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FINANCIAL CRISES: HISTORY, THEORY AND NEW INSIGHTS

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ABSTRACT

This review essay discusses the history, causes and consequences of financial crises. In recent years scholars have assembled new sources of data and utilized new empirical designs to analyze crises, shedding light on old questions and producing new insights. This essay highlights those new insights, and uses the historical record of crises in the United States to put those insights into perspective. I begin with a discussion of the defining characteristics of financial crises and their evolution, both in the U.S. and in the rest of the world. I then revisit the chronology of crises in the U.S. since 1870. Data on bank failure rates and large-bank equity losses suggest that some panics were not full-blown financial crises, and also identify episodes when no panic occurred that could potentially be considered crises. I then turn to two categories of theoretical models developed to analyze the mechanisms responsible for crises. The first focuses on asset price bubbles, which have been associated with many crises. The second is focused on the dynamics of bank runs and panics, which have been especially common in the United States. Finally, I present an overview of the effects of crises and the mechanisms transmitting financial distress in the banking system into the rest of the economy.

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1. Introduction

Financial crises, like disease outbreaks, are recurring events with devastating consequences. Contagious and difficult to control, crises trigger steep declines in asset prices, disrupt credit intermediation, and precipitate waves of business failures, unemployment and other economic dislocations. The experience of living through a crisis can have lasting impacts, even shaping individuals' beliefs and preferences decades later (Malmendier, 2021). Crises can also have significant political repercussions (Funke et al., 2016). One of the largest-ever financial crises, the Great Depression, contributed to the rise of fascism in Europe, and to an unprecedented reconfiguration of American institutions, in the form of President Franklin Delano Roosevelt's New Deal.

Over the past two centuries, as financial markets and institutions evolved, the character and frequency of financial crises evolved as well. From the early 19th century until the mid-20th century, crises occurred with some regularity. Particularly in the United States, the most acute phases of those crises often began with the outbreak of banking panics—widespread runs on financial institutions, leading to a broad scramble for liquidity. Then in the period from the 1940s to the 1970s, a time of rigid financial regulations and strong public roles in the allocation of credit, there were essentially no financial crises at all. Finally, beginning in the 1970s, many countries implemented financial liberalizations, and financial crises began to recur, but in variants that differed somewhat from their historical antecedents. Deposit insurance schemes generally ended major panics within the commercial banking systems of high-income countries; many crises occurred without panics (Baron et al., 2021). Panics reemerged in some financial crises, but broke out among the holders of short-term financial liabilities outside the purview of deposit insurance systems, such as international lenders, or, more recently, depositors in shadow banking systems.

This review essay discusses the history, causes and consequences of financial crises. In recent years scholars have assembled new sources of data and utilized new empirical designs to analyze crises, shedding light on old questions and producing new insights. This essay highlights those new insights, and uses the historical record of crises in the United States to put those insights into perspective. I begin with a discussion of the defining characteristics of financial crises and their evolution, both in the U.S. and in the rest of the world. I then revisit the chronology of crises in the U.S. since 1870. Data on bank failure rates and large-bank equity losses suggest that some panics were not associated with full-blown financial crises, and also identify episodes when no panic occurred that could potentially be considered crises. I then turn to two categories of theoretical models developed to analyze the mechanisms responsible for crises. The first focuses on asset price bubbles, which have been associated with many crises. The second is focused on the dynamics of bank runs and panics, which have been especially common in the United

States. Finally, I present an overview of the effects of crises and the mechanisms transmitting distress in the banking system into the rest of the economy.

Financial crises have been an element of economic life for a very long time. Among the earliest crises documented by historians was an episode in Rome in A.D. 33, which apparently resembled modern financial crises in some respects.[1] Some studies of financial crises have analyzed relatively large numbers of examples from a broad range of time periods, in order to identify common elements among them.[2] Instead, in this essay I focus on the period from the late 19th century to the present. Although that span of time witnessed substantial changes in the development, regulation and structure of financial markets in high-income economies, the presence of institutionalized commercial banks and securities markets throughout the period creates a common framework for describing and analyzing crises. The relative continuity in institutional structure also makes comparisons of the frequency of crises over time and across countries more reasonable.

The literature on financial crises is vast, and in fact the growing number of reviews of that literature itself constitutes a substantial literature. Recent review essays include Kondor (2025), Frydman and Xu (2023), Sufi and Taylor (2021), Gorton (2018), Peek and Rosengren (2016), Bordo and Meissner (2016), Goldstein and Razin (2015), Claessens and Kose (2014), Brunnermeier and Oehmke (2013), Laeven (2011), and Cecchetti et al. (2009). This essay builds on those earlier reviews, and advances the literature by using applying insights from recent studies to the historical record of crises in the United States.

Recent scholarship on crises has called attention to the fact that a panic is not a necessary element of a financial crisis (Baron et al., 2021). This is particularly significant in the context of the United States, whose banking system was historically so panic prone that it may have led scholarship on crises to overemphasize panics. Using bank failure data from Correia et al. (2024) and large bank equity rates of return from Baron et al. (2021), I find that some bank panics commonly included in chronologies of crises in the U.S. may not meet the definition of a financial crisis, and also that some episodes of financial distress in the banking system when no panic occurred could be considered financial crises. The most severe financial crises in the U.S. did of course include panics, and the panics almost certainly amplified those crises. Yet recent studies of the impact of crises have found that the losses incurred by banks in crises were unlikely to have been direct consequence of panics, and were more likely the product of declining lending standards and greater risk taking prior to crises, which weakened bank balance sheets (Baron et al., 2025; Correia et al., 2024).

[1] Frank (1935); see also Temin (2013). Elliot (2015) offers a critique of the literature on that crisis.
[2] Prominent examples of this approach are Kindleberger and Aliber (2011) and Reinhart and Rogoff (2009). Calomiris and Jaremski (2024) argue that analyses of broad numbers of crises should be used to develop a taxonomy of different crisis types, rather than a single set of common causes or features.

