.

Section 5 then examines the impact of monetary intervention on the balance sheet of the Atlanta Federal Reserve District. By analyzing balance-sheet data from the Annual Reports of individual Federal Reserve Districts, I find that aggressive intervention did not impair the reserve position of the Atlanta Fed. This is further substantiated by the descriptions of panics contained in contemporary news reports. According to the press, the sight of the arrival of cash to banks undergoing runs—coupled with a strong public commitment by Fed officials to provide assistance to banks—was often sufficient to contain a panic. This indicates that monetary intervention did not expend large resources during the early stages of the depression and that the Federal Reserve System could have intervened to stabilize the country's banking system without jeopardizing its reserve position.

These findings suggest that monetary intervention alleviated banking panics and that a concerted, system-wide response would have been feasible during the early stages of the depression. Thus, the Federal Reserve committed a major policy mistake by not acting as a lender of last resort to stabilize the country's banking system in 1929 and 1930.

## **Part I. Prior Studies**

Were the banking crises of the Great Depression liquidity or solvency crises? Despite the amount of resources devoted to this debate, economists remain divided on this issue. The endogeneity of policy responses, data limitations, and ‘correlation versus causality’ concerns dominate this literature. Nevertheless, two recent studies have made some substantial headway.

In the first study, Calomiris and Mason (2003) seek to identify the connection between bank failure rates and fundamentals. Using a disaggregated, panel data set of individual bank characteristics, Calomiris and Mason conclude that fundamentals describe bank failure risk extremely well and that Friedman and Schwartz exaggerated the extent to which the banking panics of 1929-1933 were liquidity crises. According to their analysis, efforts by the Federal Reserve to act as a lender of last resort to provide liquidity assistance to struggling banks would have proven ineffective.

In the second study, Richardson and Troost (2005) analyze the performance of banks in Mississippi during the depression. The Federal Reserve Act of 1913 separated the northern half of Mississippi from its southern half. The northern half of the state fell under the jurisdiction of the St. Louis Federal Reserve District, whereas the southern half fell under the jurisdiction of the Atlanta Federal Reserve District. These two districts pursued divergent policies. The St. Louis Fed was a staunch advocate of the Real Bills Doctrine, a principle that called for a contraction of the supply of credit during recessions and limited intervention in the face of banking panics. Conversely, the Atlanta Fed governed with great monetary activism and strictly adhered to Bagehot’s Law: during periods of panic, it rushed money to ailing banks and acted as a lender of last resort. Richardson and Troost track bank survival rates across the two regions and conclude that bank performance was far superior in the portion of Mississippi that fell under the jurisdiction of the Atlanta Fed—evidence that monetary intervention mitigated banking panics during the depression.

Both papers employ first-rate analysis; yet, the two papers arrive at contradictory conclusions. Consequently, researchers face difficulties in evaluating the merits of these competing arguments. These difficulties become compounded when one takes into account some of the limitations inherent in the two studies. Calomiris and Mason’s data suffer from imperfections. Due to a lack of continuous time series data, Calomiris and Mason rely on biennial data in assembling their bank-specific characteristics—a constraint that may render their data unrepresentative of the health of institutions at the timing of failures. Richardson and Troost’s study suffers from some potential problems as well. Because their analysis is confined to one observation—Mississippi, it is possible that some other force may be driving their results rather than Fed policies.

## **Part II. A New Test**

The debate over the nature of these banking panics continues. Economists remain divided as to whether interventionist policy actions could have alleviated the nation’s banking panics. Consequently, a stronger test should be designed to evaluate the merits of Friedman and Schwartz’s classic claim that the Fed could have stabilized the country’s banking system had it acted as a lender of last resort.

In this paper, I propose a test similar in nature to that proposed by Richardson and Troost, but one that is broader in scope. The key limitation of Richardson and Troost's analysis—their restriction to one observation, Mississippi—makes it natural to wonder whether their results are being driven by differences in monetary regimes or by some omitted variable. Here, I suggest a different, more expansive range of regions for analysis.

During the early stages of the depression, two Federal Reserve districts, Atlanta and New York, championed monetary activism and aggressively intervened to support their banking systems. In the midst of panics, they acted as lenders of last resort, extending credit and rushing money to ailing financial institutions. These policy actions were driven by the belief that such expansionary initiatives would increase the survival rate of solvent, but illiquid banks. Richardson and Troost draw on myriad sources to document the policy regime of the Atlanta Fed. They cite memos from Eugene Black, the Governor of the Atlanta Fed, showing that agents rushed large sums of cash to Knoxville, Tennessee and the surrounding areas following the Collapse of Caldwell and Company, a firm that governed large banking chains in the South, in November 1930. According to these memos, Black believed that liquidity support would relieve the situation. Moreover, Richardson and Troost cite Richard Gamble's *A History of the Federal Reserve Bank of Atlanta, 1914-1989* to document that such interventionist actions were not isolated instances and that the Atlanta Fed continually responded to banking panics with expansionary measures. They also document that these policies predated the Great Depression and that the Atlanta Fed adhered to Bagehot's law as far back as the early 1920s.

Richardson and Troost note that the other Federal Reserve districts adhered to the Real Bills doctrine during the first half of the depression. Fed officials from these districts espoused liquidationist ideologies. They believed that occasional recessions helped purge economies by removing inefficient firms and institutions from the market. According to this view, expansionary monetary initiatives would impede these healthy market corrections and hinder economic recovery. Richardson and Troost document that the St. Louis Fed followed this Real Bills doctrine from 1929 to the summer of 1931. Moreover, Friedman and Schwartz argue that the Federal Reserve System as a whole did not intervene to support its banking system.

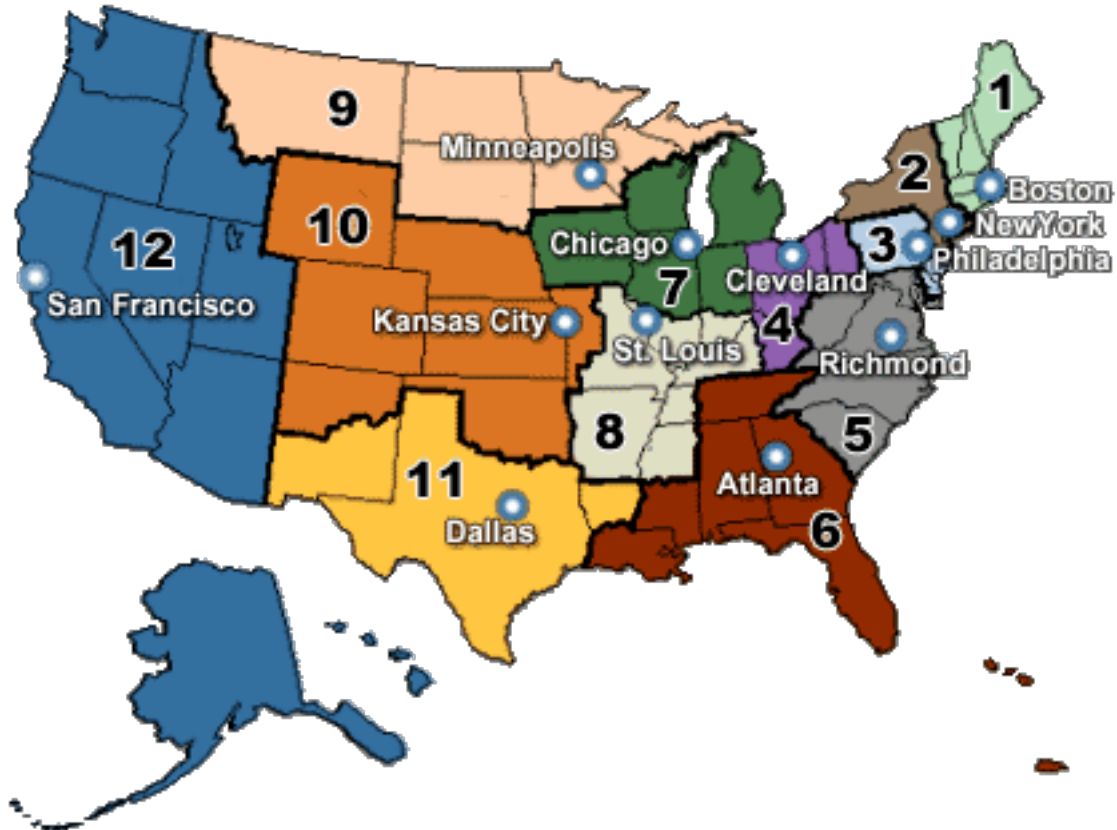
Therefore, I develop a new test of the effectiveness of monetary intervention by exploiting this diversity in monetary regimes. Specifically, I focus on the performance of banks in counties straddling the borders of the Atlanta and New York Federal Reserve Districts. The logic of my proposed strategy is the following. Due to geographical proximity, neighboring counties should share a similar underlying propensity to suffer from a depositor panic. Therefore, by restricting my analysis to counties located close to either the Atlanta or New York Federal Reserve District border, I isolate counties that share a similar susceptibility to experience a bank run, with one major distinction—some counties are under the jurisdiction of a different Federal Reserve District. Consequently, an analysis of bank performance in counties straddling the Atlanta or New York Federal Reserve border reveals the effectiveness of interventionist monetary measures. For



example, if the Atlanta Fed's interventionist policies had no effect on outcomes, then bank suspension rates in counties in the Atlanta District should be similar to bank suspension rates in neighboring counties across the Federal Reserve border. Conversely, if the Atlanta Fed's interventionist policies had significant effects on outcomes, then bank suspension rates should be lower in counties located in the Atlanta district than bank suspension rates in neighboring counties across the border. This same logic applies to counties along the New York Federal Reserve district border.

I propose a simple rule for constructing my sample: I include any county located within 50 miles of the Atlanta or New York Federal Reserve District border. Moreover, for organizational reasons, I partition my sample into distinct regions, based on state boundaries. Maps 1 – 17 present these counties as the shaded regions. The 17 regions that I isolate are:

- (1) Georgia (District 6) – South Carolina (District 5)
- (2) Georgia (District 6) – North Carolina (District 5)
- (3) Tennessee (District 6) – North Carolina (District 5)
- (4) Tennessee (District 6) – Virginia (District 5)
- (5) Tennessee (District 6) – Kentucky (District 4 & District 8)
- (6) Tennessee (District 6) – Tennessee (District 8)
- (7) Alabama (District 6) – Mississippi (District 8)
- (8) Mississippi (District 6) – Mississippi (District 8)
- (9) Mississippi (District 6) – Louisiana (District 11)
- (10) Louisiana (District 6) – Louisiana (District 11)
- (11) Louisiana (District 6) – Texas (District 11)
- (12) New York (District 2) – Vermont (District 1)
- (13) New York (District 2) – Massachusetts (District 1)
- (14) New York (District 2) – Connecticut (District 1)
- (15) New Jersey (District 2) – New Jersey (District 3)
- (16) New Jersey (District 2) – Pennsylvania (District 3)
- (17) New York (District 2) – Pennsylvania (District 3)



Each pairing contains all of the counties located within 50 miles of the Atlanta or New York Federal Reserve district border within that specific state. My algorithm for constructing these 17 regions places particular emphasis on geographical proximity. Hence, this partitioning procedure identifies regions that share a similar susceptibility to experience a panic. Counties located in the Dallas (11), St. Louis (8), Cleveland (4), Richmond (5), Philadelphia (3), and Boston (1) Federal Reserve district serve as the control group. They received no assistance from monetary authorities. Neighboring counties in the Atlanta (6) or New York (2) Federal Reserve district serve as the experimental group. Whenever necessary, the Atlanta and New York Fed rushed to the aid of struggling banks, providing emergency loans and injecting liquidity into its banking system. Therefore, these 17 pairings possess all of the hallmarks of ideal natural experiments.

### **Part III. Raw Results**

#### Data

The data used in this paper come from a study conducted by the Federal Deposit Insurance Corporation.<sup>72</sup> The FDIC data set contains county level, annual data that

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<sup>72</sup> This data set was transferred to computer format by the Inter-University Consortium for Political Science Research and is readily downloadable on their website.

reveal the number of banks in operation, the number of banks suspending, and the total number of deposits from 1920 to 1936. According to the accompanying documentation, “these data were originally collected under WPA [Works Project Administration] auspices and were obtained in manuscript form from the University of Wisconsin’s Department of Economic History” (Inter-University Consortium for Political and Social Research, p. 12). *Historical Statistics* reports that there was a joint effort by the Federal Deposit Insurance Corporation and Federal Reserve Board of Governors to collect data from the Office of the Comptroller of the Currency to develop a consistent series on bank performance as far back as 1920. Richardson (2006) discloses that this joint project was funded by the Works Project Administration between 1935 and 1941 and Chung and Richardson (2006) report that the Comptroller of the Currency’s data derives from state regulatory reports and from communication with state banking authorities.

I utilize this data set to construct bank suspension rates for each year. In calculating these rates, the numerator is the number of banks in operation at the start of 1929 and the denominator is the number of banks suspending in that particular year. Thus, the percentage of banks suspending since the start of 1929 is simply the sum of these calculated bank suspension rates in each prior year.

### 17 Regions

Figures 1 to 17 present bank suspension rates. Figures 1-11 show suspension rates for regions along the Atlanta Federal Reserve District border, whereas figures 12-17 show suspension rates for regions along the New York Federal Reserve District border. The results are divided into the 17 groups described in the preceding section. Purple represents regions under the jurisdiction of an interventionist monetary regime (Atlanta or New York), whereas white represents regions under the jurisdiction of a more passive monetary regime (Richmond, Cleveland, St. Louis, Dallas, Boston or Philadelphia).

In discussing the results, I divide my sample into two periods—the first half of the depression (1929-1931) and the second half of the depression (1932-1933). As economic conditions and fundamentals deteriorated over the course of the depression, monetary measures designed to rush liquidity to ailing institutions likely became less effective over time. Consequently, I am most interested in assessing bank performance during the earlier stages of the depression.

First, consider the results along the Atlanta Federal Reserve border. During the first half of the depression (1929-1931), bank suspension rates were lower for counties under the jurisdiction of the Atlanta Fed in seven of the eleven groups: (1) Georgia – South Carolina, (2) Georgia – North Carolina, (3) Tennessee – North Carolina, (4) Tennessee – Tennessee, (5) Alabama – Mississippi, (6) Mississippi – Mississippi, and (7) Louisiana – Texas. The differences in bank suspension rates between the Atlanta counties and non-Atlanta counties are strongest in the Georgia – South Carolina (5% vs 18% in 1930), Georgia – North Carolina (25% vs 41% in 1929, 4% vs 12% in 1930, and 4% vs 18% in 1931), Tennessee – North Carolina (9% vs 31% in 1929), Tennessee – Tennessee (2% vs 6% in 1929 and 0% vs 6% in 1931), Alabama – Mississippi (4% vs

31% in 1929 and 8% vs 23% in 1930), and Mississippi – Mississippi (13 vs 22% in 1929 and 13 vs 22% in 1930) matchings.

Among the four remaining groups, bank suspension rates were similar across Federal Reserve Districts in two groups (Tennessee-Virginia and Tennessee-Kentucky) and slightly higher in the Atlanta Federal Reserve District in two groups (Mississippi-Louisiana and Louisiana-Louisiana). However, for the two former pairings, the percentage of banks suspending was small (below 10% in each region), meaning that these areas did not experience serious panics, and for the two latter pairings, the sample size and thus, the number of bank suspensions were small (less than seven bank suspensions in each region).

Therefore, with a few exceptions, these results seem to support the hypothesis that monetary intervention mitigated banking panics during the first half of the depression, 1929-1931. In seven of the eleven groups, banks suspended at far lower rates in counties under the jurisdiction of the Atlanta Federal Reserve District.

Next, consider the results for counties along the New York Federal Reserve border. The most striking observation is quickly noticeable in Figures 12 to 17: counties along the New York Federal Reserve border were not as heavily affected by banking panics as counties along the Atlanta Federal Reserve border from 1929 to 1931. Bank suspension rates rise above 10% in only two instances, New York in 1930 (Figure 12) and Pennsylvania in 1930 (Figure 16). In most other cases, bank suspension rates hover around 1 to 5 percent. Moreover, there does not seem to be any general pattern to bank performance across monetary regimes. From 1929 to 1931, banks in the New York Federal Reserve district suspended at slightly lower rates in the New York-Connecticut and New Jersey-Pennsylvania pairings, whereas banks in the New York Federal Reserve district suspended at slightly higher rates in the New York-Vermont matching. Bank performance was roughly similar in the remaining three regions, New York-Massachusetts, New Jersey-New Jersey, and New York-Pennsylvania. This lack of a correlation between Fed district and bank performance does not undermine the results found along the Atlanta Federal Reserve border. Rather, these findings merely demonstrate that bank performance did not diverge across different monetary regimes because this region was not as heavily gripped by banking panics during the early stages of the depression.

#### Supplementary 6 Region Framework

In this sub-section, I supplement the preceding 17-region analysis with a 6-region framework. Any county located within 50 miles of the Atlanta or New York Federal border is still in my sample, but instead of using state boundaries to divide regions, I now use Federal Reserve boundaries. Specifically, the 6 regions I isolate are the following: (1) Atlanta – Richmond, (2) Atlanta – St. Louis, (3) Atlanta – Cleveland, (4) Atlanta – Dallas, (5) New York – Boston, and (6) New York – Philadelphia. Maps 18 to 23 show these six regions. Figures 18 to 23 present the results.

A 6 region breakdown possesses a few advantages over a 17 region breakdown. First, clustering observations on the basis of Federal Reserve district facilitates quick

assessments of aggregate bank performance across distinct monetary regimes. Second, an analysis of 6 regions is more tractable than one of 17 regions. Nevertheless, aggregating 17 regions into 6 regions possesses one significant disadvantage—it may mask important heterogeneity in bank performance within individual Federal Reserve districts. Hence, I view both the 17 region framework and the 6 region framework as complementary.

The Atlanta-Richmond and Atlanta-St. Louis regions provide the strongest results in support of the hypothesis that monetary intervention mitigated banking panics during the early stages of the downturn. In 1929, 1930 and 1931, banks in the Atlanta district suspended at lower rates than banks in the Richmond and St. Louis districts. In Atlanta-Richmond, the bank suspension rates were 9% and 18% in 1929, 6% and 10% in 1930, and 4% and 5% in 1931, respectively. In Atlanta-St. Louis, the bank suspension rates are 7% and 14% in 1929, 9% and 9.4% in 1930, and 4% and 5% in 1931, respectively.

The Atlanta-Cleveland and Atlanta-Dallas regions do not show such a trend. In Atlanta-Cleveland, banks suspended at slightly higher rates in the Atlanta Fed district in 1929, whereas banks suspended at lower rates in the Atlanta Fed district in 1930 and 1931. Bank suspension rates were 8% and 5% in 1929, 2% and 5% in 1930, and 0% and 12% in 1931, respectively. Since the Atlanta-Cleveland region contains only 51 banks in Atlanta and 58 banks in Cleveland, these suspension rates correspond to a very small number of bank suspensions. The number of banks suspending in Atlanta-Cleveland were 4 and 3 in 1929, 1 and 3 in 1930, and 0 and 7 in 1931, respectively. Moreover, in Atlanta-Dallas, bank suspension rates were 3% and 5% in 1929, 11% and 1% in 1930, and 2% and 0% in 1931, respectively, but this also corresponds to a small number of bank suspensions. The number of banks suspending in Atlanta-Dallas were 3 and 5 in 1929, 9 and 1 in 1930, and 2 and 0 in 1931, respectively. These results do not necessarily contradict or support the preceding results; instead, they must be interpreted cautiously given the much smaller sample sizes of the Atlanta-Cleveland and Atlanta-Dallas regions.

In New York-Philadelphia, banks suspended at lower rates in the New York Fed district, but the difference is small. Bank suspension rates were 0.5% and 0.6% in 1929, 5% and 8% in 1930, and 1% and 2% in 1931, respectively. In New York-Boston, banks suspended at lower rates in the New York Fed district in 1929 and 1931, but at higher rates in 1930. Bank suspension rates were 0.3% and 4% in 1929, 5% and 3% in 1930, and 1% and 2% in 1931, respectively. These results are not inconsistent with the previous findings; rather, they merely demonstrate that bank performance did not significantly differ across monetary regimes because these regions were not seriously affected by banking panics during the first half of the depression. Bank suspension rates rose above 5% in only one region in one year—New York-Philadelphia in 1930.

#### **Part IV. Empirical Model**

In this section, I develop an empirical model that assesses the effectiveness of monetary intervention. Specifically, I estimate a panel regression with bank suspension rate as the dependent variable. I index observations by county and year and I divide observations into distinct geographical regions and distinct monetary regimes. A

“geographical region” includes all of the counties that are located within 50 miles of a Federal Reserve border. Thus, there are six geographical regions: Atlanta-Richmond, Atlanta-St.Louis, Atlanta-Cleveland, Atlanta-Dallas, New York-Boston, and New York-Philadelphia. Maps 24 and 25 show these regions. A “monetary regime” includes all of the counties under the jurisdiction of a particular Federal Reserve District. Two monetary regimes—Atlanta and New York—aggressively intervened to stabilize their banking systems. Thus, I formulate the following model:

$$S_{it} = \sum_{j=1}^6 \sum_{t=1929}^{1933} \beta_{jt} (R_j D_t) + \sum_{k=1}^2 \sum_{t=1929}^{1933} \alpha_{kt} (M_k D_t) + \varepsilon_{it}$$

where  $S_{it}$  represents bank suspension rate in county  $i$  in year  $t$ ,  $R_j$  represents geographical region  $j$  ( $j=1$  Atlanta-Richmond,  $j=2$  Atlanta-St. Louis,  $j=3$  Atlanta-Cleveland,  $j=4$  Atlanta-Dallas,  $j=5$  New York-Boston,  $j=6$  New York-Philadelphia),  $M_k$  represents monetary regime  $k$  ( $k=1$  Atlanta Fed,  $k=2$  New York Fed), and  $D_t$  represents year  $t$  ( $t=1929, 1930, 1931, 1932, 1933$ )

I interact region and year dummies to capture region-year fixed effects. These interaction terms measure the average level of bank suspension rates among counties in a region in a given year. They reveal the extent to which banking panics gripped a particular region in a given year.

I include dummy variables for the Atlanta Federal Reserve district and New York Federal Reserve district because these two districts pursued interventionist policies during the first half of the Depression. I interact these monetary regime dummies with year dummies to capture monetary regime-year fixed effects. These interaction terms measure the average effect on bank suspension rates of being in the Atlanta or New York Federal Reserve district in each year. Hence, they provide yearly estimates of the effectiveness of monetary intervention in mitigating banking panics.

Tables 1 and 2 describe the sample size. Table 1 reports the number of counties and the number of banks in operation in each region on January 1, 1929 and Table 2 reports the number of counties and number of banks in operation in the two interventionist monetary regimes on January 1, 1929. Table 3 reports the regression results.

Table 1 – Number of Counties and Number of Banks in the Six Regions

	Number of Counties	Number of Banks
Atlanta-Richmond	123 (69 in Atlanta, 54 in Richmond)	441 (218 in Atlanta, 223 in Richmond)
Atlanta-St. Louis	133 (58 in Atlanta, 75 in St. Louis)	627 (256 in Atlanta, 371 in St. Louis)
Atlanta-Cleveland	30 (13 in Atlanta, 17 in Cleveland)	109 (51 in Atlanta, 58 in Cleveland)

Atlanta-Dallas	55 (25 in Atlanta, 30 in Dallas)	185 (82 in Atlanta, 103 in Dallas)
New York-Boston	44 (22 in New York, 22 in Boston)	541 (270 in New York, 271 in Boston)
New York-Philadelphia	76 (34 in New York, 42 in Philadelphia)	1526 (672 in New York, 854 in Philadelphia)

Table 2 – Number of Counties and Number of Banks in the Two Interventionist Monetary Regimes, within 50 miles of the Border

	Number of Counties	Number of Banks
Atlanta Fed	165	607
New York Fed	56	942

Table 3 – Panel Regression, Bank Suspension Rates along Atlanta and New York Federal Reserve Borders, 1929-1933

	Coefficient	Standard Error	P-value
<u>Region-Year Fixed Effect</u>			
D1929x'Atlanta-Richmond Region'	0.1775	0.0166	0.0000
D1929x'Atlanta-St.Louis Region'	0.1451	0.0149	0.0000
D1929x'Atlanta-Cleveland Region'	0.1440	0.0308	0.0000
D1929xAtlanta-Dallas Region'	0.0736	0.0220	0.0010
D1930x'Atlanta-Richmond Region'	0.0974	0.0166	0.0000
D1930x'Atlanta-St.Louis Region'	0.1070	0.0149	0.0000
D1930x'Atlanta-Cleveland Region'	0.0519	0.0308	0.0920
D1930xAtlanta-Dallas Region'	0.0436	0.0220	0.0470
D1931x'Atlanta-Richmond Region'	0.0635	0.0166	0.0000
D1931x'Atlanta-St.Louis Region'	0.0484	0.0149	0.0010
D1931x'Atlanta-Cleveland Region'	0.0677	0.0308	0.0280
D1931xAtlanta-Dallas Region'	0.0115	0.0220	0.6010
D1932x'Atlanta-Richmond Region'	0.1207	0.0166	0.0000
D1932x'Atlanta-St.Louis Region'	0.0802	0.0149	0.0000
D1932x'Atlanta-Cleveland Region'	0.1421	0.0308	0.0000
D1932xAtlanta-Dallas Region'	0.1976	0.0220	0.0000
D1933x'Atlanta-Richmond Region'	0.0040	0.0166	0.8110
D1933x'Atlanta-St.Louis Region'	-0.0009	0.0149	0.9520
D1933x'Atlanta-Cleveland Region'	-0.0024	0.0308	0.9380

D1933xAtlanta-Dallas Region'	-0.0034	0.0220	0.8780
D1929x'NewYork-Boston Region'	0.0183	0.0268	0.4950
D1929x'NewYork-Philadelphia Region'	0.0088	0.0211	0.6780
D1930x'NewYork-Boston Region'	0.0268	0.0268	0.3190
D1930x'NewYork-Philadelphia Region'	0.0382	0.0211	0.0700
D1931x'NewYork-Boston Region'	0.0132	0.0268	0.6210
D1931x'NewYork-Philadelphia Region'	0.0242	0.0211	0.2520
D1932x'NewYork-Boston Region'	0.1014	0.0268	0.0000
D1932x'NewYork-Philadelphia Region'	0.1196	0.0211	0.0000
D1933x'NewYork-Boston Region'	0.0003	0.0268	0.9920
D1933x'NewYork-Philadelphia Region'	0.0017	0.0211	0.9370

Monetary Regime-Year Fixed Effect

D1929xAtlanta	-0.0651	0.0169	0.0000
D1930xAtlanta	-0.0397	0.0169	0.0190
D1931xAtlanta	-0.0131	0.0169	0.4360
D1932xAtlanta	0.0108	0.0169	0.5210
D1933xAtlanta	0.0082	0.0169	0.6270
D1929xNewYork	-0.0066	0.0276	0.8100
D1930xNewYork	0.0208	0.0276	0.4500
D1931xNewYork	-0.0061	0.0276	0.8240
D1932xNewYork	-0.0090	0.0276	0.7440
D1933xNewYork	0.0072	0.0276	0.7950

$R^2 = 0.2350$

The region-year fixed effects from this regression reveal the extent to which banking panics gripped these six geographical regions in each year. First, consider the four Atlanta regions during the first half of the depression, 1929-1931. The region-year fixed effects show that banking panics were most severe in Atlanta-Richmond and Atlanta-St. Louis in 1929 and 1930 and in Atlanta-Cleveland in 1929. The region-year fixed effects were 0.1775 in 1929 and 0.0974 in 1930 for Atlanta-Richmond, 0.1451 in 1929 and 0.1070 in 1930 for Atlanta-St. Louis, and 0.1440 in 1929 for Atlanta-Cleveland. All of the other region-year fixed effects for Atlanta regions are below 0.08 from 1929 to 1931. Moreover, in each year in this period, the Atlanta-Dallas region has the smallest region-year fixed effects, indicating that this region was not as severely affected by banking panics as the other three.

In 1929, 1930, and 1931, region-year fixed effects in the two New York regions are generally relatively low. The region-year fixed effects only rise above 0.03 in one



instance and are significantly different from zero in just one case—New York-Philadelphia in 1930. These results show that banks suspended at far lower rates in the regions near the New York Fed border than in the regions near the Atlanta Fed border during the first half of the depression.

For the later years, region-year fixed effects increase in 1932 to 0.1207, 0.0802, 0.1421, 0.1976, 0.1014, and 0.1196 in the Atlanta-Richmond, Atlanta-St. Louis, Atlanta-Cleveland, Atlanta-Dallas, New York-Boston, and New York-Philadelphia regions, respectively. In 1933, region-year fixed effects drop to levels that are insignificantly different from zero across all six areas.

The monetary regime-year fixed effects show the impact of being in the Atlanta or New York Federal Reserve district on bank suspension rates. In 1929 and 1930, the early stages of the depression, the Atlanta Fed fixed effects are negative and statistically significant. They are -0.0651 and -0.0397, with p-values of 0.0000 and 0.0190, indicating that effects on bank performance of being under the jurisdiction of the Atlanta Fed are large and strongly significant. These results support the hypothesis that monetary intervention mitigated banking panics during the early stages of the depression. According to these results, by the end of 1930, the percentage of bank suspensions in counties located in the St. Louis, Richmond, Cleveland, or Dallas district were on average 10.5 percentage points higher than the percentage of bank suspensions in neighboring counties located in the Atlanta district. Moreover, the magnitude of these results is consistent with Richardson and Troost's results. Richardson and Troost show that approximately 75 percent of the banks in the St. Louis district of Mississippi were still in operation by mid 1931, while approximately 85 percent of the banks in the Atlanta district of Mississippi were still in operation by mid 1931—a difference of roughly 10 percentage points.

In 1931, the Atlanta Fed fixed effect is still negative, but no longer significantly different from zero. In 1932 and 1933, the Atlanta Fed fixed effects become positive, but are still not significantly different from zero. These findings are not inconsistent with the earlier results. Rather, they indicate that monetary intervention alleviated banking panics during the initial stages of the depression, but that such intervention was rendered ineffective subsequently. A likely explanation for this finding is that as economic conditions and fundamentals deteriorated over the course of the depression, interventionist monetary initiatives to prop up ailing banks became less effective.

The New York Fed fixed effects are not significantly different from zero in any of the five years. These results are not inconsistent with the findings along the Atlanta Federal Reserve border; instead, they demonstrate that bank performance did not differ significantly along the New York Federal Reserve border because this region was not seriously affected by panics during the first half of the depression. Indeed, five of the six region-year fixed effects for the New York-Boston and New York-Philadelphia regions from 1929 to 1931 are not significantly different from zero, indicating that these areas were not heavily affected by banking panics.

The findings of this empirical model support the hypothesis that monetary intervention mitigated banking panics during the early stages of the depression.

Consider, for example, the Atlanta-Richmond and Atlanta-St. Louis areas. Their region-year fixed effects are 0.1775 and 0.1451 in 1929 and 0.0974 and 0.1070 in 1930, respectively. The Atlanta Fed fixed effects are -0.0651 and -0.0397 in 1929 and 1930, indicating that the Atlanta Fed reduced the extent of bank suspensions by approximately 37% in 1929 and 45% in 1930 in Atlanta-Richmond and by approximately 41% in 1929 and 37% in 1930 in Atlanta-St. Louis.<sup>73</sup>

However, these estimates must be viewed as lower bounds. For instance, suppose that monetary intervention was effective in reducing bank suspension rates in Atlanta counties. Such outcomes might have had externality effects in neighboring regions across the border. By reducing the incidence of banking panics in Atlanta counties, the Atlanta Fed may have reduced the incidence of banking panics in neighboring counties across the border by calming depositor fear. These externality effects would decrease both the region-year and monetary regime-year fixed effects, but would have a greater effect on the monetary regime-year fixed effect, reducing the calculated

$\frac{\text{monetary regime year fixed effect}}{\text{region year fixed effect}}$  ratio. Thus, these estimates must be viewed as lower bounds.

## **Part V – The Impact of Monetary Intervention on the Fed Balance Sheet**

The results from the previous sections indicate that monetary intervention—on the part of the Atlanta Fed—mitigated banking panics during the first half of the depression. This suggests that interventionist policies from the Federal Reserve System as a whole would have alleviated the banking panics of the early stages of the depression.

However, this finding poses a related question: would such a concerted system-wide response have been feasible? A potential constraint on Fed policy might have been its reserve position. If liquidity intervention expended large resources, then it might be the case that all twelve Federal Reserve Districts would not have been able to extend support to their banking systems without jeopardizing the reserve position of the Federal Reserve System as a whole.

To investigate this issue further, I analyze the balance sheet of the Atlanta Fed to determine whether its actions impaired its reserve position. Table 4 displays the reserve position of the Atlanta Fed from Aug 1, 1929 to Dec 31, 1930.<sup>74</sup> For sake of comparison, I include the reserve position of two other Federal Reserve Districts that experienced serious banking panics during the first two years of the Depression, but that did not intervene to support their banking systems—St. Louis and Richmond.

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<sup>73</sup> Re-estimating the preceding regression using weighted least squares—where the weight is number of bank suspensions in each county—does not change any of these findings.

<sup>74</sup> The data come from the 1929 and 1930 Annual Reports of the individual Federal Reserve Districts.

Figure 4 – Cash Reserves of Atlanta, St. Louis, and Richmond Federal Reserve Districts

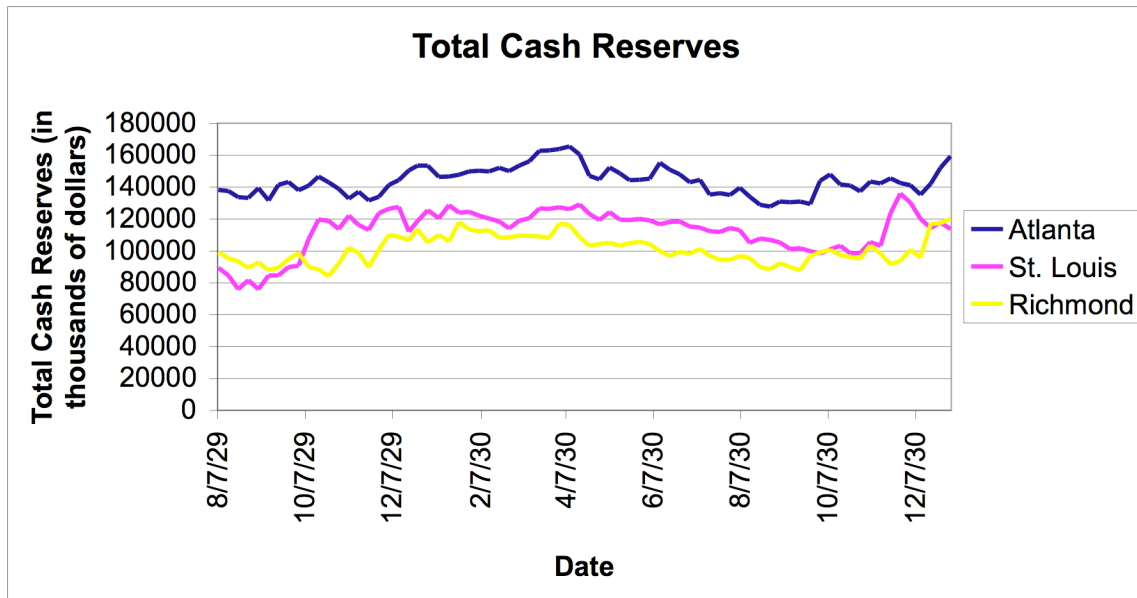


Figure 4 reveals that the reserve position of the Atlanta Fed did not become impaired in 1929 and 1930. Even during November and December of 1930—the months that coincided with the banking panic that followed the collapse of Caldwell and Company—the reserve position of the Atlanta Fed held steady. This suggests that monetary intervention did not impair the balance sheet of the Atlanta Fed during the early stages of the depression.

What explains the strong reserve position of the Atlanta Fed in the midst of such large-scale intervention? To help answer this question, I read contemporary news reports that described the banking panics that occurred in the Atlanta Federal Reserve District in 1929 and in 1930. According to the newspaper reports, officials from the Atlanta Fed made their commitment to the banks well known. A July 18, 1929 article in the *Baltimore Sun* describes the efforts of Atlanta Fed officials to publicize their commitment to support banks following the outbreak of a panic in Florida:

To bolster up public confidence, \$1,000,000 in cash was brought here by airplane today from Atlanta and delivered to the First National Bank of Tampa, a member of the Federal Reserve...Creed Taylor, Deputy Governor of the Federal Reserve Bank at Atlanta, who arrived here today, also declared that local bankers could ‘have all the money they need with which to meet the situation.’<sup>75</sup>

<sup>75</sup> July 20, 1929. *Baltimore Sun* in *Commercial and Financial Chronicle*. “The Florida Bank Failures.” p. 422

Moreover, according to the newspaper reports, these actions calmed depositor anxiety. A July 18, 1929 *New York Times* article reports that the sight of the arrival of cash was sufficient to restore confidence and allay the panic in Florida:

Indications were that confidence had been restored and that in the next few days most of the money withdrawn yesterday and today will be returned to the vaults of the banks. The arrival of \$5,000,000 here today and yesterday from the Atlanta Federal Reserve Bank and the sight of the money in huge stacks in the cages of the bank tellers had a reassuring effect. Crowds about the banks were much smaller than yesterday and were there out of curiosity.<sup>76</sup>

These reports suggest that the Atlanta Fed was able to rush cash to banks without impairing its reserve position because its visible promise to extend aid to banks had a powerful effect in restoring confidence.

These findings indicate that the Federal Reserve System as a whole had the resources to act as aggressively as the Atlanta Fed in combating banking panics. A system-wide defense of the U.S. banking system would not have impaired the reserve position of the Federal Reserve System during the early stages of the depression. A public commitment to extend aid to illiquid institutions—backed by rushing cash to banks undergoing runs—would have gone a long way in alleviating panics. Consequently, the failure of the Federal Reserve System to act as a lender of last resort during the first half of the depression was a squandered opportunity.