In the next section of this essay, I discuss the definition of a crisis, present narratives by which crises typically unfolded in the years prior to World War II (WWII), and discuss how that changed during the period after WWII. In Section 3 I then discuss the chronology of financial crises since 1870 in the United States, and evaluate potential crises dates. In Section 4 I present data on the historical frequency of crises among high-income countries since 1870, and middle-income countries since the 1970s. These data indicate that there have been significant crises experienced by many wealthy economies simultaneously, and that especially since 1970, middle-income economies have experienced crises at far greater frequencies than high-income economies. Sections 5 and 6 present discussions of theoretical models of bubbles and of bank runs, which help clarify some of the mechanisms responsible for those crises. Section 7 then presents a discussion of approaches taken to analyze the effects of crises, and insights from recent contributions to that literature that use novel empirical designs that help isolate the effects of crises from the effects of shocks that triggered crises.

2. Crises: Definition, Evolution and Historical Frequency

Financial crises are events in which the banking system experiences financial distress to a degree that is sufficient to restrict its capacity to engage in financial intermediation. To encompass the full range of episodes that could reasonably be characterized as financial crises, the term 'banking system' needs to be defined broadly: it should be understood to include not only commercial banks, but also non-bank institutions and markets that facilitate financial intermediation. Particularly when they are associated with panics, financial crises typically cause a number of banking institutions to suspend operations, or trigger the implementation of interventions aimed at preventing suspensions. Yet panics are not a necessary element of financial crises, and in some cases, they unfold over relatively long periods of time, as banks suffer losses on investments but are protected by deposit guarantee systems or other institutions that insulate them from immediate liquidity pressures.

Although the definition focuses on banks, financial crises generally have impacts well beyond the banking system—stock market crashes, real estate price declines, and widespread insolvencies and defaults, for example, are common occurrences in crises.[3] Yet stock market crashes or declines in the value of real estate alone do not constitute financial crises if they occur in the absence of distress in the banking system. For example, the collapse of the technology stock bubble in the U.S. of the late 1990s was associated with a recession in the U.S., but no financial crisis. Likewise, a default on foreign debt or a

[3] Much of the literature on financial crises would designate events fitting the definition above as 'banking crises.'

devaluation of an exchange rate alone do not constitute financial crises, although of course those events may have significant economic consequences.[4]

2.1 Narrative of a typical pre-WWII financial crisis

Financial crises tend to be preceded by broad expansions in the availability of credit (Schularick and Taylor, 2012; Baron and Xiong, 2017), and declining risk spreads (Krishnamurthy and Miur, 2025). In many cases, growing optimism regarding the value of new investments and increases in collateral values fuel increases in bank lending. Behavioral biases may help fuel the expansion; in good times, lenders may overextrapolate from low default rates and underestimate risks (Bordalo et al., 2018). Whatever its origins, credit expansions tend to be accompanied by declining lending standards and greater risk-taking by banks, in some cases over relatively long spans of time.

A crisis occurs when those conditions end. This could be triggered by a shock of some kind, such as an increase in interest rates, or by a change in beliefs relating to the valuation of assets or the soundness of borrowers. With asset prices beginning to fall, the institutions that had most aggressively taken on risks associated with those assets begin to suffer losses, although they may be able to conceal those losses from outsiders for some time. In addition, a market contraction may expose frauds or scandalous mismanagement that were possible to conceal only in periods of high asset prices and abundant credit, potentially spreading concerns regarding the soundness of the financial system. At some point, financial institutions, including some with very strong reputations, begin to suspend or fail.

Especially in the U.S., the closure of a prominent financial institution may then trigger a banking panic, intensifying the crisis with runs on financial institutions spreading via a "contagion of fear."[5] The suspension of Knickerbocker Trust in October 1907 is a prominent example of a closure that provoked broader panic; another example is the suspension of the investment bank Jay Cook & Co. in 1873, which triggered a panic in the U.S. in that year. The outbreak of a panic induces a scramble for liquidity, leading banks to withdraw their interbank deposits to raise cash, and to liquidate other assets, sometimes at fire sale prices. This transmits the shock to banks not initially impacted by the panic, as they experience declines in the values of their assets, while also facing declines in the deposits of other banks.

[4] Reinhart and Rogoff (2009) and Claessens and Kose (2014) discuss different types of crises, like currency crises or debt crises; as Bordo and Meissner (2016) note, the causes of exchange rate and debt crises are interrelated with those of banking crises, implying that these crises cannot always be viewed as distinct events.

[5] Contagion of fear is Friedman and Schwartz's (1963) phrase for the spread of bank runs during the Great Depression. Mitchener and Richardson (2020) empirically explore the panic-driven decline in lending in the Great Depression.

Historically, panics typically subsided when measures were implemented to control their spread. In the United States, that occurred when commercial banks suspended the convertibility of their deposits into cash, and bank clearinghouses issued emergency currency (clearinghouse loan certificates) and restricted the release of bank-level information about their members (Gorton and Tallman, 2018). The capacity of the banking system to halt the spread of contagion and control panics, a product of experience in dealing with those events, may help explain the finding that panics were not responsible for many bank failures (Correia et al., 2024). One of the reasons the banking panics of the Great Depression were so severe is that measures historically used to control panics were not implemented—and the Federal Reserve also generally failed to step in and act as a lender of last resort (Friedman and Schwartz, 1963).[6]

Not all early financial crises in the U.S. triggered panics, however. Substantial boom and bust cycles occurred in particular regions, resulting in suspensions and failures of large numbers of banks in those regions, but not elsewhere. These crises were felt in the major banking centers, but not always with sufficient force to provoke a significant panic. For example, the collapse of commodities prices and land values in the years after World War I (WWI) spread significant financial distress among banks in some agricultural regions of the U.S., but did not trigger a major panic (see Jaremski and Wheelock, 2020 and Rajan and Ramcharan, 2015).

Outside the U.S., banking crises were far less likely to provoke panics. In some cases, this was likely due to the actions of a lender of last resort. In the U.K., in the years following the Overend & Gurney panic in 1866, the aggressive actions of the Bank of England helped prevent the outbreak of major panics when crises occurred (Flandreau and Ugolini, 2014).[7] For example, in 1890 the Bank of England bailed out the systemically important private bank Barings Brothers, making the Barings Crisis of that year less severe than it would have been absent the intervention, and likely preventing the outbreak of a major panic (White, 2018). In other cases, it was not a lender of last resort but other features of countries' banking systems that prevented panics. For example, the banking system of Canada, which lacked a central bank until 1936, suffered widespread insolvencies during the Great Depression (Kryzanowski and Roberts, 1993), but no panics.[8]

[6] Richardson and Troost (2009) and Carlson et al. (2011) present convincing evidence that interventions by the Fed, which were enacted by the Federal Reserve Bank of Atlanta but not most of the rest of the Federal Reserve System, would have diminished the severity and impacts of the 1930-33 panics.