## **Part VI – Conclusions**

This paper develops a new test of the effectiveness of monetary intervention by focusing on bank performance along counties straddling the borders of the Atlanta and New York Federal Reserve Districts. I find that banks suspended at far lower rates in counties under the jurisdiction of the interventionist Atlanta Fed than neighboring counties across the border. My results corroborate those of Richardson and Troost (2005) and support the assertion that the Federal Reserve System could have mitigated the banking panics of the early stages of the depression had it acted as a lender of last resort.

However, these findings pose a follow-up question: would monetary intervention during the early stages of the depression have been enough to prevent subsequent panics? According to Friedman and Schwartz (1963), the Federal Reserve could have prevented the depression had it acted as a lender of last resort to stabilize the country's banking system and countered the decline in the money supply. But recent events cast some doubts on their hypothesis. In 2007 and 2008, facing a growing financial crisis, the Federal Reserve followed Friedman and Schwartz's policy prescriptions: it rushed liquidity to banking institutions and aggressively expanded the monetary base. Yet, those actions alone were not sufficient to contain the crisis.

In a recent interview, Anna Schwartz argues that the two crises are fundamentally different. According to Schwartz, the Great Depression was a liquidity crisis, whereas

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<sup>76</sup> July 20, 1929. *New York Times* in *Commercial and Financial Chronicle*. "The Florida Bank Failures." p. 422

the current crisis is a solvency crisis. She criticizes Fed Chairman Ben Bernanke for his policy response to the current crisis, arguing that Bernanke is ‘fighting the last war:’

In the 1930s, as Ms. Schwartz and Mr. Friedman argued in "A Monetary History," the country and the Federal Reserve were faced with a liquidity crisis in the banking sector. As banks failed, depositors became alarmed that they'd lose their money if their bank, too, failed. So bank runs began, and these became self-reinforcing: "If the borrowers hadn't withdrawn cash, they [the banks] would have been in good shape. But the Fed just sat by and did nothing, so bank after bank failed. And that only motivated depositors to withdraw funds from banks that were not in distress," deepening the crisis and causing still more failures.

But "that's not what's going on in the market now," Ms. Schwartz says. Today, the banks have a problem on the asset side of their ledgers -- "all these exotic securities that the market does not know how to value."<sup>77</sup>

In truth, it is not clear that Schwartz is correct in asserting that the two crises are fundamentally different. Moreover, in the case of the Great Depression, a categorical distinction between liquidity and solvency crisis may not apply. Some banks that failed may have been simply illiquid, whereas others may have been insolvent. Furthermore, as the severity of the depression intensified between 1929 and 1933, the nature of the banking panics might have changed. That monetary intervention had big effects during the early stages of the depression, but not during later stages suggests that the banking panics of the first half of the depression might have been primarily liquidity crises and that the banking panics of the latter half of the depression might have been primarily solvency crises. This might reconcile the findings of Richardson and Troost (2005) with those of Calomiris and Mason (2003).

Thus, the big question remains: could the Federal Reserve have prevented the banking panics of the Great Depression had it aggressively intervened to inject liquidity into the banking system? Unfortunately, because we do not have the counterfactual—bank performance between 1929 and 1933 with the Federal Reserve System as lender of last resort—it may be impossible to know with certainty whether monetary intervention would have been sufficient to stop a nationwide banking crisis and avert the worst of the depression. Nevertheless, the results of this paper suggest that monetary intervention was effective during the early stages of the depression and that a concerted system-wide policy response was certainly worth a shot.

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<sup>77</sup> Carney, Brian. "Bernanke is Fighting the Last War." *Wall Street Journal*. Oct 18, 2008

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# Figures and Tables for Chapter 1

Table 1. Eight Panic Series, 1825-2007

Bordo-Wheelock	Thorp	Reinhart-Rogoff: Table A3	Reinhart-Rogoff: Table A5	Gorton	Sprague	Wicker	Kemmerer	DeLong-Summers
Banking Panic	Panic	Banking Crisis	Banking Crisis	Banking Panic	Crisis	Banking Panic	Panic	Panic
1790-1933	1790-1925	1800-2007	1800-2007	1863-1914	1864-1910	1864-1914	1873-1908	1890-1913
	1825	1825	1825	Jan 1825				
	1833	1833						
			1836					
	1837	1837		March 1837 - 1838				
	1839	1839						
				March 1841				
				1847				
	1857	1857	1857	Aug 1857				
				Dec 1861				
				April 1864				
	1873	1873	1873	Sept 1873	Sept 1873	1873 (Crisis)	Sept 1873 (Panic)	Sept 1873 (Major)
								April 1876 (Minor)
1878 (financial distress)								Nov 1879 (Minor)
								May-June 1880 (Minor)
								March-April 1882 (Minor)
1884 (financial distress)		1884	May 1884	June 1884	1884 (Panic)	May 1884 (Incipient Panic)	May 1884 (Major)	1890:4
								June 1887 (Minor)
								March-April 1888 (Minor)
1890 (financial distress)		1890		Nov 1890	1890 (Financial Stringency)	Nov 1890 (Incipient Panic)	Nov 1890 (Major)	
								Feb 1893 (Minor)
	1893	1893	May 1893	May 1893	1893 (Crisis)	Jun-Aug 1893 (Panic)	May - Aug 1893 (Major)	1893:2 and 1893:3
								Sept-Dec 1895 (Minor)
								1896:1
				Oct 1896				June-July 1896 (Minor)
								1896:3
								Dec 1896 (Minor)
								March 1898 (Minor)
								1898:2
								Sept 1899 (Minor)
								Dec 1899 (Major)
								1899:4
								May 1901 (Major)
								1901:2
								July 1901 (Minor)
								Sept 1901 (Minor)
								Sept-Nov 1902 (Minor)
								March - Aug 1903 (Major)
								1903:2
								Dec 1904 (Minor)
								April 1905 (Minor)
								1905:4
								April-May 1906 (Minor)
								Dec 1906 (Minor)
				March 1907				March 1907 (Minor)
	1907	1907	1907	Oct-07	1907 (Crisis)	Oct 1907 (Panic)	Oct 1907 (Major)	1907:4
								Sept 1908 (Minor)
								1909:4
			1914	Jul-14	Aug-14			
1920s (financial distress)								
1929-1933			1929	1929-1933				
1980s (financial distress)								
			1984	1984-1991				
			2007					

Table 2. New Series on Banking Panics, 1825-1929

Major Banking Panic	Minor Banking Panic
Nov 1833 - Apr 1834	
Mar - May 1837	
Oct 1839	
	Jan - April 1841 (PA, DE, MD, NC, VA, IL)
	Mar 1842 (PA)
	May - Jun 1842 (New Orleans)
	Oct 1851 (NY, NJ, MD)
	Sep 1854 - Feb 1855 (OH, IN, MI, WI, IA, MO, NY, CA)
Aug - Oct 1857	
	Nov 1860 (suspension of specie payments by banks in the South, Philadelphia, Baltimore)
	Dec 1861 (generalized suspension of specie payments)
Sep 1873	
	May 1884 (NYC, PA, NJ)
	Nov 1890 (New York City)
May - Aug 1893	
	Dec 1896 (MN, IL)
	Dec 1899 (Boston and New York City)
	Jun - Jul 1901 (New York: Buffalo and NYC)
	Oct 1903 (PA, MD)
	Dec 1905 (Chicago)
Oct - Nov 1907	
	Jan 1908 (New York City)
	Aug - Sep 1920 (Boston)
	Nov 1920 - Feb 1921 (North Dakota)
	Jul 1926 (FL, GA)
	Mar 1927 (FL)
	Jul - Aug 1929 (FL)

Table 3. Comparison of Eight Earlier Panic Series with New Series on Banking Panics

Entries with a Strike Through Them Denote Episodes Not Listed in New Series on Banking Panics. Those episodes do not contain banking panics.

Bordo-Wheelock 1790-1933	Thorp 1790-1925	Reinhardt-Rogoff: A3 1800-2007	Reinhardt-Rogoff: A5 <del>1800-2007</del>	Gorton 1863-1914	Sprague 1864-1910	Wicker 1864-1914	Kemmerer 1873-1908	DeLong-Summers 1890-1913	New Series (Major) 1825-1929	New Series (Minor) 1825-1929
	<del>1825</del>	<del>1825</del>	<del>1825</del>	<del>Jan-1825</del>						
	1833	1833							Nov 1833 - Apr 1834	
	1837	1837	1836	March 1837 - 1838					Mar - May 1837	
	1839	1839							Oct 1839	
				March 1841						Jan - April 1841
										Mar 1842
										May - Jun 1842
										October 1851
										Sep 1854 - Apr 1855
	1857	1857	1857	Aug 1857					Aug - Oct 1857	
				Dec 1861						Nov 1860
				<del>April-1864</del>						Dec 1861
	1873	1873	1873	Sept 1873	Sept 1873	1873 (Crisis)	Sept 1873 (Panic)			Sept 1873
										Sept 1873 (Major)
										<del>April-1876 (Minor)</del>
										<del>Nov-1879 (Minor)</del>
										<del>May-June-1880 (Minor)</del>
										<del>March-April-1882 (Minor)</del>
1884 (financial distress)		1884	May 1884	June 1884	1884 (Panic)	May 1884 (Incipient Panic)				May 1884 (Major)
										<del>June-1887 (Minor)</del>
										<del>March-April-1888 (Minor)</del>
1890 (financial distress)		1890		Nov 1890	1890 (Stringency)	Nov 1890 (Incipient Panic)			1890:4	Nov 1890
										<del>Nov 1890 (Major)</del>
	1893	1893	May 1893	May 1893	1893 (Crisis)	June-August 1893 (Panic)				<del>Feb-1893 (Minor)</del>
								1893:2 and 1893:3	May-Aug 1893	
										<del>Sept-Dec-1895 (Minor)</del>
										<del>1896:1</del>
				<del>Oct-1896</del>						<del>1896:2</del>
										<del>June-July-1896 (Minor)</del>
										Dec 1896 (Minor)
										<del>March-1898 (Minor)</del>
										<del>1898:2</del>
										<del>Sept-1899 (Minor)</del>
										Dec 1899 (Major)
								1899:4		Dec 1899
										<del>May-1901 (Major)</del>
										1901:2
										July 1901 (Minor)
								1901:2 (same as above)		Jun-Jul 1901
										<del>Sept-1901 (Minor)</del>
										<del>Sept-Nov-1902 (Minor)</del>
										<del>March-Aug-1903 (Major)</del>
										<del>1903:2</del>
										Oct 1903
										<del>Dec-1904 (Minor)</del>
										<del>April-1905 (Minor)</del>
										1905:4
										<del>April-May-1906 (Minor)</del>
										<del>Dec-1906 (Minor)</del>
										<del>March-1907 (Minor)</del>
1907	1907	1907	<del>March-1907</del>	Oct-07	1907 (Crisis)	Oct 1907 (Panic)			1907:4	Oct - Nov 1907
										Jan 1908
										<del>Sept-1908 (Minor)</del>
										<del>1909:4</del>
										Aug - Sep 1920
										Nov 1920 - Feb 1921
										Jul 1926
										Mar 1927
										Jul-Aug 1929

Table 4. Frequency of Banking Panics

Banking Panics	Pre-Fed	Post-Fed (1914 - 1929)
	Average Rate	Average Rate
Major	one every 12.9 years (median # years b/w major bank panics = 16)	no major banking panics between 1914 and 1929 (next one occurs in 1930, 16 years after 1914)
Minor	one every 6 years	one every 3.5 years

Table 5. Seasonality of Banking Panics

Distribution of Panics by Starting Months		
	Major Bank	Minor Bank
<u>Spring</u>		
March	1	1
April	1	0
May	0	2
<u>Summer</u>		
June	0	1
July	0	0
August	1	0
<u>Fall</u>		
September	1	1
October	2	2
November	1	2
<u>Winter</u>		
December	0	4
January	0	2
February	0	0
Percentage Spring & Fall	85.7	53.3
Percentage Summer & Winter	14.3	47.7

Table 6. Correlation of Major Banking Panics and Downturns

Panic	Percent Change in Davis Index
1833	-4.5% from 1833 to 1834
1837	-1.4% from 1837 to 1838
1839	-4.7% from 1839 to 1840
1857	-8.0% from 1856 to 1858
1873	-6.0% from 1873 to 1875
1893	-15.3% from 1892 to 1894
1907	-15.6% from 1907 to 1909

Table 7. Classification of Panics

Panic	Dimension 1	Dimension 2
1833	3	3
1837	No Rank	No Rank
1839	No Rank	No Rank
1857	3	3
1873	3	3
1893	3	1
1907	2	1

Table 8. The Impact of Banking Panics on Industrial Production

Specification 1: Panic Dummy = {Panics with 3 on Dimension 1}					
Panic Shock			Change in Industrial Production		
Lag	Coefficient	Standard Error	Lag	Coefficient	Standard Error
0	-0.0395	0.0359	0	-----	-----
1	-0.1024	0.0359	1	0.0315	0.1113
2	0.0240	0.0376	2	-0.1358	0.1142
3	-0.0526	0.0378	3	0.0452	0.1094
R <sup>2</sup> =0.14					
Specification 2: Panic Dummy = {Panics with 2 or 3 on Dimension 1}					
Panic Shock			Change in Industrial Production		
Lag	Coefficient	Standard Error	Lag	Coefficient	Standard Error
0	-0.0351	0.0301	0	-----	-----
1	-0.1300	0.0303	1	0.0787	0.1103
2	0.0437	0.0332	2	-0.1537	0.1132
3	-0.0583	0.0340	3	0.0642	0.1014
R <sup>2</sup> =0.25					
Specification 3: Panic Dummy = {Panics with 3 on Both Dimensions}					
Panic Shock			Change in Industrial Production		
Lag	Coefficient	Standard Error	Lag	Coefficient	Standard Error
0	0.0046	0.0426	0	-----	-----
1	-0.0910	0.0425	1	0.0234	0.1123
2	0.0071	0.0436	2	-0.1224	0.1155
3	-0.0299	0.0437	3	0.0581	0.1127
R <sup>2</sup> =0.07					



Table 9. Panic of 1893: Miron-Romer Index of Industrial Production (Seasonally Adjusted)

Month	Index	Percent Change
Nov-1892	60.1	-0.67
Dec-1892	60.3	0.46
Jan-1893	60.2	-0.24
Feb-1893	60.2	0.07
Mar-1893	61.2	1.70
Apr-1893	60.7	-0.97
<b>May-1893</b>	<b>59.4</b>	<b>-2.01</b>
<b>Jun-1893</b>	<b>58.7</b>	<b>-1.22</b>
<b>Jul-1893</b>	<b>56.3</b>	<b>-4.13</b>
<b>Aug-1893</b>	<b>54.7</b>	<b>-2.89</b>
Sep-1893	54.8	0.17
Oct-1893	53.2	-2.85
Nov-1893	52.2	-1.89
Dec-1893	52.3	0.31
Jan-1894	51.3	-1.96
Feb-1894	51.0	-0.66

Table 10. Panic of 1907: Miron-Romer Index of Industrial Production (Seasonally Adjusted)

Month	Index	Percent Change
Apr-07	97.66	0.48
May-07	99.31	1.69
Jun-07	102.19	2.90
Jul-07	103.48	1.26
Aug-07	102.17	-1.27
Sep-07	100.11	-2.02
<b>Oct-07</b>	<b>96.66</b>	<b>-3.45</b>
<b>Nov-07</b>	<b>92.35</b>	<b>-4.45</b>
Dec-07	90.00	-2.54
Jan-08	88.25	-1.95
Feb-08	85.72	-2.86
Mar-08	83.97	-2.04
Apr-08	83.61	-0.43
May-08	82.72	-1.07

Table 11. The Impact of Banking Panics on Construction

Specification 1: Panic Dummy = {Panics with 3 on Dimension 1}					
Banking Panic Shock			Change in Index		
Lag	Coefficient	Standard Error	Lag	Coefficient	Standard Error
0	-0.2829	0.1682	0	-----	-----
1	-0.3349	0.1684	1	-0.6597	0.0458
2	-0.8491	0.1686	2	-0.4175	0.0543
3	-0.4544	0.1729	3	-0.4385	0.0568
4	-0.2235	0.1738	4	-0.3517	0.0597
5	0.0146	0.1737	5	-0.3423	0.0609
6	-0.0713	0.1736	6	-0.2727	0.0622
7	-0.2234	0.1735	7	-0.1792	0.0631
8	0.0484	0.1738	8	-0.1978	0.0631
9	0.0131	0.1727	9	-0.2479	0.0636
10	-0.3459	0.1726	10	-0.1942	0.0646
11	-0.2111	0.1728	11	-0.0724	0.0650
12	0.1442	0.1731	12	0.0589	0.0649
13	0.2681	0.1729	13	0.1352	0.0650
14	-0.0750	0.1733	14	0.0262	0.0654
15	-0.0217	0.1732	15	-0.0415	0.0642
16	0.1075	0.1732	16	-0.0646	0.0632
17	-0.0547	0.1723	17	-0.0795	0.0623
18	0.0427	0.1720	18	-0.1119	0.0618
19	-0.2182	0.1720	19	-0.1480	0.0608
20	0.2462	0.1722	20	-0.1515	0.0593
21	0.0040	0.1714	21	-0.0615	0.0580
22	-0.3160	0.1709	22	-0.0603	0.0548
23	0.1384	0.1710	23	-0.0765	0.0517
24	-0.0338	0.1709	24	-0.0203	0.0426

R<sup>2</sup>=0.61

Specification 1: Panic Dummy = {Panics with 2 or 3 on Dimension 1}					
Banking Panic			Change in Index		
Lag	Coefficient	Standard Error	Lag	Coefficient	Standard Error
0	-0.2177	0.1356	0	-----	-----
1	-0.2783	0.1359	1	-0.6693	0.0458
2	-0.6486	0.1363	2	-0.4321	0.0544
3	-0.3393	0.1394	3	-0.4551	0.0570
4	-0.3121	0.1400	4	-0.3605	0.0601
5	-0.0778	0.1403	5	-0.3406	0.0612
6	0.0116	0.1402	6	-0.2645	0.0623
7	-0.1746	0.1401	7	-0.1611	0.0631
8	0.1513	0.1402	8	-0.1652	0.0630
9	0.1484	0.1399	9	-0.2096	0.0634
10	-0.2282	0.1400	10	-0.1567	0.0641
11	-0.0628	0.1401	11	-0.0318	0.0644
12	0.2577	0.1402	12	0.0997	0.0640
13	0.3450	0.1406	13	0.1758	0.0640
14	0.0475	0.1414	14	0.0589	0.0646
15	0.0286	0.1413	15	-0.0142	0.0636
16	0.1079	0.1412	16	-0.0338	0.0628
17	-0.0356	0.1406	17	-0.0666	0.0617
18	-0.0568	0.1405	18	-0.1204	0.0612
19	-0.1868	0.1405	19	-0.1635	0.0602
20	0.0483	0.1406	20	-0.1775	0.0587
21	-0.0129	0.1398	21	-0.0873	0.0573
22	-0.2294	0.1394	22	-0.0840	0.0542
23	0.0845	0.1394	23	-0.0901	0.0512
24	-0.1142	0.1390	24	-0.0276	0.0422