[7] For a chronology of financial crises in the U.K., see Kenny et al. (2021).

[8] Bordo (1985) argues that the reason Canada did not experience a panic was its large robust banks with extensive branch networks, and also the Canadian Bankers Association's role in acting to stabilize the industry in times of crisis. Kryzanowski and Roberts (1993) argue that an implicit guarantee of all deposits contributed to the absence of panics during that time in Canada.

2.2 Evolution of financial crises post-WWII

The typical chronology of events by which financial crises unfold changed over time, as the institutional context of banking and financial markets has evolved. In the years after WWII, some pre-crisis credit expansions occurred following financial liberalizations, which led financial institutions to enter markets or invest in instruments with which they had little experience. Yet the crises that occurred when those booms went bust generally did not trigger panics. The introduction of guarantee systems for bank deposits led the near-total disappearance of panics in the commercial banking systems of high-income countries. The few panics that did occur mostly resulted from doubts about the resources of deposit insurance systems.[9]

Although guarantee systems generally remove the incentive for depositors to run on banks, they do not dampen lending booms or bank risk taking. By removing the discipline created by the threat of runs, deposit insurance may in fact worsen the problems associated with greater risk taking and declining lending standards during credit expansions (see Calomiris and Jaremski, 2016). Noteworthy examples of severe financial crises from this era include the Norwegian crisis of the late 1980s and the Japanese crisis of the early 1990s, both of which occurred following financial liberalizations. In both cases, an economic contraction and collapse of real estate values had significant impacts on the banking system.

With depositors generally protected from losses and an absence of panics, commercial banks were partly insulated from the intense liquidity pressures that characterized many pre-WWII crises. Yet banks nonetheless suffered substantial declines in the values of their assets, not because they had to sell them at fire sale prices in a scramble for liquidity, but because their assets consisted of loans and other risky investments whose values declined when the lending boom and/or price bubbles that had inflated them went bust. These losses impacted bank capital, impairing the ability of banks to lend (Baron et al., 2021; Baron et al., 2025).

Beginning in the late 20th century, a relatively new variant of financial crises emerged, in which the dynamic of the bank panic returned, but outside the commercial banking system. Following financial liberalizations, several middle-income countries experienced credit booms that were fueled in part by short-term international borrowing that was 'rolled over,' or financed by new indebtedness, when it came due. Concerns about the soundness of their economies and the potential for defaults led to what was effectively a panic among international lenders, who did the equivalent of withdrawing a deposit by refusing to purchase new debt. Examples of crises fitting this description include the Latin American debt

[9] For example, in 1997, after the failure of two major securities firms, the collapse of some regional banks in Japan led to a panic among the depositors of similar institutions, as doubts emerged regarding the ability of the deposit insurance system to cover the affected institutions. The panic ended when the Bank of Japan and Ministry of Finance announced a strong commitment to guarantee all deposits (Nakaso, 2001).

crisis of 1982, the Mexican crisis of 1994, and the East Asian financial crisis of 1997. Of course, few developments in modern financial markets are ever truly new, and this is no exception. The international transmission of the financial crisis of 1907 into Sweden in bears some similarities to these later crises (Grodecka-Messi et al., 2021).

Another context outside of the commercial banking system in which panics have broken out in recent years is the shadow banking system. In the years leading up to the 2008 financial crisis, a significant share of financial intermediation in the United States shifted into markets and institutions not subject to commercial banking regulations or covered by deposit insurance (see Gorton and Metrick, 2010). Mortgages and other forms of lending were financed by the issuance of securities, and some institutions funded investments in those securities via short-term borrowing. When concerns about a decline in real estate values and borrower insolvency became widely held, a panic emerged among the lenders of the shadow banking system. The panic intensified significantly and spread throughout the financial system following the sudden collapse of Lehman Brothers, an investment bank that was a significant investor in securitized mortgages.

Panics occurring in markets outside the commercial banking system are also not entirely new. The Panic of 1907 in the U.S., for example, originated in panics among the depositors of early shadow banks (trust companies), and bears many similarities to the financial crisis of 2008 (Moen and Tallman, 1992; Frydman et al., 2015). Rockoff (2017, 2021) in fact shows that the failures that initially triggered most historical crises in the U.S. were typically of shadow banks.

3. Chronology of financial crises in the U.S.

From the early 19th century through the mid-20th century, the United States led the world in the frequency with which it experienced banking panics. In the uniquely panic-prone banking system of the U.S., the term ‘panic’ was in fact used to denote crises. Yet panics are neither necessary or sufficient to generate a financial crisis, and the literature on crises in the U.S. may have overemphasized some panic episodes and neglected other crises when no panic occurred. To be sure, panics occurred in the most significant financial crises, such as the Great Depression. The banking system was simply so vulnerable to panics that those events may not always have constituted financial crises.

There is no scholarly consensus on the chronology of panics that have occurred in the U.S. The unique institutional structure of the banking system of the U.S., however, provides some valuable indirect indicators for the presence of a presence of a panic, which can serve as a useful starting point. For example, for the National Banking Era (1863-1914), actions taken by the New York Clearinghouse to aid banks facing a panic is a clear indication that a panic occurred. As Calomiris and Gorton (1991) note,

there were six episodes in which the clearinghouse issued 'clearinghouse loan certificates'—paper money for the aid of member banks facing acute liquidity pressures. This occurred in 1873, 1884, 1890, 1893, 1907, and 1914. Some of these episodes were likely less severe than others; some scholars have designated 1884 and 1890 as incipient panics rather than full-blown panics (see the discussion in Jalil, 2015). In a reflection of the significance of agriculture to the U.S. economy at the time, most of those episodes were associated with poor cotton harvests, which reduced export revenues (Hanes and Rhode, 2013).

An alternative indirect indication of the occurrence of a panic in the U.S. is the suspension of the convertibility of deposits or notes into cash by the banking system. This has the advantage of being available for periods prior to the creation of the New York Clearinghouse, and also being more likely to have been associated with significant crises, as suspension was a radical (and illegal) measure that was only adopted in emergencies. Widespread suspensions occurred in response to panics in 1814, 1819, 1837, 1839, 1857, 1873, 1893, and 1907 (Gorton, 1985). These dates include what where likely the more significant panics of the National Banking Era (1873, 1893, and 1907), and represent a reasonable series for major financial crises in the U.S. prior to the Great Depression. The entire U.S. banking system also suspended in 1933, during the nation-wide banking holiday that was imposed.