R<sup>2</sup>=0.61

Table 12. The Impact of Banking Panics on Prices

Specification 1: Panic Dummy = {Panics with 3 on Dimension 1}					
Banking Panic Shock			Change in Prices		
Lag	Coefficient	Standard Error	Lag	Coefficient	Standard Error
0	0.0012	0.0121	0	-----	-----
1	-0.0172	0.0121	1	0.3007	0.0391
2	-0.0420	0.0121	2	0.0471	0.0407
3	-0.0123	0.0122	3	-0.0039	0.0409
4	0.0162	0.0122	4	-0.0409	0.0408
5	-0.0173	0.0122	5	-0.0289	0.0409
6	-0.0066	0.0123	6	0.0136	0.0409
7	0.0015	0.0123	7	-0.0731	0.0405
8	-0.0091	0.0122	8	0.1472	0.0405
9	-0.0102	0.0123	9	-0.0313	0.0410
10	-0.0041	0.0123	10	-0.0289	0.0412
11	0.0005	0.0122	11	-0.0209	0.0412
12	0.0026	0.0122	12	-0.0092	0.0412
R <sup>2</sup> =0.19					
Specification 2: Panic Dummy = {Panics with 2 or 3 on Dimension 1}					
Banking Panic Shock			Change in Prices		
Lag	Coefficient	Standard Error	Lag	Coefficient	Standard Error
0	0.0026	0.0105	0	-----	-----
1	-0.0242	0.0105	1	0.2971	0.0391
2	-0.0341	0.0105	2	0.0453	0.0407
3	-0.0114	0.0106	3	0.0009	0.0409
4	0.0092	0.0106	4	-0.0409	0.0408
5	-0.0109	0.0106	5	-0.0301	0.0409
6	-0.0010	0.0106	6	0.0189	0.0409
7	0.0018	0.0106	7	-0.0686	0.0404
8	-0.0058	0.0106	8	0.1445	0.0404
9	-0.0051	0.0106	9	-0.0322	0.0409
10	-0.0056	0.0106	10	-0.0256	0.0411
11	-0.0001	0.0106	11	-0.0183	0.0411
12	0.0046	0.0106	12	-0.0141	0.0411
R <sup>2</sup> =0.19					
Specification 3: Panic Dummy = {Panics with 3 on Both Dimensions}					
Banking Panic Shock			Change in Prices		
Lag	Coefficient	Standard Error	Lag	Coefficient	Standard Error
0	0.0014	0.0148	0	-----	-----
1	-0.0214	0.0148	1	0.3057	0.0390
2	-0.0483	0.0149	2	0.0433	0.0407
3	0.0014	0.0150	3	-0.0028	0.0409
4	-0.0005	0.0150	4	-0.0337	0.0408
5	-0.0254	0.0149	5	-0.0283	0.0408
6	0.0066	0.0150	6	0.0090	0.0408
7	0.0068	0.0150	7	-0.0700	0.0404
8	-0.0018	0.0150	8	0.1485	0.0405
9	-0.0116	0.0150	9	-0.0353	0.0409
10	0.0052	0.0150	10	-0.0263	0.0411
11	-0.0092	0.0149	11	-0.0191	0.0412
12	0.0049	0.0149	12	-0.0147	0.0411
R <sup>2</sup> =0.19					

Table 13.

Turning Points in the Prewar U.S. Industrial Economy, 1830-1915				
Peak	Trough	Major Panic	% Change in Davis Index	
Antebellum Industrial Cycles				
1828	1829	No Major Panic	-6.0	
<b>1833</b>	<b>1834</b>	<b>Panic of 1833</b>	<b>-4.5</b>	
<b>1836</b>	<b>1837</b>	<b>Panic of 1837</b>	<b>-1.4</b>	
<b>1839</b>	<b>1840</b>	<b>Panic of 1839</b>	<b>-4.7</b>	
<b>1856</b>	<b>1858</b>	<b>Panic of 1857</b>	<b>-8.0</b>	
Civil War Industrial Cycles				
1860	1861	No Major Panic	-0.9	
1864	1865	No Major Panic	-5.2	
Postbellum Industrial Cycles				
<b>1873</b>	<b>1875</b>	<b>Panic of 1873</b>	<b>-6.0</b>	
1883	1885	No Major Panic	-6.3	
<b>1892</b>	<b>1894</b>	<b>Panic of 1893</b>	<b>-15.3</b>	
1895	1896	No Major Panic	-3.1	
1903	1904	No Major Panic	-4.7	
<b>1907</b>	<b>1908</b>	<b>Panic of 1907</b>	<b>-15.6</b>	
1910	1911	No Major Panic	-3.7	
1913	1914	No Major Panic	-10.2	

Table 14. Downturns with Major Banking Panics vs Downturns without Major Banking

Downturns with Major Banking Panics					Downturns without Major Banking Panics				
Downturn	% Change in Output	Length in Years	Output Recovery in Years		Downturn	% Change in Output	Length in Years	Output Recovery in Years	
<b>Pre-Civil War</b>					<b>Pre-Civil War</b>				
1833-1834	-4.5	1	1		1828-1829	-6	1	1	
1836-1837	-1.4	1	1						
1839-1840	-4.7	1	1						
1856-1858	-8.0	2	1						
<b>Post-Civil War</b>					<b>Post-Civil War</b>				
1873-1875	-6.0	2	3		1883-1885	-6.3	2	1	
1892-1894	-15.3	2	3		1895-1896	-3.1	1	1	
1907-1908	-15.6	1	2		1903-1904	-4.7	1	1	
					1910-1911	-3.7	1	1	
<b>All Downturns</b>	Avg.	-7.9	1.4	1.7	<b>All Downturns</b>	Avg.	-4.8	1.2	1.0
<b>Pre-Civil War Downturns</b>	Avg.	-4.7	1.3	1.0	<b>Pre-Civil War Downturns</b>	Avg.	-6.0	1.0	1.0
<b>Post-Civil War Downturns</b>	Avg.	-12.3	1.7	2.7	<b>Post-Civil War Downturns</b>	Avg.	-4.5	1.3	1.0

Panics

Table 15. Breaks in Trend

$$\ln y_t = \alpha_0 + \alpha_1 D_t + \beta_0 t + \beta_1 D_t t + \varepsilon_t$$

	<b>Coefficient</b>	<b>Standard Error</b>
<b>Panic of 1857</b>		
$\alpha_0$	5.2117	0.0537
$\beta_0$	0.0753	0.0059
$\alpha_1$	-0.2605	0.0573
$\beta_1$	-0.0284	0.0063
<b>Panic of 1873</b>		
$\alpha_0$	5.6964	0.0209
$\beta_0$	0.0461	0.0024
$\alpha_1$	-0.0963	0.0412
$\beta_1$	0.0173	0.0036
<b>Panic of 1893</b>		
$\alpha_0$	6.8044	0.0240
$\beta_0$	0.0630	0.0041
$\alpha_1$	-0.2093	0.0393
$\beta_1$	0.0002	0.0053
<b>Panic of 1907</b>		
$\alpha_0$	7.5424	0.0259
$\beta_0$	0.0632	0.0034
$\alpha_1$	-0.1740	0.0545
$\beta_1$	-0.0309	0.0114