Scholarship on crises has often sought to refine these series using alternative indicators. Jalil (2015), for example, develops a chronology of crises using a combination of narrative and quantitative evidence, producing a somewhat different set of crisis dates. Jalil denotes 1873, 1893 and 1907 as major panics, but also identifies 13 minor panics in the years between 1870 and 1929. Other chronologies have been offered in Gorton (1988), Bordo and Wheelock (1988), Calomiris and Gorton (1991) and Wicker (2000); Jalil (2015) presents a comparison of many chronologies for the U.S.

Which of these panics were actually associated with financial crises, and were there any crises that did not trigger panics? One way to answer these questions is to investigate when the available measures of distress in the banking system became elevated. Figure 1A presents a measure of the failure rates of U.S. commercial banks from 1870 to 2021, from Correia et al. (2024). This is an imperfect measure of distress in the banking system, since many banks experiencing significant distress do not fail, and instead are voluntarily liquidated, merged, or simply manage to slog their way through. In addition, the pre-1933 data in the figure include only national banks. The failure rates of state-chartered banks were likely higher in many crises, so the figure understates the true failure rate, perhaps by a significant margin. The figure also excludes all financial intermediaries other than commercial banks, and therefore presents an incomplete picture of the banking system. The data in the figure should therefore be interpreted as a rough indicator that is imperfectly correlated with the true level of distress in the banking system.

Figure 1A: U.S. Bank Failure Rates

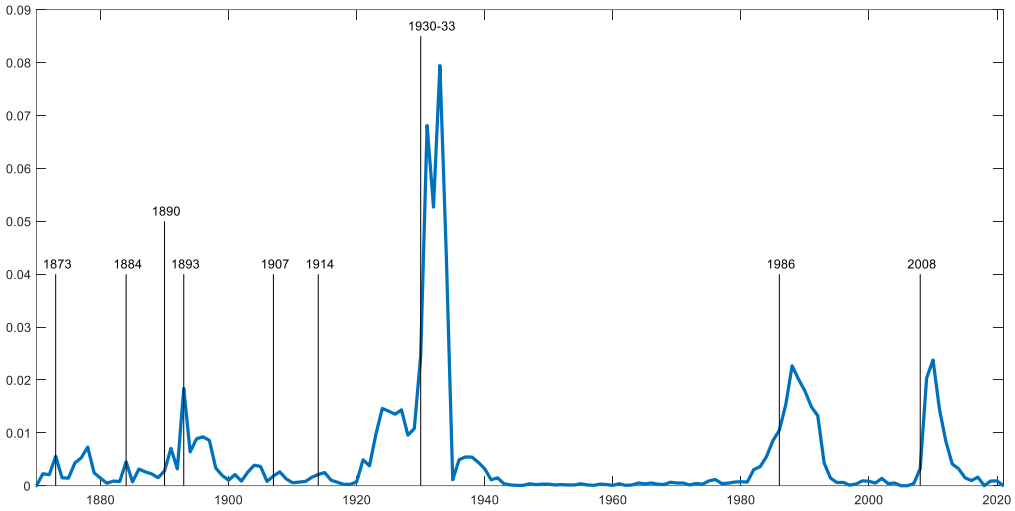
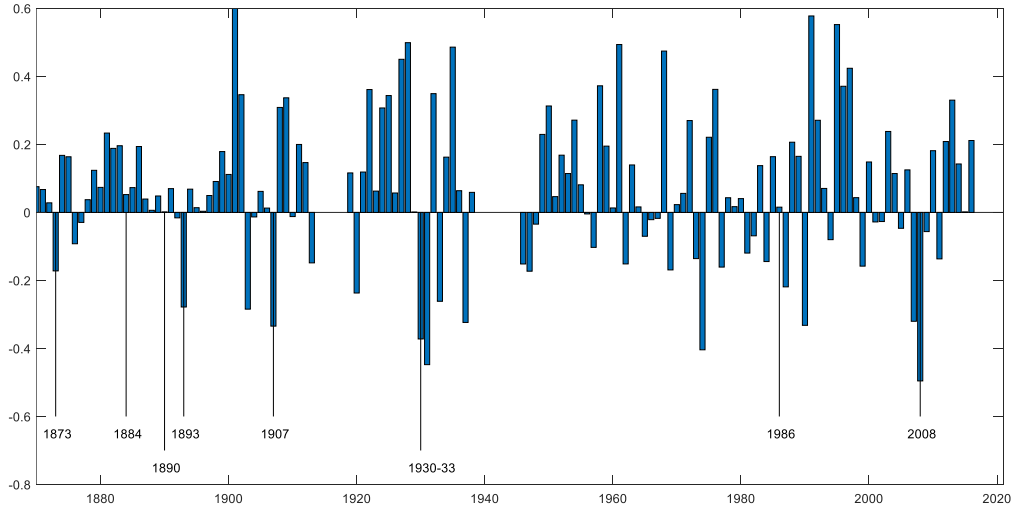


Figure 1B: Real Equity Returns, Large U.S. Banks



Notes: *1A* (*Top panel)*: bank failure rates Correia et al. (2024). The failure rates for 1870-1933 are calculated as the failure rate for national banks only, and exclude state-chartered banks. The failure rates for 1933- are from the FDIC and much more comprehensive. The crisis events labeled in the figure are the dates of issuance of clearinghouse loan certificates, plus the crises of 1930-33, 1986, and 2008. *1B* (*Bottom panel)*: real rate of return for the equity of the 10 largest U.S. banks, as reported in Baron et al. (2025). The crisis events labeled in the figure are the dates of issuance of clearinghouse loan certificates, plus the crises of 1930-33, 1986, and 2008. However, Baron et al. do not include the years around WWI (1914-1919) in their series, so there is no data plotted for those years and the incipient crisis of 1914 is not labeled in the figure. There is also no data for years around WWII (1939-45).