Figure 1. Classification Algorithm

Figure 1. Classification Algorithm

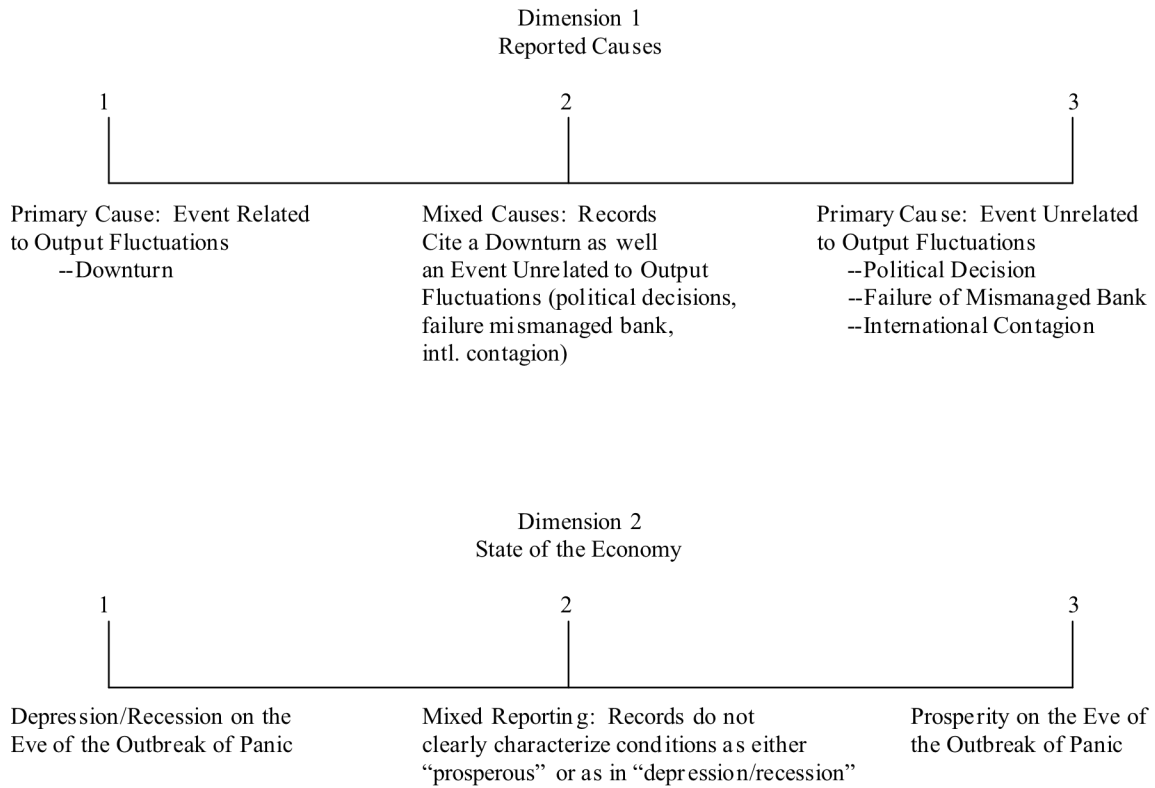


Figure 2. The Impact of a Major Banking Panic on Industrial Production

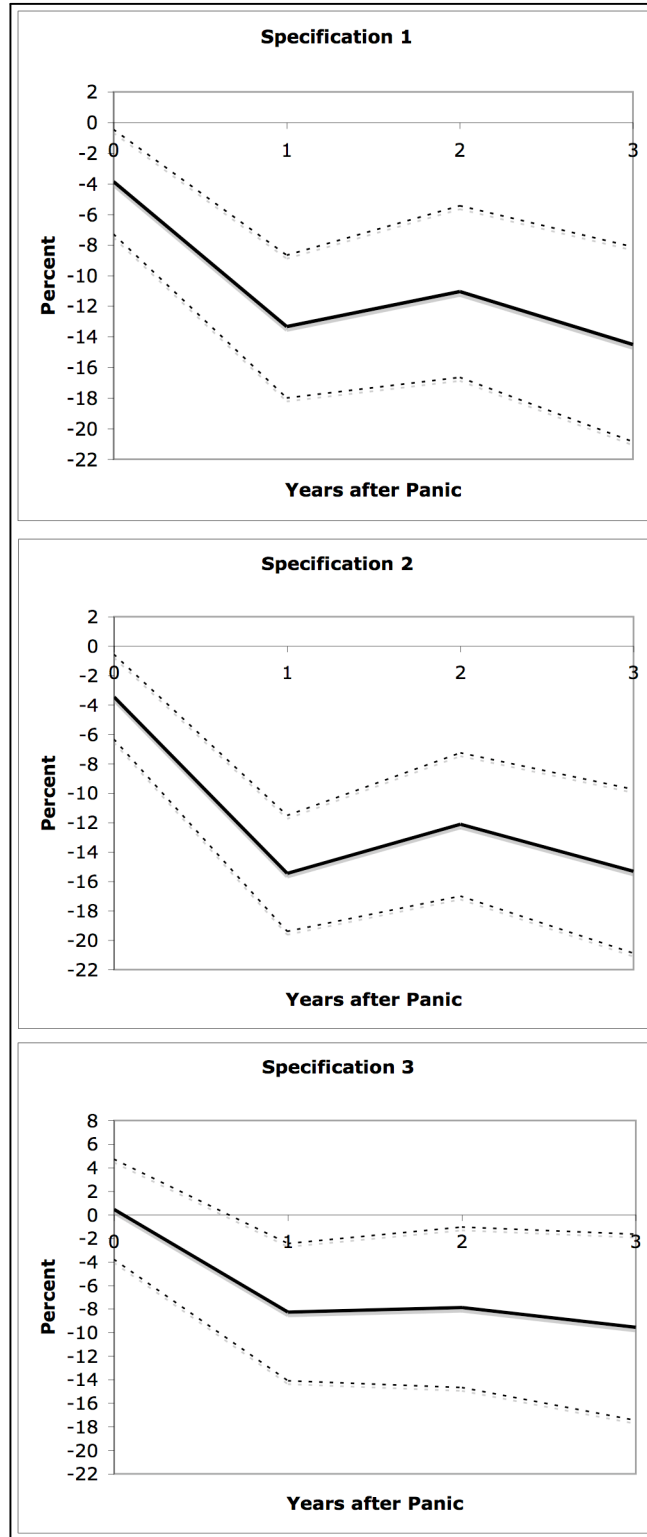




Figure 3. The Impact of a Major Banking Panic on Construction

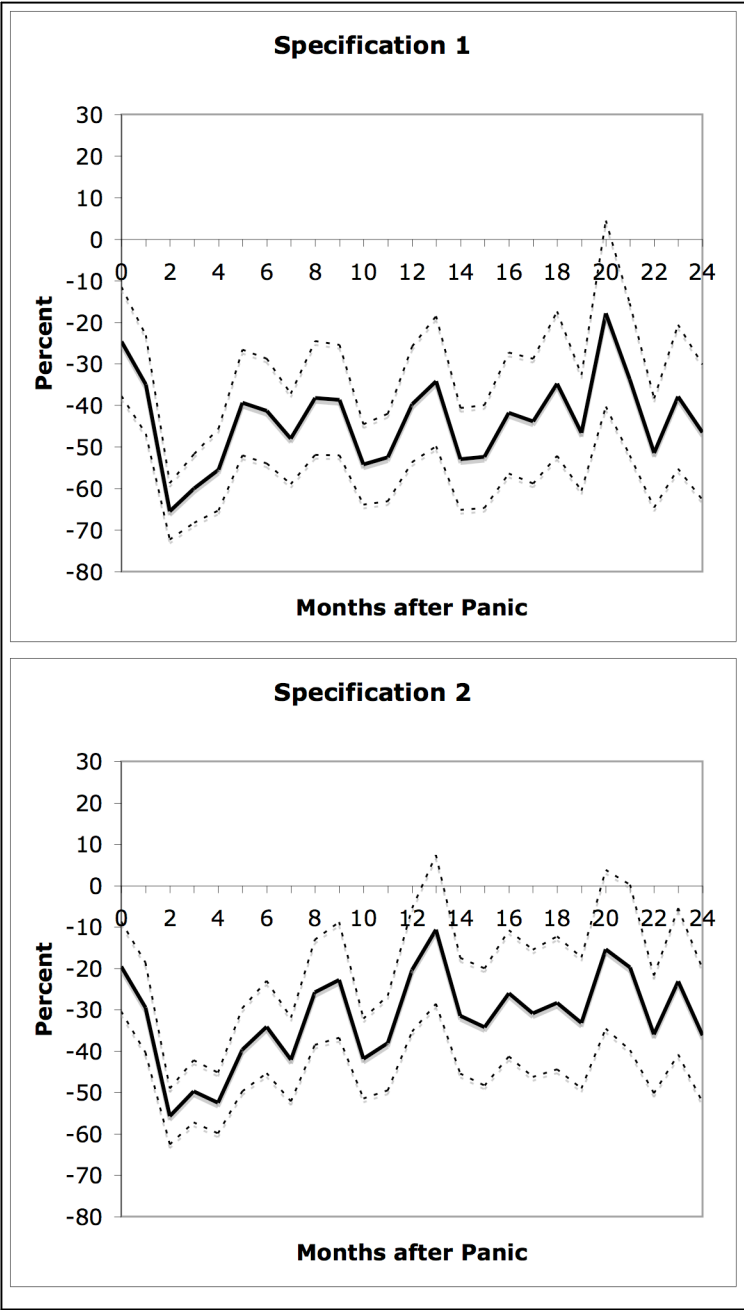


Figure 4. The Impact of a Major Banking Panic on the Price Level

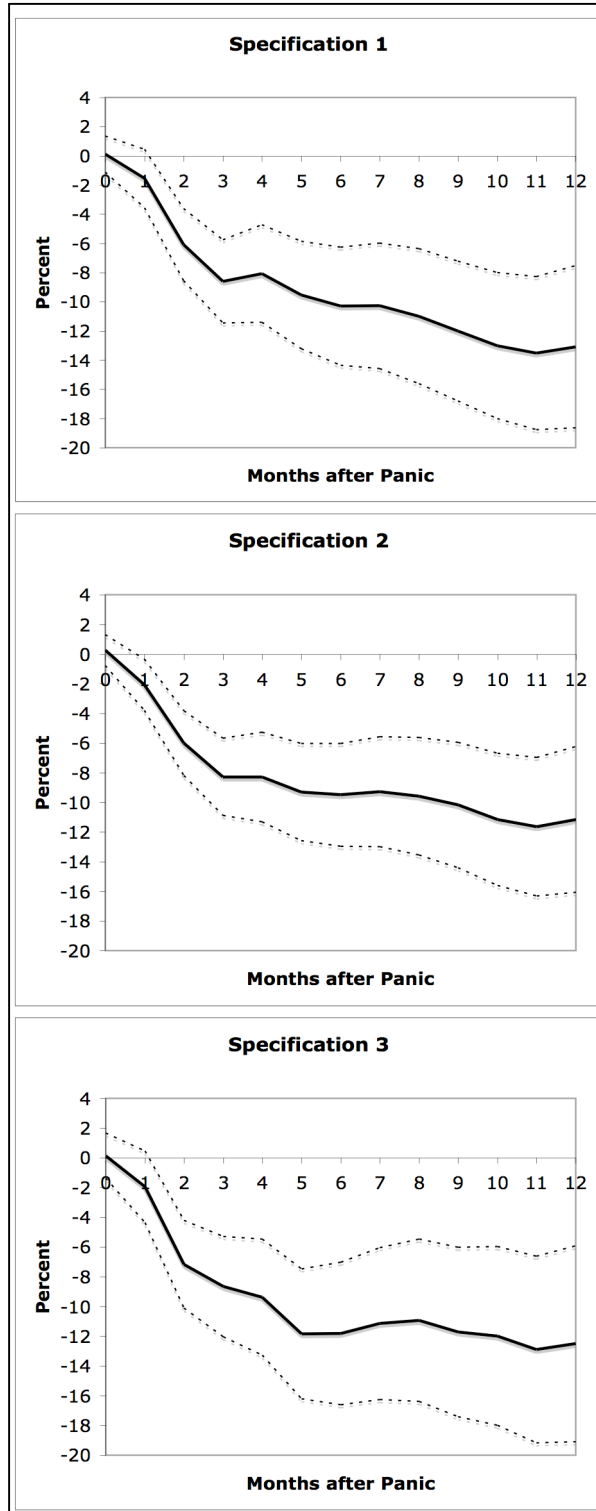


Figure 5. Breaks in Level and Trend at Beginning of Post-Panic Period

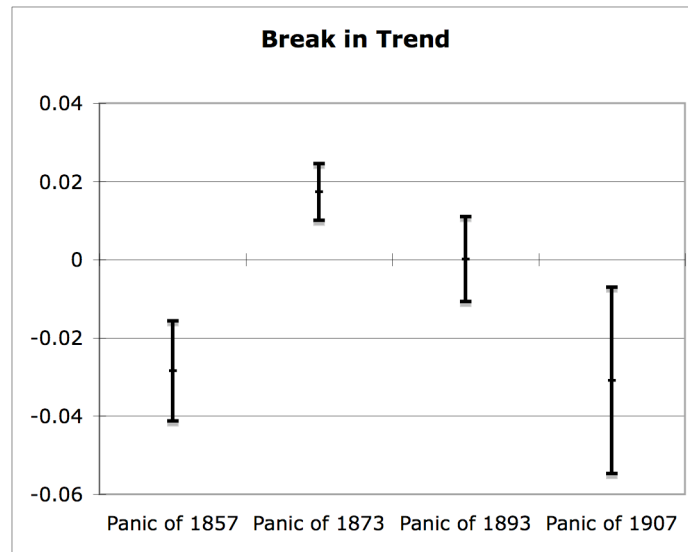
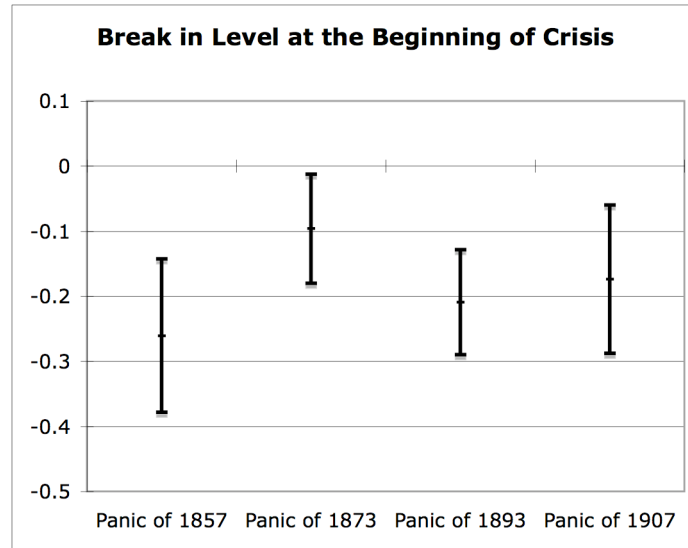
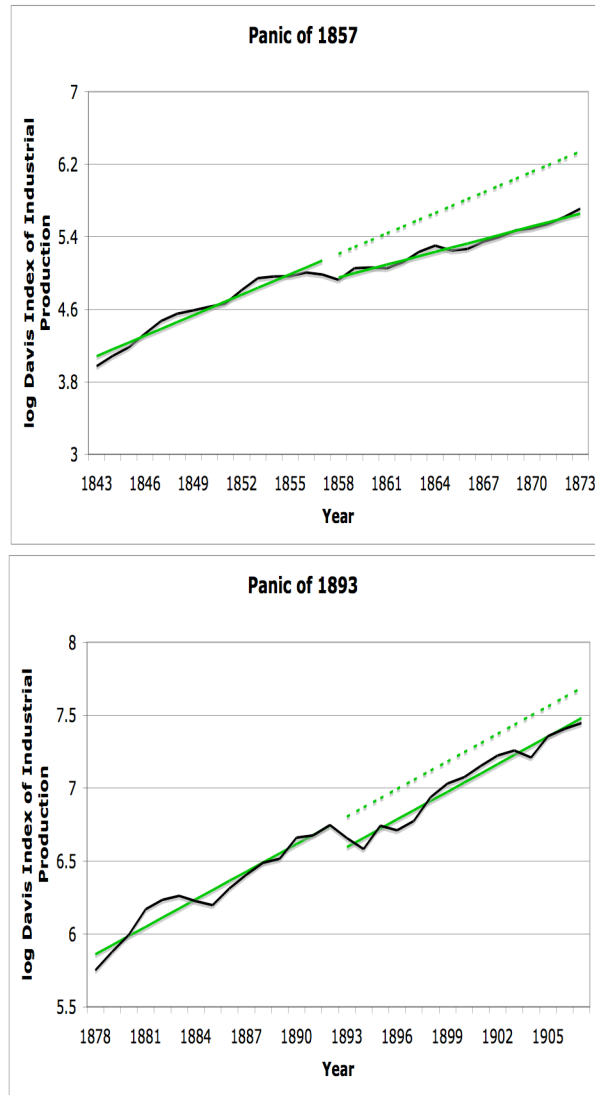
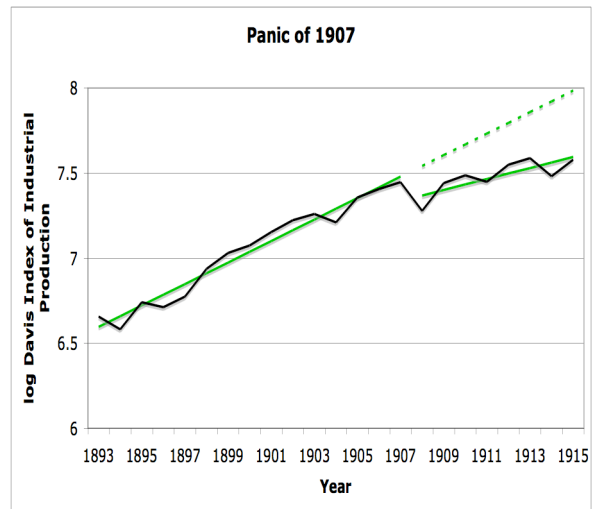
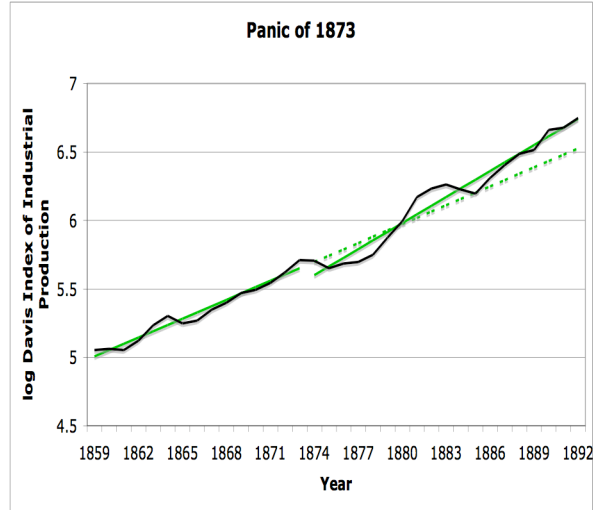


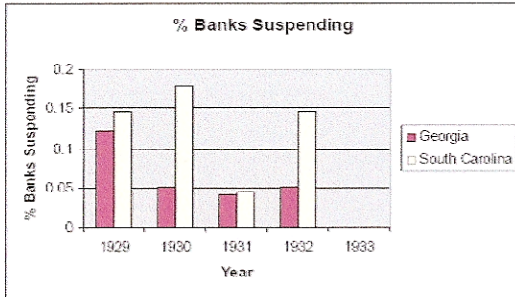
Figure 6. Actual and Projected Trend Lines (Panics of 1857, 1873, 1893, and 1907)





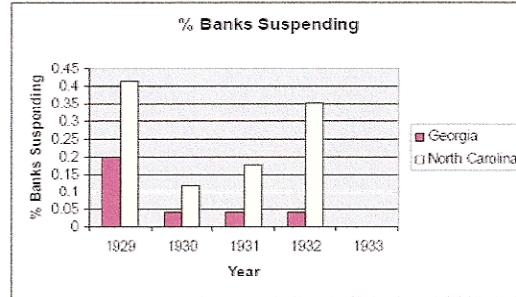
## Figures, Tables, and Maps for Chapter 2

Figure 1  
Georgia (District 6) – South Carolina (District 5)



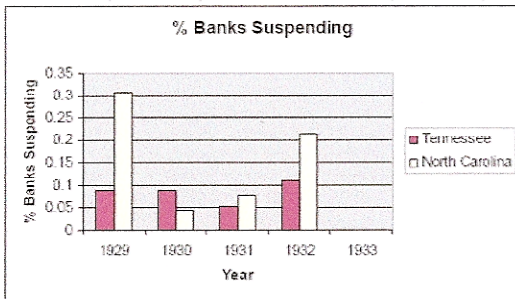
Georgia (98 banks, 37 counties)  
South Carolina (89 banks, 20 counties)

Figure 2  
Georgia (District 6) – North Carolina (District 5)



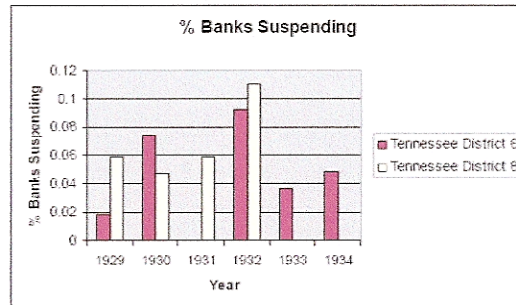
Georgia (25 banks, 13 counties)  
North Carolina (17 banks, 7 counties)

Figure 3  
Tennessee (District 6) vs North Carolina (District 5)



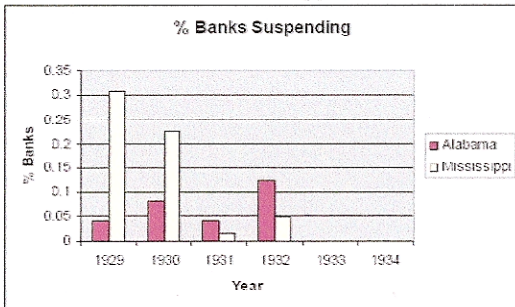
Tennessee (93 banks, 19 counties)  
North Carolina (65 banks, 20 counties)

Figure 4  
Tennessee (District 6) vs Tennessee (District 8)



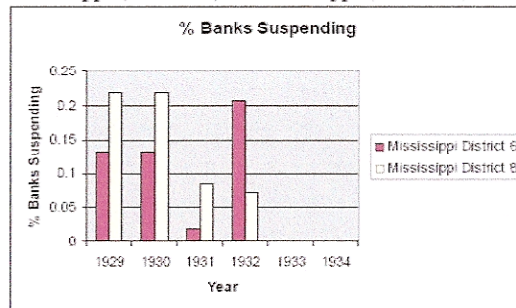
District 6 (54 banks, 12 counties)  
District 8 (84 banks, 12 counties)

Figure 5  
Alabama (District 6) vs Mississippi (District 8)



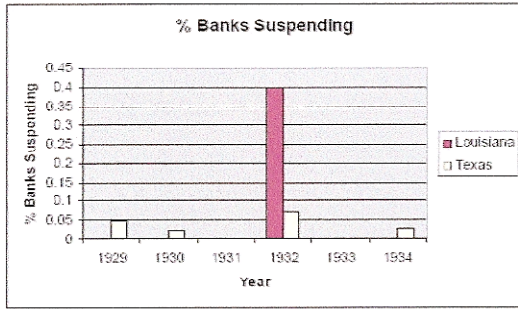
Alabama (48 banks, 11 counties)  
Mississippi (62 banks, 17 counties)

Figure 6  
Mississippi (District 6) vs Mississippi (District 8)



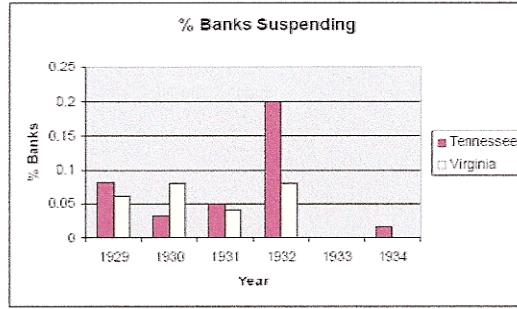
District 6 (53 banks, 13 counties)  
District 8 (82 banks, 16 counties)

Figure 7  
Louisiana (District 6) vs Texas (District 11)



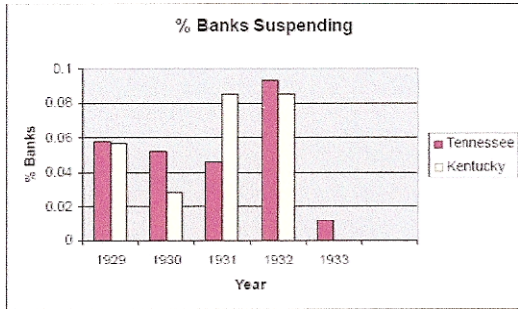
Louisiana (20 banks, 7 counties)  
Texas (43 banks, 11 counties)

Figure 8  
Tennessee (District 6) vs Virginia (District 5)



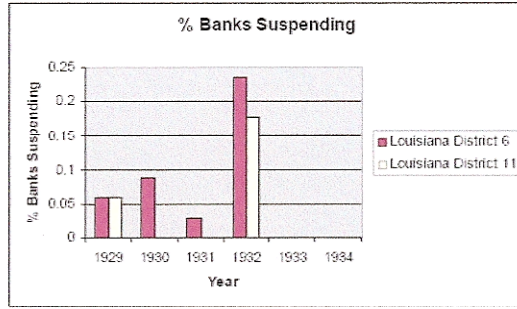
Tennessee (60 banks, 16 counties)  
Virginia (49 banks, 9 counties)

Figure 9  
Tennessee (District 6) vs Kentucky (District 4 & 8)



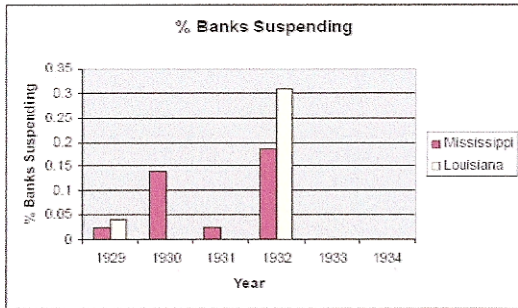
Tennessee (172 banks, 39 counties)  
Kentucky (176 banks, 45 counties)

Figure 10  
Louisiana (District 6) vs Louisiana (District 11)



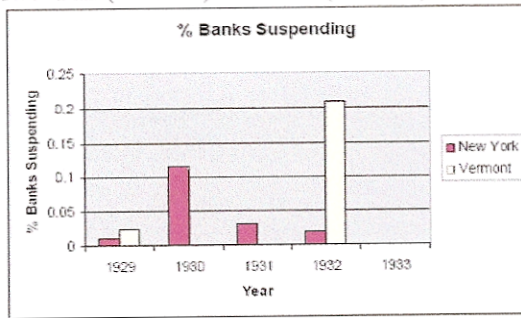
District 6 (34 banks, 9 counties) vs District 11 (34 banks, 12 counties)

Figure 11  
Mississippi (District 6) vs Louisiana (District 11)



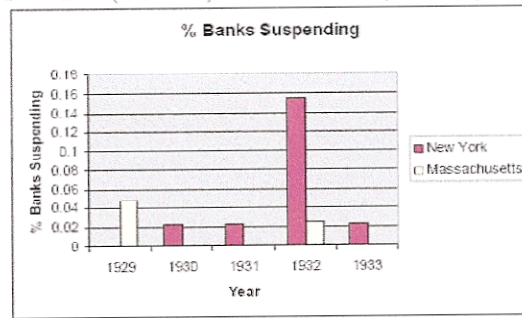
Mississippi (43 banks, 13 counties)  
Louisiana (26 banks, 11 counties)

Figure 12  
New York (District 2) – Vermont (District 1)



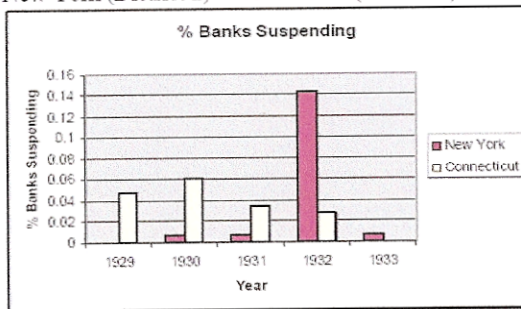
New York (95 banks, 11 counties)  
Vermont (81 banks, 12 counties)

Figure 13  
New York (District 2) – Massachusetts (District 1)



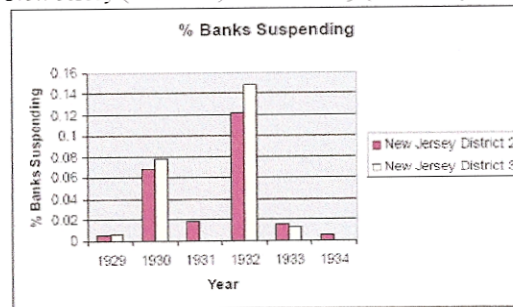
New York (45 banks, 5 counties)  
Massachusetts (41, 4 counties)

Figure 14  
New York (District 2) – Connecticut (District 1)



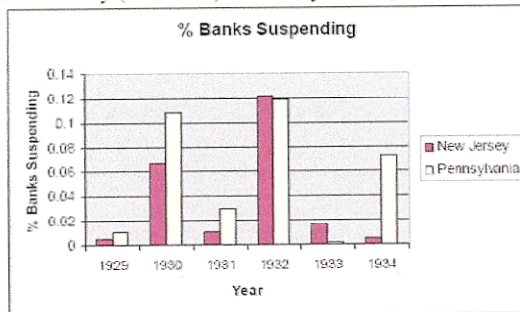
New York (140 banks, 7 counties)  
Connecticut (149 banks, 5 counties)

Figure 15  
New Jersey (District 2) – New Jersey (District 3)



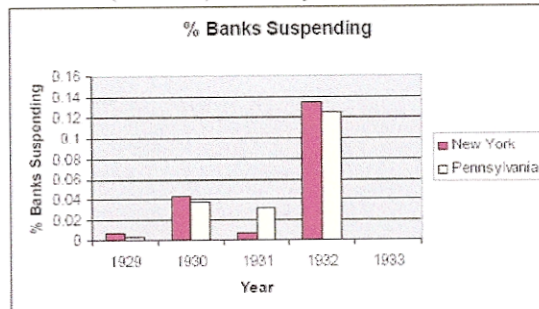
District 2 (383 banks, 13 counties)  
District 3 (154 banks, 8 counties)

Figure 16  
New Jersey (District 2) vs Pennsylvania (District 3)



New Jersey (369 banks, 12 counties)  
Pennsylvania (470 banks, 14 counties)

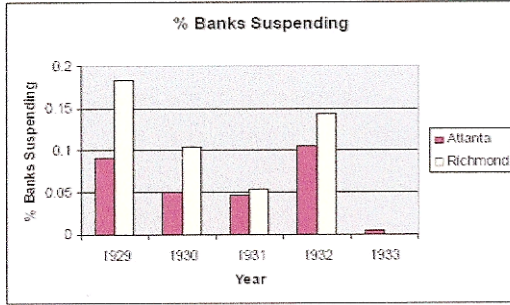
Figure 17  
New York (District 2) vs Pennsylvania (District 3)



New York (282 banks, 21 counties)  
Pennsylvania (344 banks, 26 counties)

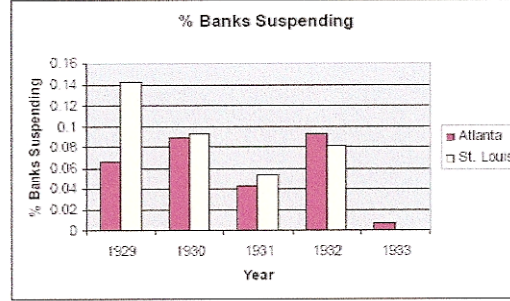


Figure 18  
Atlanta (District 6) – Richmond (District 5)



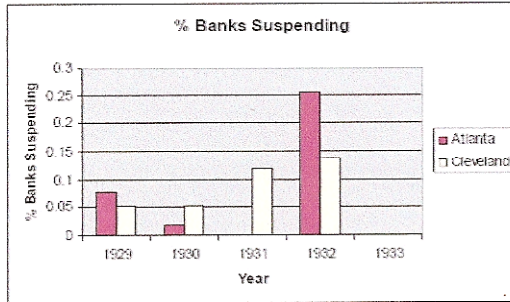
Atlanta (218 banks, 69 counties)  
Richmond (223 banks, 54 counties)

Figure 19  
Atlanta (District 6) – St. Louis (District 8)



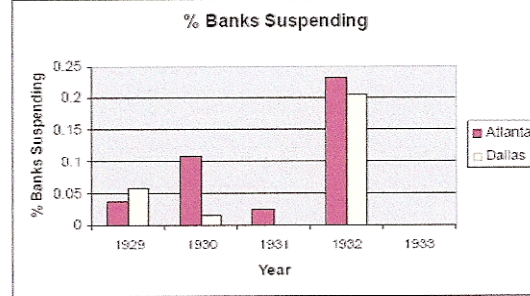
Atlanta (256 banks, 58 counties)  
St. Louis (371 banks, 75 counties)

Figure 20  
Atlanta (District 6) – Cleveland (District 4)



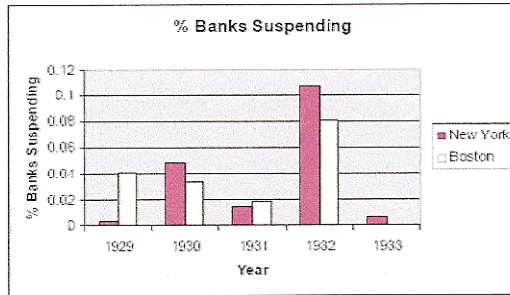
Atlanta (51 banks, 13 counties)  
Cleveland (58 banks, 17 counties)

Figure 21  
Atlanta (District 6) – Dallas (District 11)



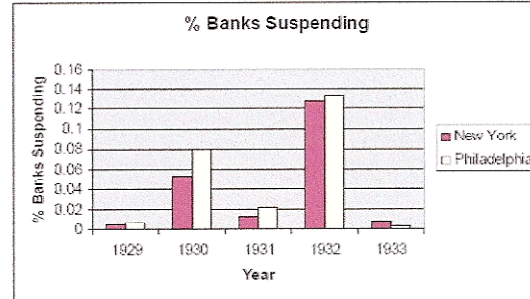
Atlanta (82 banks, 25 counties)  
Dallas (103 banks, 30 counties)

Figure 22  
New York (District 2) – Boston (District 1)



New York (270 banks, 22 counties)  
Boston (271 banks, 22 counties)

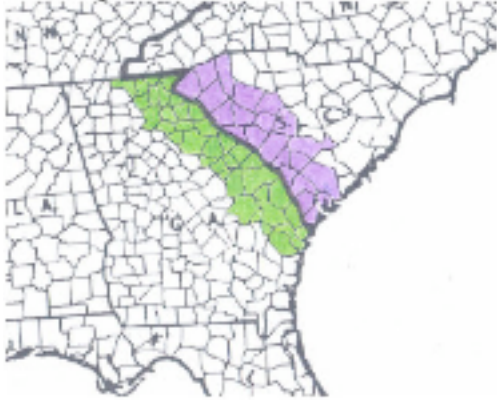
Figure 23  
New York (District 2) – Philadelphia (District 3)



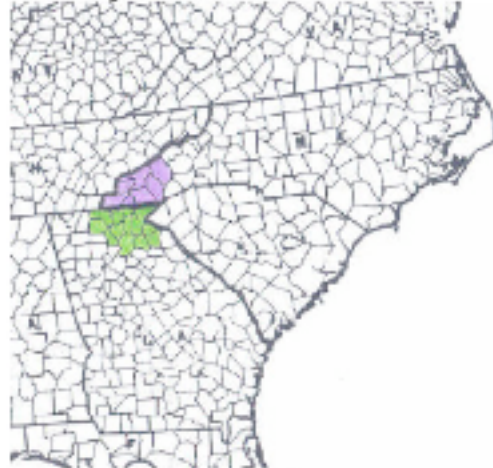
New York (740 banks, 34 counties)  
Philadelphia (854 banks, 42 counties)

## Maps

1. Georgia – South Carolina



2. Georgia – North Carolina



3. Tennessee – North Carolina



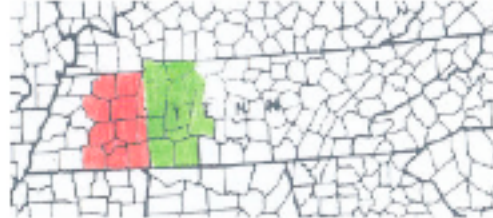
4. Tennessee -- Virginia



5. Tennessee – Kentucky

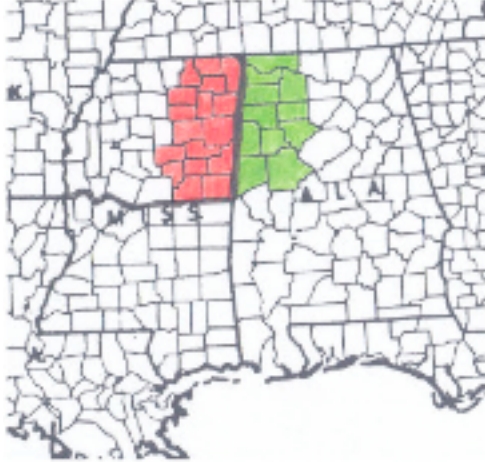


6. Tennessee -- Tennessee

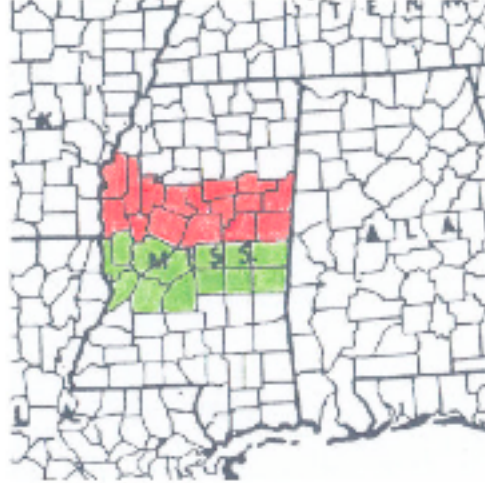


Green = Atlanta Fed; Purple = Richmond Fed; Blue = Cleveland Fed; Red = St. Louis Fed; Orange = Dallas Fed

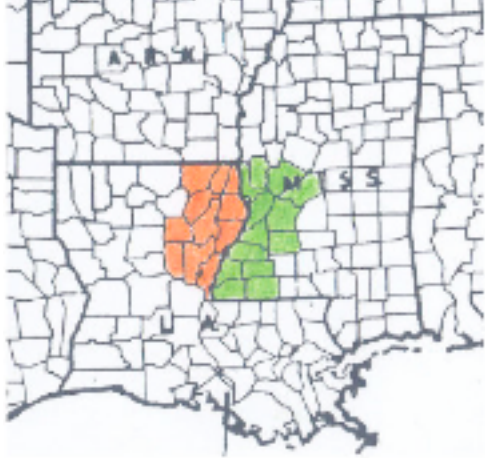
7. Mississippi – Alabama



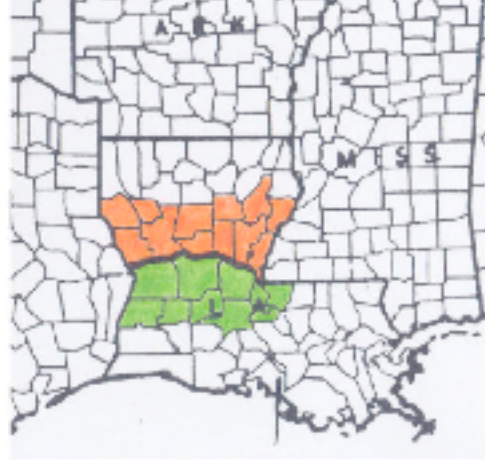
8. Mississippi -- Mississippi



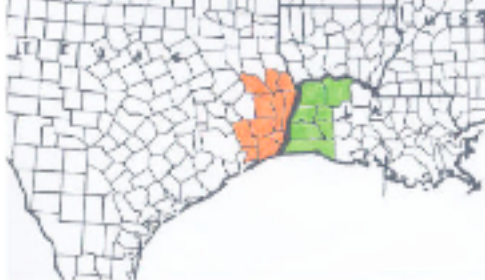
9. Mississippi – Louisiana



10. Louisiana – Louisiana



11. Louisiana – Texas



Green = Atlanta Fed, Purple = Richmond Fed; Blue = Cleveland Fed; Red = St. Louis Fed; Orange = Dallas Fed

12. New York -- Vermont



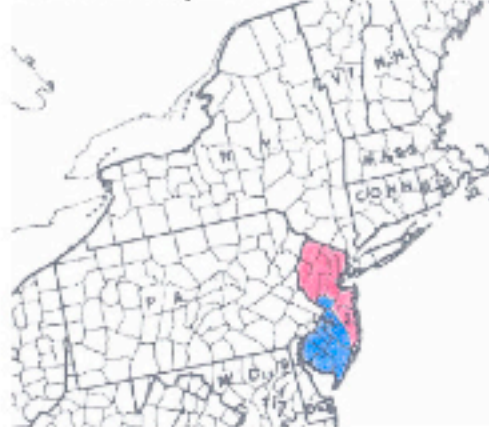
13. New York -- Massachusetts



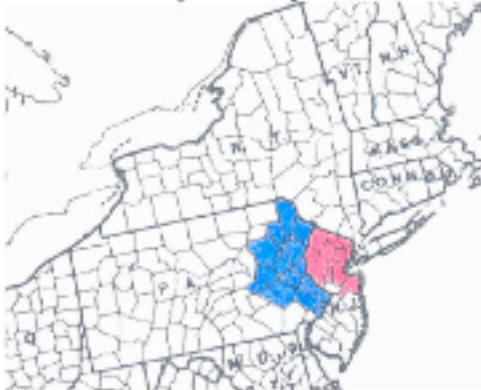
14. New York -- Connecticut



15. New Jersey -- New Jersey



16. New Jersey -- Pennsylvania

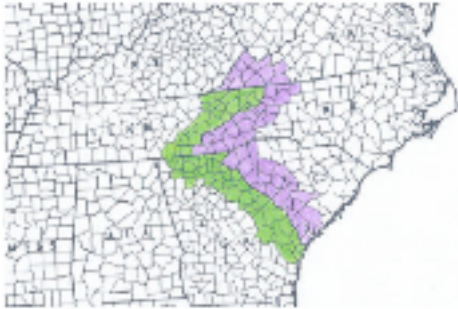


17. New York -- Pennsylvania

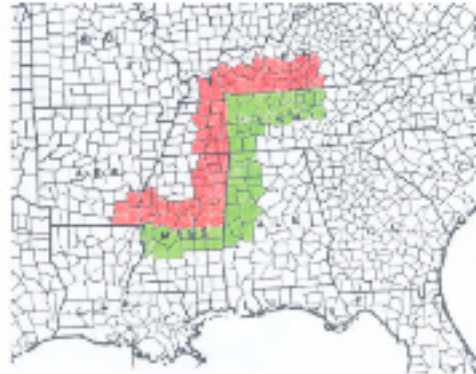


Pink = New York Fed; Purple = Boston Fed; Blue = Philadelphia Fed

18. Atlanta – Richmond



19. Atlanta – St. Louis



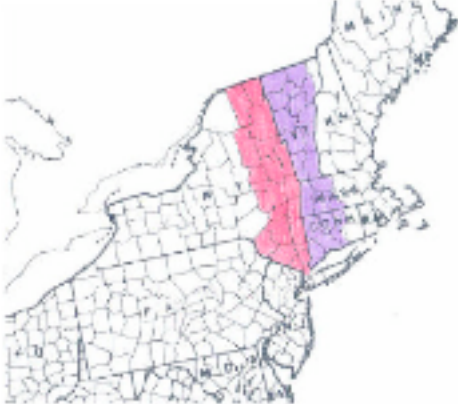
20. Atlanta – Cleveland



21. Atlanta – Dallas



22. New York – Boston



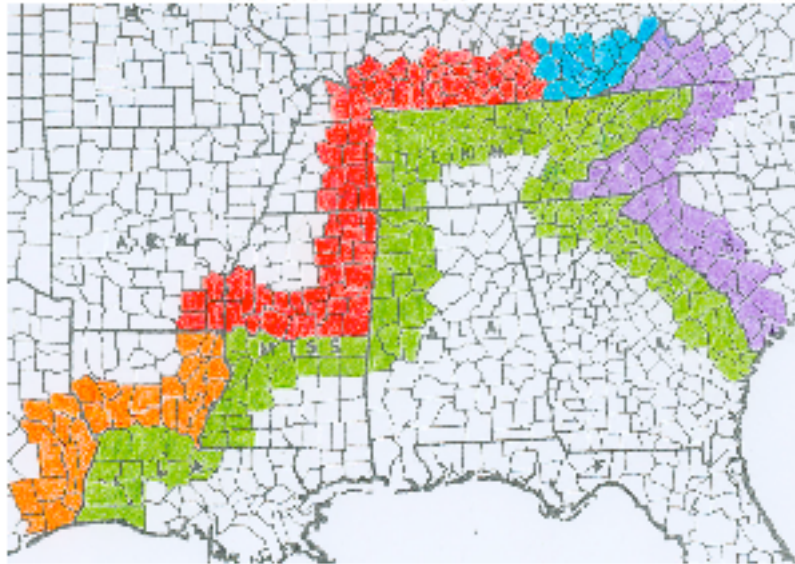
23. New York – Philadelphia



Maps 18-21 (Green = Atlanta Fed, Purple = Richmond Fed, Blue = Cleveland Fed, Red = St. Louis Fed, Orange = Dallas Fed)

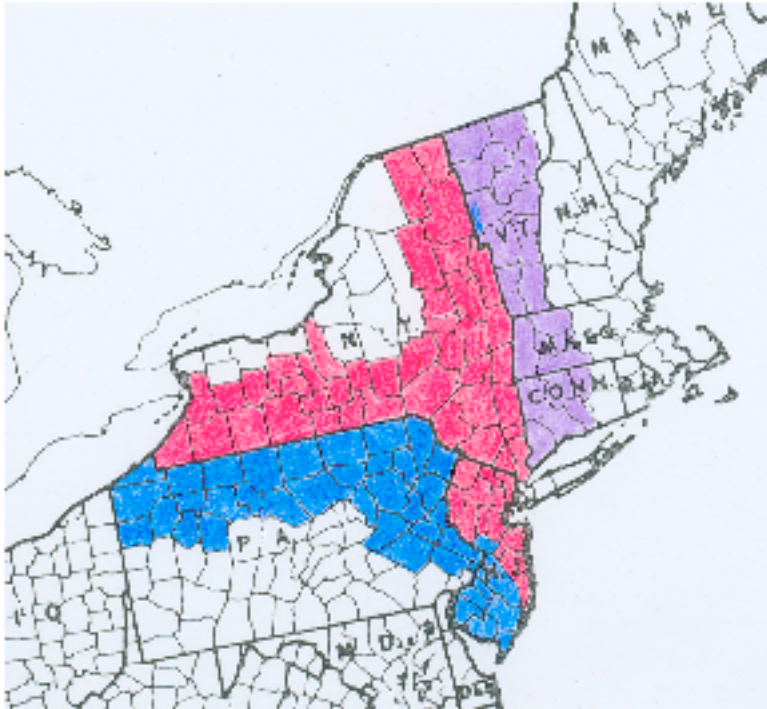
Maps 22-23 (Pink = New York Fed, Purple = Boston Fed, Blue = Philadelphia Fed)

Map 24  
All Counties Within 50 Miles of Atlanta Federal Reserve Border



- Green – Atlanta Federal Reserve District
- Purple – Richmond Federal Reserve District
- Blue – Cleveland Federal Reserve District
- Red – St. Louis Federal Reserve District
- Orange – Dallas Federal Reserve District

Map 25  
All Counties within 50 Miles of New York Federal Reserve Border



Pink – New York Federal Reserve District  
Purple – Boston Federal Reserve District  
Blue – Philadelphia Federal Reserve District

## APPENDIX

### A.1 – Panic Series Documentation

Section A.1 of the appendix provides citations to the contemporary news articles reporting the banking panics on my new series. For each banking panic, I list the following information: (1) the name of the newspaper reporting the panic, (2) the listing of the panic in the index page, (3) the newspaper articles reporting the panic, (4) whether the panic was reported on the front page of the newspaper, and (5) the geographic reach of the panic.

<b>Banking Panic</b>	<b>Newspaper</b>	<b>Index Listing</b>	<b>Newspaper Articles</b>	<b>Front Page</b>	<b>Geographic Reach</b>
Nov 1833 - May 1834	Niles Weekly Register	Bank Run, Bank Failures	Vol 45: [Dec 28, 1833 "Bank Items and Scraps" p. 295; Jan 25, 1834 "Banks and Banking Matters" p. 373; Feb 1, 1834 "Miscellaneous" p. 389; Feb 15, 1834 "The Pressure" p. 415] Vol 46: Mar 1, 1834 "The Pressure" p. 5; Mar 8, 1834 "The Currency" p.17; Mar 22, 1834 "Panic-Makers" p. 51; Mar 29, 1834 "Front Page" p. 65; Apr 5, 1834 "Front Page" p. 82; Apr 12, 1834 "Front Page" p. 97; Apr 19, 1834 "Front Page" p. 113; Apr 19, 1834 "Banks, Currency, and the Times" p. 117-118; Apr 26, 1834 "Banks--Currency--and the Times" p. 133; May 10, 1834 "Maryland Savings Institution" p. 171; May 17, 1834, "Front Page" p. 185]	Yes [Mar 1, 1834; Mar 8, 1834; Mar 29, 1834; Apr 12, 1834; May 17, 1834]	Most of U.S.
Mar - May 1837	Niles Weekly Register	Specie Payments, Suspension of	Vol 52: [Mar 25, 1837 "Money Market" p. 49; Apr 1, 1837 "Money Affairs" p. 66; Apr 8, 1837 "Money Matters in New York" p. 81-82; Apr 15, 1837 "Money Matters" p. 97; Apr 22, 1837 "Money Matters" p. 113; May 6, 1837 "The Money Market" p. 143; May 13, 1837 "Suspension of Specie Payments" p. 161; May 20, 1837 "Suspension of Specie Payments" p. 179-180; May	Yes [May 6, 1837; May 13, 1837; May 27, 1837]	Most of U.S.