In the figure, all of the pre-WWII panics in which the NYCH issued clearinghouse loan certificates, along with the crises of 1930-33, 2008, and the Savings and Loan Crisis of 1986 are labeled. As the data in the figure make clear, failure rates were generally low during most panics; the share of banks facing liquidity pressures or even significant capital losses may have been quite high, but actual failures were relatively uncommon. Yet the failure rates in 1884, 1890, 1907 and 1914 were lower than those of 1873, 1893 and certainly 1930-33. This may reflect the fact that the effects of at least some of those panics were felt more acutely among state-chartered financial institutions (as was certainly the case in 1907, which was most significant among state-chartered trust companies), or it may indicate that some of those were correctly characterized as incipient panics rather than financial crises.

Also apparent in the figure is the unprecedented severity of the Great Depression, the near total absence of failures from 1940 to 1980, and the resurgence of significant crises after 1980. Finally, the data in the figure also reveal that there were two pre-WWII episodes with relatively high failure rates that were not associated with panics: 1878, and the mid-1920s. As noted above, the latter period coincided with boom-bust cycle in agriculture that began during WWI (see Jaremski and Wheelock, 2020 and Rajan and Ramcharan, 2015). Bordo and Wheelock (1998) note that significant financial distress occurred in the banking system in 1878.

An alternative indicator for crises proposed by Baron et al. (2021) is based on the real rates of return of the equity of large banks, calculated from stock price data. This measure has the advantage of capturing the degree of losses (or gains) embodied in bank equity valuations, which should be a more accurate indication of the degree of distress in the banking system in times of crisis than the failure rate. Yet it also has the disadvantage of being calculated from only the ten largest banks, and therefore excludes the tens of thousands of small local banks that populated the banking system in the U.S. over most of the years since 1870. Figure 1B presents these data, with the same dates are labeled as in Figure 1A. The data show that many of the panics labeled in the figure were associated with losses in the equity of large banks. Yet as in Figure 1A, the panics of 1884 and 1890 were not years of declines in the equity values of large banks, further corroborating that those dates should be designated as incipient panics rather than full-blown financial crises. However, unlike in Figure 1A, the Panic of 1907 was associated with substantial losses and large bank equity returns seem to indicate that was a year of significant crisis.

An interesting element of Figure 1B is that there were several episodes of equity losses of more than 25 percent that were not associated with the crisis dates labeled in the figure. Those occurred in 1903, 1937, 1974, and 1990. Those events (and other cases of losses of less than 25 percent in the figure) may represent additional financial crises without panics. The 1990-91 period, for example, witnessed a major 'credit crunch' that has been the subject of empirical analysis (see Peek and Rosengren, 2016); the

Table 1: Frequency and Duration of U.S. Recessions

	All Recessions	Recessions With Financial Crises (Panics + Equity Losses)	Recessions With Panics But No Equity Losses	Recessions With Bank Equity Losses But No Panics
	(1)	(2)	(3)	(4)
1871-1945				
Mean Duration (Months)	21.8	34.5	23.7	18.0
N	17	4	3	2
1945-2020				
Mean Duration (Months)	10.2	18.0	--	12.0
N	13	1	--	2

Source: Author's calculations using the NBER's business cycle dates and peak-to-trough durations. The duration of recessions associated with crises or other events are calculated as the duration of the recession during which the event occurred; all crises, panics, and episodes of large-bank equity losses occurred during recessions. Panics are defined as episodes in which the NYCH issued clearinghouse loan statistics; "Equity Losses" refer to episodes of significant losses in the equity of large banks, as reflected in Figure 1B. In column (2) the dates of financial for the pre-1945 period are 1873, 1893, 1907 and 1930-33, and for post-1945, 2008. These are all episodes in which panics occurred and there were also large-bank equity losses. In column (3), the dates of panics with no equity losses are 1884, 1890, and 1914. In column (4), the dates of large-bank equity losses but no panics are 1903 and 1937 in the pre-1945 years, and 1974 and 1990 in the post-1945 years.

year 1974 saw a major bank failure (Franklin National Bank) and followed a major oil price shock of the previous year; 1937 was a year of severe recession and a substantial increase in required reserves of commercial banks (see Friedman and Schwartz, 1963); and 1903 was the year of a "rich man's panic" on the stock market, precipitated in part by a change in bank lending to underwriting syndicates. The focus on the equity returns of large banks in Figure 1B, however, fails to capture the losses incurred by smaller regional banks in the mid-1920s or among Savings and Loans in the mid-1980s associated with high bank failure rates in Figure 1A. Large-bank equity returns were also positive in 1878, which was associated with elevated failure rates, was not associated with significant equity losses.

Taken together, the data presented in Figures 1A and 1B indicate that among the dates associated with financial panics, 1873, 1893, 1907, 1930-33 and of course 2008 should be designated as financial crises, whereas the panics of 1884, 1890, 1914, and other pre-1929 dates identified by Jalil (2015) likely should not. The also indicate that 1903, 1937, 1974, and 1990 could be designated as crises without panics due to large-bank equity losses, and 1878, the mid-1920s, and 1986 could be designated as crises, due to elevated bank failure rates.

A means of evaluating whether some of those dates should actually be designated as financial crises can be found with business cycle data. Although no reliable high-frequency series for GDP exists for the late 19th century United States, the specific months of business cycle peaks and troughs have been identified, and the durations of recessions can be used as a crude gauge of the severity of historical recessions. Table 1 compares the mean durations of recessions with and without financial crises, and also presents the mean durations of recessions associated with panics but no large-bank equity losses, and also

of recessions associated with large-bank equity losses, but no panics.[10] The data are divided into two roughly equal time periods, 1871 to 1945, and 1945 to 2020.[11]

Beginning with the earlier time period, the average duration for all 17 recessions that occurred during those years was 21.8 months. By contrast, the mean duration of recessions during which a financial crisis occurred (1873, 1893, 1907, and 1930-33) was more than 50 percent greater, 34.5 months. This is generally consistent with the cross-country evidence of Jordà et al. (2013), which shows that recessions associated with financial crises are more severe than ordinary recessions. The mean duration of recessions associated with panics but no large-bank equity losses (1884, 1890, and 1914) was 23.7 months, only slightly elevated compared to the mean value of all recessions. And the mean duration of recessions associated with large-bank equity losses but no panics (1903 and 1937) was 18 months, or nearly four months less than the mean for all recessions.

In the later time period, recessions became less frequent and substantially shorter. The mean duration of recessions fell to only 10.2 months. As in the earlier time period, the duration of the one recession associated with a financial crisis (2008) was substantially longer than that average, 18 months. There were no panics without large-bank equity losses, but the two episodes of large-bank equity losses and no panics (1974 and 1990) were associated with recessions that were only slightly longer than the average for all recessions, 12 months.

These simple comparisons need to be interpreted cautiously, as durations are likely only imperfectly correlated with other measures of the severity of recessions, and no effort has been made to model counterfactual conditions. Yet the comparisons in the table do provide suggestive evidence of the economic significance of financial crises, identified here as panics that were also associated with large-bank equity losses. The data also lend some support for the exclusion of panics that were not associated with large-bank equity losses from the category of financial crises, as they were associated with recessions of only very mildly elevated durations. The data also do not provide clear support for the notion that episodes of large-bank equity losses in the U.S. that were not associated with panics resulted in financial crises significant enough to produce recessions of greater than average severity.

Deeper investigation into the macroeconomic consequences of historical episodes of large-bank equity losses without panics in the U.S. is warranted. One conclusion that can be drawn from these data is that in the panic-prone experience of the U.S., alternative measures of financial distress in the banking

[10] The NBER's business cycle dates are available at https://www.nber.org/research/data/us-business-cycle-expansions-and-contractions.

[11] The dates of elevated failure rates but no crises (1878, the mid-1920s, and 1986) do not match well with the recession data and are therefore not examined in the table. There was no recession in 1986, the "mid-1920s" is not precise enough to match to the business cycle, and 1878 is contained within a long recession that begins in 1873 and is associated with the Panic of 1873.

system such as large-bank equity losses are particularly valuable for determining the severity of panic episodes. Yet the significance of episodes when large-bank equity losses occurred without a panic is less clear. Especially in the pre-WWII years of the U.S., panics were seemingly so common that even minor shocks could trigger them, and it is reasonable to conclude that a rare combination of circumstances would be needed for a significant crisis to occur without a panic. Episodes of insolvency limited to banks in remote agricultural regions could produce that outcome, but it is unclear whether major shocks to large banks could actually have produced a crisis without a panic.

4. Chronology of Financial Crises among High-Income and Middle-Income Countries

Constructing crisis chronologies for a broad set of countries, with different financial systems and different varieties of banking institutions, confronts scholars with the challenge of ensuring the designations are comparable internationally. A number of different chronologies for crises across a broad range of countries have nonetheless been constructed; these include Kaminsky and Reinhart (1999), Bordo et al. (2001), Caprio and Kingebiel (2003), Reinhart and Rogoff (2009), Romer and Romer (2017) and Laven and Valencia (2020). These series typically present binary indicators of the beginning of a crisis, and do not include quantitative measures of their magnitude or duration. As with the case of the U.S., the available series are generally similar but differ on some crisis dates; see Bordo and Meissner (2016) and Sufi and Taylor (2021) for comparisons of several chronologies. Here we will not look too closely into the academic sausage-making that was involved in the construction of those series. Instead, I simply use one representative series to explore patterns in the data.

Figure 2 presents the yearly count of financial crises among fourteen high-income countries from 1870 to 2008, as reported in Schularick and Taylor (2012).[12] Two patterns in the figure are worth noting. First, the outbreak of crises has been correlated across countries. Instead of a random distribution, there have been a few periods in which many countries experienced crises, and many more years in which no country experienced a crisis. The years in which a large share of the 14 countries experienced a crisis

[12] The fourteen countries are Australia, Canada, Denmark, France, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, and United States. Their chronology is a refinement over those adopted in several other sources; see the references in that paper and its appendix. Since their sample is restricted to advanced economies, it covers a relatively long span of time, although for many countries in their sample, chronologies of crises going back well before 1870 are available.

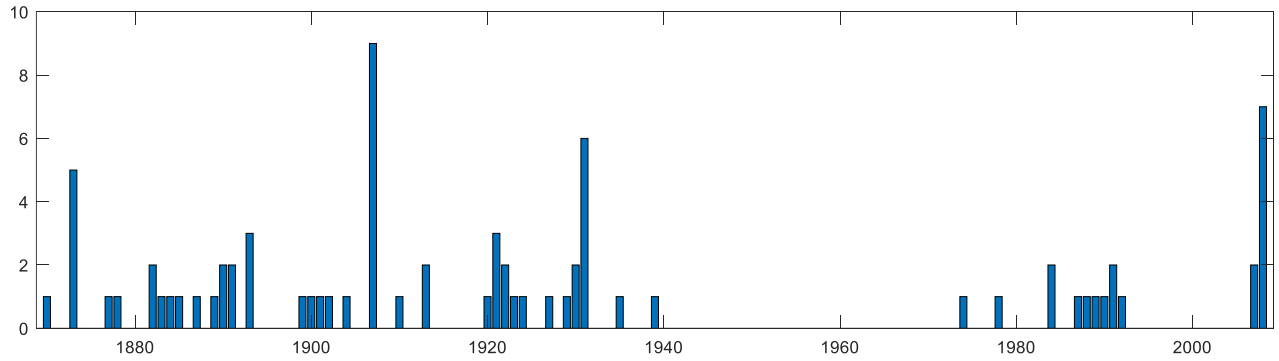


Figure 2: Number of financial crises by year, fourteen high-income countries, 1870-2008

Source: Author's calculations from data in Schularick and Taylor (2012).

included 1873, 1893, 1907, 1929-31, and 2007-08.[13] These dates of are the same as the dates of significant financial crises in the U.S. discussed above. This suggests that the occurrence of crises may be influenced by financial fluctuations that are transmitted internationally, rather than purely domestic factors.[14] On the other hand, there have been many years in which only a single country experienced a crisis, which suggests that factors specific to particular economies have also played a role.

A second pattern evident in the figure is that the frequency of crises varied substantially over the long span of time since 1870. Over first half of the period, from 1870 to 1939, there were a total of 59 crises in the fourteen countries. Then over the second half of the period, from 1940 to 2008, there were only about one-third as many crises, 20 in total.[15] This suggests that crises are not an inherent feature of the functioning of high-income economies, but instead are the product of particular choices relating to the institutional structure and regulation of financial markets, which have varied over time.