			27, 1837 "Front Page" p. 193]		
Oct 1839	Niles Weekly Register	Suspension of Specie Payments, Bank Suspensions	Vol 57: [Oct 12, 1839 "Suspension of Specie Payments" p. 97; Oct 19, 1839 "Suspension of Specie Payments" p. 121-123; Oct 26, 1839 "Suspension of Specie Payments" p. 139--143; Nov 2, 1839 "The Philadelphia Banks in Explanation of their Course" p. 155-156; Nov 9, 1839 "Suspension of Specie Payments" p. 169-170]	Yes [Oct 12, 1839]	Most of U.S.
Jan - Apr 1841	Niles Weekly Register	Banks - Suspension of Specie Payments (Vol 59); Bank Suspension (Vol 60)	Vol 59: [Feb 13, 1841 "Another Suspension of Specie Payments by the Banks" p. 372] Vol 60: [Mar 31, 1841 "Banks" p. 32; Mar 20, 1841 "North Carolina" p. 39; Apr 10, 1841 "Banks" p. 96]	No	PA, DE, MD, NC, VA, IL
Mar 1842	Niles Weekly Register	Bank Run	Vol 62: [Mar 19, 1842 "Banks" p. 48; Mar 25, 1842 "Bank Items" p. 64]	No	PA
May - Jun 1842	Niles Weekly Register and Merchants' Magazine and Commercial Review	Bank Failure (Niles Weekly Register Vol 62); Bank Suspension (Merchants' Magazine and Commercial Review Vol 7)	Vol 62 of Niles Weekly Register: [Jun 18, 1842 "Bank Items" p. 256]; Vol 7 of Merchants' Magazine and Commercial Review: [July 1842 "Monthly Commercial Chronicle" p. 77-79]	No	New Orleans
Oct 1851	Merchants' Magazine and Commercial Review	Bank Failure, Panic	Vol 25: [Nov 1851 "Commercial Chronicle and Review" p. 595]	No	NY, NJ, MD

Sep 1854 - Feb 1855	Merchants' Magazine and Commercial Review	Bank Panic	Vol 31: [Oct 1854 "Commercial Chronicle and Review" p. 460; Nov 1854 "Commercial Chronicle and Review" p. 591; Dec 1854 "Commercial Chronicle and Review" p. 716; Jan 1855 "Commercial Chronicle and Review" p. 81-82; Feb 1855 "Commercial Chronicle and Review" p. 209]	No	OH, IN, MI, WI, IA, MO, NY, CA
Aug - Oct 1857	Merchants' Magazine and Commercial Review	Bank Panic, Bank Suspensions, Financial Revulsion	Vol 37: [Oct 1857 "Commercial and Financial Chronicle" p. 452-453; Nov 1857 "The Commercial Crisis of 1857" p. 531-534; Nov 1857 "Commercial and Financial Chronicle" p. 581-584; Dec 1857 "The Panic and Financial Crisis of 1857" p. 659-668; Dec 1857 "Commercial and Financial Chronicle" p. 711-712]	Yes [Nov 1857; Dec 1857]	Most of U.S.
Nov 1860	Merchants' Magazine and Commercial Review	Bank Suspension, Panic	Vol 44: [Jan 1861 "Commercial and Financial Chronicle" p. 75-84; Feb 1861 "Commercial and Financial Chronicle" p. 196-211]	No	Suspension of Specie Payments by Banks in the South; citywide suspension of specie payments in Philadelphia, Baltimore
Dec 1861	Merchants' Magazine and Commercial Review	Bank Suspension	Vol 46: [Jan 1862 "Commercial Chronicle and Review" p. 100-102; Mar 1862 "Commercial Chronicle and Review" p. 308-313]	No	Generalized Suspension of Specie Payments
Sep 1873	Commercial and Financial Chronicle	Panic	Vol 17: [Sep 13, 1873 "Monetary Trouble and Financial Reform" p. 341-342; Sep 13, 1873 "The Money Market and Financial Situation" p. 350; Sep 20, 1873 "Is the Outlook Hopeful" p. 373-374; Sep 20, 1873 "Financial Remedies and Preventives" p. 375-375; Sep 20, 1873 "The Failures in Wall Street" p. 375-376; Sep 20, 1873 "The Money Market	Yes [Sep 13, 1873; Sep 20, 1873; Sep 27, 1873]	Most of U.S.

			and Financial Situation" p. 382; Sep 27, 1873 "Will Wall Street Recover" p. 405-406; Sep 27, 1873 "The Money Market and Financial Situation" p. 410; Oct 25, 1873 "How Are We Recovering from the Panic?" p. 541-542]		
May 1884	Commercial and Financial Chronicle	Bank Failures, Panic	Vol 38: [May 10, 1884 "The Financial Situation" p. 549; May 10, 1884 "The Money Market and Financial Situation" p. 563; May 17, 1884 "The Financial Situation" p. 581-582; May 17, 1884 "The Money Market and Financial Situation" p. 589; May 24, 1884 "The Financial Situation" p. 605; May 31, 1884 "Lessons Which the Panic Teaches Us" p. 632; May 31, 1884 "The Money Market and Financial Situation" p. 640]	Yes [May 10, 1884; May 17, 1884; May 24, 1884]	NYC, PA, NJ
Nov 1890	Commercial and Financial Chronicle	Panic	Vol 51: [Nov 8, 1890 "The Money Market and Financial Situation" p. 637; Nov 15, 1890 "The Financial Situation" p. 654-655; Nov 15, 1890 "The Money Market and Financial Situation" p. 667; Nov 22, 1890 "The Money Market and Financial Situation" p. 703; Nov 22, 1890 "The Financial Situation" p. 692]	Yes [Nov 15, 1890; Nov 22, 1890]	NYC
May - Aug 1893	Commercial and Financial Chronicle	Bank Failures	Vol 56: [May 13, 1893 "The Financial Situation" p. 770; May 27, 1893 "The Financial Situation" p. 856; Jun 10, 1893 "The Money Market and Financial Situation" p. 964; Jun 17, 1893 "The Money Market and Financial Situation" p. 1000; Jun 24, 1893 "The Money Market and Financial Situation" p. 1046] and Vol 57: [Jul 8, 1893 "Results of President Cleveland's Proclamation" p. 42-43; Jul 15, 1893 "The	Yes [May 13, 1893; May 27, 1893; Jul 22, 1893; Jul 29, 1893]	Most of U.S.

			Money Market and Financial Situation" p. 92; Jul 22, 1893 "The Financial Situation" p. 122; Jul 29, 1893 "The Financial Situation" p. 162; Aug 5, 1893 "Is It the Balance of Trade or the Silver Law?" p. 199; Aug 12, 1893 "The Financial Situation" p. 232; Aug 19, 1893 "The Money Market and Financial Situation" p. 283]		
Dec 1896	Commercial and Financial Chronicle	Bank Failures	Vol 63: [Dec 26, 1896 "The Financial Situation" p. 1132; Dec 26, 1896 "The Money Market and Financial Situation" p. 1146]	Yes [Dec 26, 1896]	MN, IL
Dec 1899	Commercial and Financial Chronicle	Bank Panic	Vol 69: [Dec 16, 1899 "Items about Banks, Bankers and Trust Companies" p. 1227; Dec 23, 1899 "The Financial Situation" p. 1268; Dec 23, 1899 "Items about Banks, Bankers and Trust Companies" p. 1277-1278; Dec 23, 1899 "The Money Market and Financial Situation" p. 1283; Dec 30, 1899 "Items about Banks, Bankers and Trust Companies" p. 1328; Dec 30, 1899 "The Money Market and Financial Situation" p. 1332] and Vol 70: [Jan 6, 1900 "Retrospect of 1899" p. 13-14]	Yes [Dec 16, 1899; Dec 23, 1899; Dec 30, 1899]	Boston, NYC
Jun - Jul 1901	Commercial and Financial Chronicle	Bank Failures	Vol 72: [Jun 29, 1901 "The Financial Situation" p. 1256; Jun 29, 1901 "Items About Banks, Bankers and Trust Companies" p. 1262] and Vol 73: [Jul 6, 1901 "The Financial Situation" p. 2; Jul 6, 1901 "Items About Banks, Bankers and Trust Companies" p. 13; Jul 6, 1901 "The Money Market and Financial Situation" p. 19]	Yes [Jun 29, 1901; Jul 6, 1901]	New York: Buffalo and NYC
Oct 1903	Commercial and	Bank Failures	Vol 77: [Oct 24, 1903 "The Financial Situation" p. 1256;	Yes [Oct 24, 1903]	PA, MD

	Financial Chronicle		Oct 24, 1903 "Items About Banks, Bankers and Trust Co's" p. 1265; Oct 24, 1903 "The Money Market and Financial Situation" p. 1273]		
Dec 1905	Commercial and Financial Chronicle	Bank Failure	Vol 81: [Dec 23, 1905 "The Financial Situation" p. 1752; Dec 23, 1905 "Items About Banks, Bankers and Trust Co's" p. 1765; Dec 23, 1905 "The Money Market and Financial Situation" p. 1774;	Yes [Dec 23, 1905]	Chicago
Oct - Nov 1907	Commercial and Financial Chronicle	Panic	Vol 85: [Oct 12, 1907 "The Financial Situation" p. 888; Oct 19, 1907 "The Financial Situation" p. 968; Oct 26, 1907 "The Financial Situation" p. 1048; Oct 26, 1907 "Items About Banks, Bankers and Trust Co's" p. 1058-1062; Nov 2, 1907 "Review of October" in Supplement Volume p. 21-22; Nov 2, 1907 "The Financial Situation" p. 1108; Dec 7, 1907 "Review of November" in Supplement Volume p. 21-22]	Yes [Oct 26, 1907; Nov 2, 1907]	Most of U.S.
Jan 1908	Commercial and Financial Chronicle	Bank Failures	Vol 86: [Feb 1, 1908 "The Financial Situation" p. 248; Feb 1, 1908 "Items About Banks, Bankers' and Trust Co's; p. 260-262]	Yes [Feb 1, 1908]	NYC
Aug - Sep 1920	Commercial and Financial Chronicle	Bank Disturbance	Vol 111:2 [Oct 2, 1920 "The Boston Bank Disturbances" p. 1327]	No	Boston
Nov 1920 - Feb 1921	Commercial and Financial Chronicle	Bank Closures	Vol 111:2 [Nov 27, 1920 "Closing of Thirteen Banks in North Dakota" p. 2101; Dec 4, 1920 "List of Closed North Dakota Banks Reaches Seventeen--Proposed Examination of Bank of North Dakota" p. 2183; Dec 11, 1920 "Twenty-Three Banks Closed in North Dakota--Relief Measures" p. 2283] and Vol 112:1 [Jan 1, 1921 "Further Closing of Banks in North Dakota" p. 21; Jan 8, 1920 "Still Another	No	ND

			Bank Closed in North Dakota" p. 108; Feb 19, 1921 "Measures to Obtain Financial Relief for North Dakota Delayed" p. 703; Feb 19, 1921 "Bank Failures Still Continue in North Dakota" p. 705; Feb 26, 1920 "Three More North Dakota Banks Fail" p. 793]		
Jul 1926	Commercial and Financial Chronicle	Bank Failures	Vol 123:1 [Jul 17, 1926 "Over 70 Chain Banks in Georgia Close as Result of Petition for Receiver for Bankers' Trust Co. of Atlanta--Florida Banks Also Affected" p. 285-286; Jul 24, 1926 "Bank Suspensions in Georgia and Florida" p. 411-412; Jul 31, 1926 "Chain Bank Failures" p. 499-501; Jul 31, 1926 "Atlanta Clearing House on Georgia Bank Suspensions" p. 529; Aug 7, 1926 "Movement for Reopening of Closed Florida Banks, Reopening of a Georgia Bank, and Closing of Another" p. 666-667; Aug 21, 1926 "Closed Georgia Banks--Nine Reported as Ready to Reopen" p. 936-938; Sep 11, 1926 "Failure of Chain Banks in Georgia Laid to Unsound, Inadequate Laws by Fulton County (Ga.) Grand Jury" p. 1332-1335; Sep 25, 1926 "Failed Georgia Banks--Fourteen of Chain Banks Reported Reopened" p. 1582-1583]	No	FL, GA
Mar 1927	Commercial and Financial Chronicle	Bank Failures	Vol 124:1 [Mar 12, 1927 "Items About Banks, Trust Companies, &C." p. 1467-1468; Mar 19, 1927 "More Florida Banks Fail" p. 1620-1621; Mar 26, 1927 "Another Florida Bank Fails" p. 1772]	No	FL
Jul - Aug 1929	Commercial and Financial Chronicle	Bank Failures	Vol 129:1 [Jul 20, 1929 "The Florida Bank Failures" p. 422, Jul 27, 1929 "The Florida Bank Failures" p.	No	FL

			576, Aug 3, 1929 "Florida Bank Failures Now Thirty-two" p.743, Aug 10, 1929 "Charles W. Collins, Formerly Deputy Comptroller of Currency, Says We Have Inherited 'Antiquated and Worn Out' Banking System--Cause of Florida Bank Failures--Predicts World-Wide Branch Bank System" p. 905, Aug 10, 1929 "Florida Bank Failures" p. 909; Aug 31, 1929 "Reopening of Tampa (Florida) Bank--Other Closed Florida Institutions Reported Reopened--New Laws Permits Opening Under 'Freezing' Provisions" p. 1386; Sep 7, 1929 "Florida Banking--State Bank Examiner Estimates Payments to Depositors by Five Closed Banks" p. 1541]		
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## A.2 – Panic Classification

Section A.2 of the appendix provides a more extensive description of the classification of major banking panics that I outline in section 4.2 of my paper. It also provides detailed documentation of the contemporary news sources that I cite in that section.

### Banking Panic of 1833-4

The Panic of 1833 broke out towards the end of November. In the weeks and months preceding the panic, economic commentators reported positively on the state of the economy. On the eve of the panic, commentators were describing “the unexampled prosperity of the year”<sup>78</sup> and were reporting that “every thing has the appearance that an early and extensive fall business will be done.”<sup>79</sup> By all accounts, economic conditions seemed to be booming in the weeks and months prior to panic.<sup>80</sup>

<sup>78</sup> *New York Commercial Advertiser*, Wed Oct 2, 1833, p. 2.

<sup>79</sup> *New York Commercial Advertiser*, Aug 17, 1833, “Review of Market.”

<sup>80</sup> Some additional accounts:

“It is the opinion of the best informed men that this city has never seen a more prosperous time than the present, and during the past year business of almost every description has been good. ... The internal

The events leading up to the panic of 1833 begin with President Andrew Jackson's "war" against the Second Bank of the United States. Chartered in 1816, the Second Bank of the United States served as the country's fiscal agent, promoted a more uniform national currency, and aided the economy in times of distress. Accordingly, many historians view the Bank of the United States as a quasi-central bank.

Andrew Jackson was a consistent opponent of the Bank of the United States throughout the course of his presidential administration. His antipathy towards the Bank was primarily ideological. A populist and champion of the common man, Jackson believed that the Bank of the United States concentrated too much financial power in one institution, benefited the east and the north at the expense of the south and the west, and made the rich richer. The bank's charter was set to expire in 1836, but out of a desire to prematurely weaken the institution, he decided to remove the government deposits from the Bank of the United States.

The U.S. government began withdrawing its deposits from the Bank of the United States on October 1, 1833 and soon thereafter, confidence in the Bank of the United States quickly became impaired, according to the news reports. In November, runs on branches of the Bank of the United States occurred, with one very notable run on its Savannah branch, in which \$350,000 in specie was demanded. Over the next several months, confidence in the stability of the nation's banking system deteriorated and the panic spread and intensified. Through the end of May 1834, bank runs and suspensions, along with general conditions of financial unrest, were reported by the press.

Why did a panic erupt in 1833 in a time of economic prosperity? The newspaper accounts attribute the panic's origins to the destruction of "aggregate individual confidence" following the removal of the government deposits from the Bank of the United States. Fears that the country's quasi-central bank would be weakened and that the nation's banking system might be destabilized were widely reported by the press. This impairment of confidence, according to the news reports, precipitated the panic. Indeed, the news reports characterize the panic as a financial disturbance that occurred due to a radical change in market expectations regarding the stability of the banking system.

How has this been done? By removing the "Deposites" from the Bank of the United States and its Branches: THEREBY IMPAIRING INDIVIDUAL CONFIDENCE—AND DESTROYING PUBLIC CREDIT...

And how has the removal of the "deposites" caused the distress and alarm which pervades the seaport towns—and which, if the panic be not arrested, will, in another three months, suspend specie payment? I answer—by impairing and finally destroying public credit. And what is

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commerce has also been flourishing... At the present moment there is every appearance of a large and extensive fall trade" (*New York Commercial Advertiser*, Aug 31, 1833, "Review of Market")  
"For the season of the year we have had a week of extraordinary activity" (*New York Commercial Advertiser*, Aug 17, 1833, "Review of Market").



Public Credit? It is the aggregate of individual confidence. And what were the elements of this confidence, in reference to the matter we are considering? What sustained it? On what was it founded? Chiefly on a knowledge of the fact—that the Bank of the United States had and did control domestic exchange—regulate its rates—and give to the country a uniform currency—and on the belief that the means, in cash and bills, were abundant for the purposes of trade and commerce. Well—the “deposits” are withdrawn—and we are told that this cannot affect public credit, or in any way impair individual confidence—because the quantity of specie and bills is not reduced. The amount is the same as before. It has only changed its place of repose. So, if you seize a man and strangle him, he is the same man still—that is—he has lost none of his powers of usefulness—because he has the same quantity of flesh and blood and bone that he had when living.<sup>81</sup>

That the removal of the government deposits from the Bank of the United States undermined confidence in the banking system and had an adverse effect on market expectations is quickly apparent from the financial press.<sup>82</sup>

During a time of economic prosperity, a political decision, unrelated to underlying economic conditions—the removal of the government deposits from the Bank of the United States—brought forth a significant change in market expectations regarding the stability of the nation’s banking system that caused a panic. The panic of 1833 is, consequently, assigned a 3 on both dimensions of the scale.

### Banking Panic of 1837

The Panic of 1837, the second major banking panic of the 1830s, broke out during the spring of that year. In contrast to the reporting of other panics, the press failed to provide descriptions of economic conditions on the eve of the outbreak of this panic. The section in the *New York Commercial Advertiser* that described economic conditions—“Review of the Market”—was discontinued in 1837.

Signs of financial and monetary unrest were first visible in March and April, primarily in New Orleans and New York City. The panic erupted in May when New York was forced to suspend specie payments following a dramatic run on its banks. Other regions quickly followed New York’s lead. Suspension of specie payments continued until May 1838.

The newspaper accounts were in widespread disagreement regarding the causes of the panic of 1837. Some argued that the Treasury Circular, an executive order passed by

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<sup>81</sup> *New York Commercial Advertiser*, Jan 6, 1834, “Correspondence for the Commercial Advertiser.

<sup>82</sup> The effect of the withdrawal of the government deposits on market expectations may have been even further amplified by the intense political debate as portrayed in the newspapers. Supporters of Jackson attacked the Bank of the United States as an unjust monopoly and argued for its termination, while Bank supporters excoriated the Jackson administration for its policies and predicted not only a derangement of the currency and credit but also financial catastrophe. It seems unlikely that depositors’ expectations would have remained undisturbed in the midst of such a fight.

the Jackson administration requiring that government lands be purchased with either gold or silver, caused the panic. The circular's intended objective centered on curbing speculation in lands. Many in the press noted, however, that the circular aggravated monetary conditions and destabilized the banking system by moving specie from eastern financial centers, where it was severely needed, to the west, where it was now required for purchasing government lands. Others identified another Jacksonian measure—the administration's 1836 decision to distribute the government surplus among the states—as the cause of the panic. This measure demanded the transfer of the government surplus from the pet banks to the states in four equal quarterly installments beginning on January 1, 1837. The news accounts, however, reported that forcing the pet banks to relinquish the surplus placed those institutions under undue strain, further destabilizing the nation's banking system. Still, others cited a different cause of the panic: years of unstable activity in the banking sector. Following President Jackson's bank war, the Bank of the United States was no longer in a position to oversee the nation's banking system and act as a regulator. The result, according to many in the press, was a multiplication of banks and an expansion that fueled inflation and rampant speculation.<sup>83</sup> As a consequence, many news reports identified this unstable banking environment as the cause of the panic.

The newspaper records are in widespread disagreement regarding the causes of this panic. They also fail to provide descriptions of the state of the economy prior to the outbreak of the panic. Therefore, I omit the panic of 1837 from both dimensions of the scale.<sup>84</sup>

### Banking Panic of 1839

Like its predecessor, the press failed to provide descriptions of the state of the economy prior to the outbreak of this panic. The section in the *New York Commercial Advertiser* that described economic conditions—"Review of the Market"—was still not in operation in 1839.

The Panic of 1839 broke out on October 9, 1839 when the banks of Philadelphia suspended specie payments. As news of the Philadelphia suspensions spread, other cities followed Philadelphia's lead in suspending payments, fearing that their reserves would be drained if they continued to pay out specie while their neighbors did not. As a consequence, by the middle of October, cities and towns throughout the country had suspended specie payments.

The press provided a variety of causes—often in conflict with one another—for the outbreak of panic in 1839. Some identified the misguided decision of Philadelphia banking officials to suspend specie payments as the cause of the panic. Others argued

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<sup>83</sup> More recently, Temin (1968) provides a different explanation of the inflation and speculation of the 1830s. He argues that international developments—capital inflows and specie inflows—caused the great inflation of the mid 1830s, rather than the impairment of the Bank of the United States.

<sup>84</sup> It might be tempting to classify this panic as a 3 on the first dimension of the scale on the grounds that political events were cited as causes; however, since the newspaper records are in disarray and do not agree on the causes, I omit this panic from the ranking to reflect the uncertainty that is displayed in these accounts.

that the suspension was an unavoidable consequence of specie outflows engineered by the Bank of England to strengthen its reserve position.<sup>85</sup> A few others identified the previous panic as the cause, arguing that resumption in 1838 was premature and that the banks—as well as the overall economy—had not yet fully recovered from the prior financial disturbance. Consequently, the editors of the *Niles Weekly Register* described the uncertainty they felt regarding the causes of the panic,

we are too much in the dark as to the immediate cause of the catastrophe,  
to venture a decided opinion on the causes which produced it.<sup>86</sup>

The newspaper records do not seem to know what caused the panic and are in widespread disagreement. The press also failed to provide descriptions of the state of the economy on the eve of the outbreak of the panic. Therefore, I omit the panic of 1839 from both dimensions of the scale.

### Banking Panic of 1857

The Panic of 1857 began during the last week of August. On the eve of the outbreak of the panic, the newspaper accounts reported positively on the state of the economy. In the September edition of *The Merchants' Magazine and Commercial Review*, the editors wrote “The country continues prosperous...We have passed through the summer, blest with unusual abundance in every department of agricultural labor, and without any serious commercial or financial difficulty.”<sup>87</sup> The Aug 27<sup>th</sup> *New York Commercial Advertiser* echoes this description: “The general business of the country is in a good condition, presenting both present and prospective, a most healthy appearance...There never was a time when merchants and bankers were in a better condition than at present.”<sup>88</sup> Indeed, by all accounts, economic conditions were prosperous prior to the outbreak of panic.

The first bank failure—the Ohio Life Insurance Company—occurred on August 24<sup>th</sup>. Its failure was attributed to mismanagement and fraudulent activities. Edward Ludlow, the director of its New York office, loaned \$2 million, an amount that equaled the firm’s capital, to several railroad companies, with a significant proportion being loaned to the struggling Cleveland & Pittsburgh road. Following the bank’s suspension, Charles Stetson, the president of the company, seemed to be unaware of Ludlow’s activities and immediately launched an investigation. The extent of Ludlow’s mismanagement is still unclear—charges that his activities involved fraud and that he stole money for his own devices were leveled against him.

The collapse of this banking firm triggered the panic. The Ohio Life was considered one of the most reputable firms in the nation and initially, the cause of its

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<sup>85</sup> In 1839, the Bank of England’s specie reserves had fallen to low levels. At the same time, a wave of crop failures hit the country, forcing England to significantly increase its food imports. To pay for these imports, England required additional specie. The result was a drain of specie from the U.S. to England, according to the press.

<sup>86</sup> *Niles Weekly Register*, Oct 26, 1839, “Suspension of Specie Payments,” p. 139.

<sup>87</sup> *Merchants' Magazine and Commercial Review*, “Commercial Chronicle and Review,” September 1857, p. 325.

<sup>88</sup> “Cincinnati Gazette of Tuesday, Aug 25” in *New York Commercial Advertiser*, August 27, 1857.

failure was unknown. Its demise shocked the financial community and sparked runs on banks throughout the country. Over the next several weeks, fear spread and the panic gained in intensity. On September 25<sup>th</sup>, the Bank of Pennsylvania suspended, along with a generalized suspension of specie payments by the banks in Philadelphia, Baltimore, Washington, and many of the interior cities. The panic reached its climax when a dramatic run on the New York City banks forced the city to suspend specie payments on October 13.

Why did a panic of such large magnitude erupt in a time of relative economic prosperity?

The newspaper reports identify a contagion of fear following the failure of the Ohio Life Insurance Company as the primary cause of the panic:

In looking back over the course of the disastrous tide, it is easy to see that, whatever other causes may have laid the foundation for the revulsion, it was *panic* that lifted the floodgates and precipitated calamity. If a house of assembly, improperly constructed, is filled to overflowing, and a bench break in the gallery, the idea that the building is falling may be disseminated by an injudicious word, and, under the influence of *fright*, hundreds of lives be lost in the struggle to escape. Now, if we grant that the number admitted was too great for safety—that the place of egress was narrow and dangerous—or even that the crowd were reckless and selfish, we must still admit that, but for the fright, the company might all have retired at their leisure, without danger or difficulty.<sup>89</sup>

In another article, the editors of the *Merchants' Magazine* identify the invention of the electro telegraph as the immediate cause of the panic. The electro telegraph enabled the news of failures to be rapidly communicated to cities and towns throughout the country, thereby spreading fear and depositor unrest.

the more immediate cause of the panic, and which tended to aggravate the evils more than tenfold, is the operation of the electro telegraph, by means of which bad news, such as the failure or embarrassment of a bank, of a merchant or manufacturer, was immediately communicated to all the cities and large towns of the United States; and information of all such misfortunes was immediately concentrated in all the cities, and worked up the minds of the laboring classes, as well as those of the business men, to a fever of excitement, causing fearful apprehensions among them in every city, that their banks also would fail, and inducing many, out of prudence, to withdraw their deposits, and to convert their bank notes into coin.<sup>90</sup>

The daily news reporting found in the *New York Commercial Advertiser* corroborates this characterization of the panic. Telegraphic dispatches announcing bank suspensions and runs were reported by the press beginning in the immediate aftermath of the failure of the Ohio Life Insurance Company, sparking bank runs and a decline in confidence that intensified over time.

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<sup>89</sup> *Merchants' Magazine and Commercial Review*, Oct 1857, p. 452.

<sup>90</sup> *Merchants' Magazine and Commercial Review*, Dec 1857, p. 660.

During a time of economic prosperity, the failure of a mismanaged banking company and the contagion of fear generated in the aftermath of its failure caused a panic. Consequently, the panic of 1857 is assigned a 3 on both dimensions of the scale.

### Banking Panic of 1873

On the eve of the outbreak of the panic of 1873, economic conditions were prosperous, according to the newspaper records. The Comptroller of the Currency described the period preceding the panic as follows:

there were in almost every direction evidences of prosperity. The harvest was nearly or quite completed, and the bins and granaries were full to overflowing. The manufacturing and mining interests had also been prosperous during the year, and there was good promise that the fall trade which had opened, would be as large as during previous years.<sup>91</sup>

Indeed, prior to the outbreak of panic, the newspaper records were positive in describing economic conditions.<sup>92</sup>

The panic of 1873 had its origins abroad. In May, a stock market crash in Vienna caused European investors to dispose of their holdings of American securities, and especially, their holdings of railroad bonds, the leading American security traded internationally. As a consequence, domestic markets became overloaded with railroad bonds to such a large degree that new bond sales could no longer be realized, cutting off the resources of many railroad companies and forcing several of them to default on interest payments. Over time, this precarious financial situation, along with the failure of some minor firms associated with the railroad sector, generated a feeling of distrust toward the railroad industry. On September 18, 1873, the failure of Jay Cooke and Company, a prominent banking company with connections to several railroad companies, unleashed the panic.

According to the newspaper records, international contagion caused the panic of 1873. The Annual Report of the Comptroller of the Currency, published in the *Commercial and Financial Chronicle*, described the transmission mechanism of an international crisis to the U.S.

The immediate cause of the crisis is, however, more apparent. The money market had become overloaded with debt, the cost of railroad construction for five years past being estimated to have been \$1,700,000,000, or about \$340,000,000 annually...such bonds and stock had been disposed of to a considerable extent in foreign markets, and as long as this continued the sale of similar securities was stimulated, and additional amounts offered.

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<sup>91</sup> "Report of Comptroller of the Currency" in the *Commercial and Financial Chronicle*, Dec 6, 1873, p. 767-768.

<sup>92</sup> Some additional accounts:

"Business has been large during the past week...the buying capacity of the country for the coming year will be large" (Aug 30, 1873, *Commercial and Financial Chronicle*, "Commercial Epitome," p. 294)

"In the aggregate the volume of business has been large, and a cheerful tone pervades mercantile circles" (Sept 13, 1873, *Commercial and Financial Chronicle*, "Commercial Epitome," p. 358).

When the sales of such securities could no longer be effected abroad, the bonds of railroads and other enterprises of like nature which were in process of construction were thus forced upon the home market, until their negotiation became almost impossible. The bankers of the city of New York, who were burdened with the load, could not respond to the demands of their creditors, the numerous holders of similar securities became alarmed, and the panic soon extended throughout the country.<sup>93</sup>

During a time of economic prosperity, international forces transmitted a crisis in Europe to the United States via the unloading of American railroad securities abroad.<sup>94</sup> Therefore, the panic of 1873 merits a 3 on both dimensions of the scale.

### Banking Panic of 1893

In contrast to many of the earlier panics, the press did not describe economic conditions as prosperous on the eve of the outbreak of the panic of 1893. There were reports of many business and mercantile failures and the *Commercial and Financial Chronicle* made general references to an “existing depression.”<sup>95</sup> The newspaper reporting suggests that the panic of 1893 might have occurred in the midst of a downturn.

The newspaper records attribute the outbreak of panic in 1893 to the Sherman Silver Purchase Act of 1890, a measure passed by pro-silver forces in the U.S. Congress. The Act’s intended objectives centered on curbing deflation to improve the plight of debt-laden farmers; however, according to the press, it failed to achieve its goals and instead, served primarily to weaken the U.S. commitment to the gold standard. The Sherman Silver Act mandated that the U.S. government purchase 4.5 million ounces of silver bullion every month with notes that could be subsequently redeemed in either gold or silver—a requirement that over time, impaired the government’s gold reserves and sparked doubts at home and abroad that the U.S. would remain on the gold standard. Fears that the U.S. would be forced onto a silver standard became self-fulfilling as foreign investors began withdrawing gold from the country in large quantities. Gold exports, coupled with growing anxiety over the U.S. commitment to the gold standard, undermined confidence in the nation’s banking system. Runs by nervous depositors began in May of 1893 and the panic grew in intensity during June, July, and August. According to the press reports, by causing gold outflows, the Sherman Silver Purchase Act weakened depositor confidence, precipitating bank runs and hoarding of currency and gold.

Nothing could better illustrate the utter and general loss of confidence than this disappearance of paper money. Every one was satisfied that gold was being hoarded and would go on being hoarded so long as the conditions remained as they were. The uninterrupted and increasing export of that

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<sup>93</sup> Report of the Comptroller of the Currency” in the *Commercial and Financial Chronicle*, Dec 6, 1873, p. 767-768.

<sup>94</sup> Many among the press even referred to the panic of 1873 as the “Railroad Bond Panic.”

<sup>95</sup> *Commercial and Financial Chronicle*, June 10, 1893, “The Financial Situation,” p. 946 and *Commercial and Financial Chronicle*, May 13, 1893, “The Depression in the Iron and Steel Trades,” p.775.

metal and the continuance of the silver bullion purchases which were forcing the outflow would obviously lead that result...But hoarding currency is another affair altogether...the withdrawals have been in the main the work of the more ignorant classes, who really have no clear notion of the actual situation. They have read and heard everywhere of the large outflow of gold money and without possessing any distinct idea of the cause for the outflow, the fact has excited their fears and led them to hold on to [their] currency.<sup>96</sup>

The newspaper records identify the Sherman Silver Purchase Act as the primary cause for the panic of 1893.

Probably a serious crisis never occurred which could be charged wholly to a single force. There is though always an obvious, dominant force...The dominant force now is no doubt the Silver Purchase law. In that belief the nation is almost of one mind; it recognizes too that owing to the action of that law the country is on the verge of a most fearful catastrophe. Already the cry of distress is heard from every part of the land.<sup>97</sup>

Of course no one can expect any revival of enterprise or even of confidence so long as the purchase clause of the 1890 silver law remains unrepealed...Such a defective measure of values is a sufficient cause for our financial disturbance. That being true, there is no need for looking for a further explanation.<sup>98</sup>

A political decision—the Sherman Silver Purchase Act—brought forth a change in market expectations regarding the stability of the nation’s monetary and banking system that led to panic. Consequently, I classify the panic of 1893 as a 3 on the first dimension of the scale. However, it receives a 1 rather than a 3 on the second dimension because the press described declining economic conditions on the eve of the panic.

### Banking Panic of 1907

Prior to the onset of the Panic of 1907, the newspaper accounts reported negatively on the state of the economy. The press described large increases in commercial failures in the months preceding the panic and made frequent references to an “existing depression” and to a “recession in business.”<sup>99</sup> The newspaper records suggest that economic activity was declining when the panic broke out. The Panic of 1907 is, therefore, assigned a 1 on the second dimension of the scale.

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<sup>96</sup> *Commercial and Financial Chronicle*, Aug 12, 1893, “The Financial Situation,” p. 232.

<sup>97</sup> *Commercial and Financial Chronicle*, Aug 5, 1893, “Is It the Balance of Trade or the Silver Law, p. 199.

<sup>98</sup> *Commercial and Financial Chronicle*, July 8, 1893, “Results of President Cleveland’s Proclamation,” p. 42-43.

<sup>99</sup> *Commercial and Financial Chronicle*, Oct 5, 1907, “The Financial Situation,” p. 826-8, *Commercial and Financial Chronicle*, Oct 5, 1907, “Commercial Epitome,” p. 871, and *Commercial and Financial Chronicle*, Nov 2, 1907, “Review of October,” p. 22.

The actions of a group of New York City financiers, with controlling interests over several banks, triggered the panic of 1907.<sup>100</sup> The group misappropriated bank funds to speculate on rising copper prices. The gamble proved to be a mistake. Copper prices collapsed and news of these events triggered runs on the banks implicated in the speculation. The New York Clearing House extended aid to these troubled institutions following an inspection that deemed the banks solvent and the resignation of those implicated in the scandal. A few days later, on October 21, the president of the Knickerbocker Trust Company, the third largest trust company in New York, resigned amid rumors that he had business connections with one of the speculators. On the same day, the National Bank of Commerce announced that it would discontinue clearing for the Knickerbocker.<sup>101</sup> This precipitated a run on the Knickerbocker on October 22, forcing it to pay \$8,000,000 to depositors before it suspended. The suspension of the Knickerbocker Trust Company unleashed the panic. Rumors that other banks and trust companies might be connected to the speculators unsettled public confidence and the panic quickly spread throughout the city.<sup>102</sup> Within a few days, the panic spanned most of the country.

What caused the panic of 1907? In contrast to the reporting of prior panics, the *Commercial and Financial Chronicle* failed to provide a primary cause for the panic of 1907. Instead, it confined most of its reporting of the panic to a description of events, with little analysis of the panic's causes, and in those articles that actually did directly address the panic's causes, the *Chronicle* mentioned several forces that worked to undermine confidence in the banking system. For one, the *Chronicle* attributed part of the decline in confidence to the growing evidence of a recession:

The more immediate causes for the upheaval deserve narration here...adverse developments kept piling up one after another...There were...multiplying evidences of a reaction in the iron and steel trades and of recession in general business.<sup>103</sup>

For another, the *Chronicle* identified the misappropriation of bank funds for speculative purposes—and the implication of other banks and trust companies—as another shock to confidence.

The *Chronicle* identified growing signs of a recession as a force that undermined confidence—an indicator that the panic may have been caused by depositor anxiety that a

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<sup>100</sup> Most prominently August F Heinze, Charles W. Morse, Edward R. Thomas and Orland F. Thomas.

<sup>101</sup> The Knickerbocker was subsequently shown to be solvent. Goodhart (1997) raises the possibility that rivalries between the national banks and trust companies played a role in the refusal of the National Bank of Commerce to clear for the Knickerbocker.

<sup>102</sup> On Oct 22, the day following the suspension of the Knickerbocker, a run occurred on the Trust Company of America, one of the other prominent trust companies of New York, after one of the daily newspapers published an article alleging that the president of the Knickerbocker and Mr. Morse, one of the speculators, had borrowed large amounts of money from the Trust Company of America. The article was subsequently revealed to be false, but it unsettled public confidence and precipitated a run, forcing the Trust Company of America to pay \$12,000,000 to depositors. From there, the panic quickly grew in intensity, extending to banks and trust companies throughout the city.

<sup>103</sup> *Commercial and Financial Chronicle*, Nov 2, 1907, "Review of October," p. 22.



downturn would cause banks to fail or suspend. However, the *Chronicle* also identified the misappropriation of bank funds for speculative purposes as a force that undermined confidence—an indicator that the panic may have been triggered by fraudulent banking activities in New York and that it then spread throughout the country due to a subsequent contagion of fear. Thus, because the newspaper accounts identify a downturn as well as an event unrelated to the downturn as causes of the panic, the panic of 1907 merits a 2 on the first dimension of the scale. It is unclear from the newspaper records alone whether the panic of 1907 was more likely to have been caused by a downturn than by another disturbance.