The period from 1940 to 1973 is particularly significant, because none of the fourteen economies experienced a crisis. During this time, most countries implemented policies that heavily regulated their financial systems, sometimes termed financial repression. Often designed with the aim of ensuring financial stability, while also lowering the cost of funds for the government and for key industries, these programs restricted the operations of commercial banks, and also imposed strict limits on the mobility of capital across borders.[16] The specific mix of policies adopted varied across countries, and it is not.

[13] In the figure, there are several three- to five-year periods in which at least one country experienced a crisis in each year (1882-1885, 1889-1891, 1899-1902, 1920-1924, and 1987-92). These may also be the product of common global financial cycle.
[14] Rey (2015) identifies a global financial cycle in modern data, driven partly by U.S. monetary policy. Bazot et al. (2022) argue that during 1891-1913, the global financial cycle originated with the Bank of England's policy choices, and study the actions of other central banks in response.
[15] Eichengreen and Bordo (2001) compare the first era of globalization with the one that began around 1971.
[16] In some cases, these policies enabled the state to control the allocation of credit across sectors; see Monnet (2018).

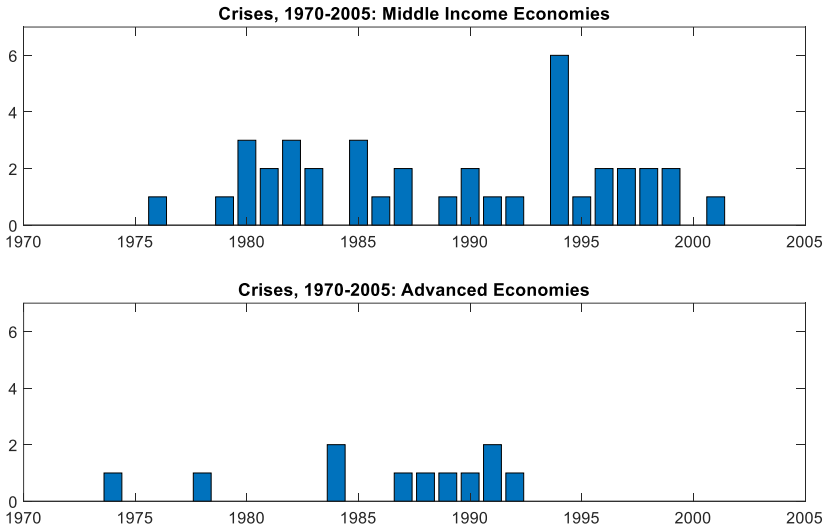


Figure 3: Number of financial crises by year: fourteen middle income economies (top), and fourteen advanced economies (bottom), 1970-2005.

Source: Author's calculations from data in Carmen Reinhart and Rogoff (2009, Table A.4.1), and Schularick and Taylor (2012).

entirely clear which policies were responsible for the stability of the period.[17] What is clear is that the financial liberalizations that began in the 1970s were associated with the re-emergence of financial crises.[18]

If we shift our focus away from high-income economies to middle-income countries, the frequency of crises beginning in the late 20th century is much greater. Figure 3 presents data for fourteen middle-income economies for the period 1970 to 2005 in the top panel, and, for purposes of comparison, data for fourteen advanced economies over the same period in the bottom panel.[19] The time period over which reliable data on crises are consistently available is shorter, so the focus must shift to the period after 1970, the period of financial liberalizations and increasing capital mobility.

Comparisons of the two panels reveal that crises were much more frequent during this period for middle-income countries compared to wealthy countries. The fourteen countries in the top panel

[17] For example, Gorton (2010) attributes this period of calm in the U.S. to the introduction of deposit insurance, as well as the imposition of other regulations and the provision of subsidies to the industry that together promoted financial stability. These U.S. policies were different from the ones adopted in Europe.

[18] Eichengreen and Bordo (2001) compare the first era of globalization with the one that began around 1971.

[19] The countries in the top panel include Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Egypt, Korea, Malaysia, Mexico, Peru, Thailand, and Turkey. Dates of crises for these countries are taken from Reinhart and Rogoff (2009, Table A.4.1), who, in turn, rely partly on Bordo et al. (2001), Caprio and Kingebiel (2003), and Kaminsky and Reinhart (1999). The data in the lower panel are the same data as in Figure 2, but restricted to the time period 1970 to 2005.

experienced a total of 39 crises, about 3.5 times as many as the fourteen high-income countries in the bottom panel, which experienced only 11. In addition to the greater frequency of crises among the middle-income countries, the timing of their crises differed as well. No high-income economy experienced a crisis in the mid or late 1990s, whereas many of the middle-income Latin American countries experienced crises during 1994-1996, and many middle-income Asian countries experienced crises during the years 1996-1998.

These patterns indicate that the period of financial liberalizations and greater capital mobility that began in the 1970s produced much greater financial instability among middle-income countries than in high-income countries. In a dynamic memorably captured in the title of Carlos Díaz-Alejandro's (1985) paper, "Good-Bye Financial Repression, Hello Financial Crash," financial liberalizations in Latin America and Asia had unintended consequences, and made countries in those regions vulnerable to cycles of lending booms abruptly ended in panics and crises.

5. Bubbles and Crises

Bubbles and financial crises sometimes coincide, and sometimes do not. Goldfarb and Kirsch's (2019) and Quinn and Turner's (2020) studies of bubbles include many examples not associated with significant financial crises. Similarly, many financial crises, such as the Panic of 1907, the Overend & Gurney crisis in 1866, or the Mexican crisis of 1994, were not associated with major bubbles. On the other hand, many of the most significant financial crises, such as the Japanese financial crisis of the early 1990s, or the financial crisis of 2008, were associated with the bursting of bubbles. Bubbles and crises need not coincide, but recent history suggests that when they do, the economic impact is magnified. Yet even in cases were no major bubble developed, the same forces that fuel bubbles may have been at work in contributing to the credit expansion that ultimately went bust in a crisis. Some of the models that describe the origins of bubbles may therefore have broad relevance in the analysis of crises.

In a bubble, asset prices rise above their fundamental values, defined as the expected present discounted value of the stream of payments their owners will receive. Some of the literature on bubbles defines them in less strict terms; Goldfarb and Kirsch (2019) and Quinn and Turner (2020) define bubbles as episodes in which the price of an asset increases substantially, and then collapses. Jordà et al. (2015) identify bubbles as cases where asset values deviate from long-run trends. These are reasonable approaches to identifying historical bubbles for analysis, and they are likely to detect cases that meet the formal definition of a bubble. But they do risk designating cases where asset prices rose rapidly because their fundamental values rose, which would not meet the definition of a bubble.

5.1 Bubbles and rationality

Bubbles are often described as the product of irrationality, with market participants' behavior shaped by unrealistically optimistic beliefs. Instead using careful calculations of fundamentals to inform their valuations, investors succumb to "speculative manias" or "irrational exuberance" or "animal spirits" or "euphoric episodes,"[20] with rising prices "capturing the thoughts and minds" of traders, further feeding the frenzy.[21] Yet as Blanchard and Watson (1982) have shown, bubbles are not inconsistent with rational expectations: it is possible for a security's price to satisfy equilibrium conditions for returns while at the same time rising above the present value of its stream of dividends (see also Stiglitz, 1990, and Froot and Obstfeld, 1991). In such 'rational bubbles,' market participants are willing to purchase an asset at a price that they recognize is greater than its fundamental value because they expect to be able to sell it to someone else at a higher price in the future (Hirano and Toda, 2024).[22] Expectations of profits from speculation, rather than fundamentals, push prices up, and these expectations are rational and accurate. A rise in prices to levels absurdly higher than fundamental values can in fact be the product of rational behavior.

One way to reconcile the accounts of bubbles as the product of irrational speculative manias with the insight that bubbles can be compatible with rational calculation is to imagine that some market participants are sophisticated, whereas others are capricious and naïve—call them "retail investors" for short. It is possible that in a bubble, with prices rising well above fundamentals, retail investors actually believe that prices reflect fundamentals, whereas sophisticated investors recognize that they do not. Sophisticated investors would nonetheless be happy to purchase overvalued assets, since they expect they will be able to resell them at a higher price.[23]

Influential research on the trading activities of hedge funds in the context of the late 1990s technology stock bubble in the U.S. suggests that this is not an unreasonable characterization of the market in a bubble. Markus Brunnermeier and Stefan Nagel's (2004) study of the trading activities of

[20] Speculative mania is Kindleberger's term (Kindleberger and Aliber, 2011). Animal spirits is Keynes' (1973 [1936]) term for behavior that reflects "spontaneous optimism" in place of "mathematical expectation" (153-54). Irrational exuberance was the term used by Federal Reserve Chair Alan Greenspan in a speech in 1996, which engaged the question of whether the U.S. stock market was in a bubble at the time (Greenspan, 1996).
[21] Galbraith (1990: 5) discusses the euphoria that captures the thoughts and minds of traders as prices increase, reinforcing the dynamics of the bubble.
[22] Santos and Woodford (1997), however, show that in intertemporal competitive equilibrium models, rational bubbles can only occur in relatively special circumstances; they conclude that the theoretical foundations of rational bubbles are weak.
[23] Strictly speaking, this is not compatible with the rational expectations equilibrium described above. However, in the model of Scheinkman and Xiong (2003), which features heterogeneity in beliefs, agents are willing to purchase assets at prices above their fundamental values, because they expect to be able to resell it to other investors with more optimistic valuations.

major hedge funds found that those institutions overweighted technology stocks with high ratios of prices to sales revenues in their portfolios during the run-up in those stocks' valuations. Hedge funds chose to "ride the bubble" and earned high profits as the stocks they purchased appreciated further. As the market began to turn and the bubble showed signs of bursting, they then sold those stocks.[24]

One might imagine that even higher returns could have been earned by attacking the bubble and selling overvalued assets, profiting from the resulting collapse in prices.[25] Yet the abundance of retail investors in the market makes it extremely risky to attack a bubble, due to the likelihood that those traders will push prices up even higher (Stiglitz, 1990; Delong et al., 1990). Sophisticated investors also face coordination problems: they do not know when other sophisticated investors will sell overpriced assets, and thus face the risk that they will act alone, with minimal impact. The risks of attacking a bubble, coupled with hedge funds' capacity to identify stocks that will appreciate most and to time the market, made riding bubbles an attractive strategy.

An alternative view of some bubbles is that they were not, in fact, bubbles. In the case of the 1990s technology stock bubble, for example, Pástor and Veronesi (2006) have argued that claims that stock prices exceeded fundamental values fail to account for the effect of uncertainty regarding their future growth rates on their valuations. Fundamental values must account for growth rates in future earnings; firms with uncertain growth rates that could potentially be very high can have very high fundamental values. Pástor and Veronesi conclude that 1990s technology stock prices were "not necessarily irrational ex ante because uncertainty about average profitability, which increases the fundamental value of a firm, was unusually high" (100). Of course, whether the rise in prices was the product of calculations along the lines of Pástor and Veronesi's, or of retail investors bidding up prices for reasons having little to do with rational calculations of value, remains an open question. Just as spectacularly high valuations and stories of frenzied investing behavior are not conclusive evidence of irrationality in pricing, the existence of a rational justification for high valuations is not conclusive evidence of rationality.

[24] Quinn and Turner (2025) find that in the late-19th century bubble in the shares of bicycle stocks in the U.K., company insiders reduced their holdings during the crash, while outside investors lost, which is consistent with better-informed investors doing better than the uninformed in a bubble.

[25] Early proponents of theories of the efficiency of financial markets argued that this should be the case (e.g., Fama 1965).

5.2 Bubbles, crises and credit

The expansion of credit that tends to precede crises may form a link between crises and bubbles. In Charles Kindleberger's influential account, bubbles occur when some shock, which he calls a 'displacement,' leads to a change in beliefs: tremendous optimism regarding the value of new investments takes hold.[26] The source of the shock may be the emergence of a new technology, a financial innovation, or a policy change, but the optimism it produces leads to a rapid growth in credit and an appreciation in the prices of associated assets; the source of the bubble is also the source of the lending boom.

An alternative mechanism connecting bubbles and crises could be that an increase in the availability of credit fuels a bubble. In this version, the bubble is a direct consequence of the credit boom. If borrowing is constrained by available collateral, and if that collateral's value is influenced by credit-financed investments, a feedback loop between asset prices and borrowing constraints can potentially generate credit cycles and credit-fueled bubbles. Kiyotaki and Moore (1997) present the foundational model of this feedback mechanism, while Miao and Wang (2018) use a model of a similar mechanism to show how bubbles can emerge (see also Martin and Ventura, 2014).[27] Allen and Gale (2000) develop an alternative model of a credit-fueled bubble, in which an expansion in the availability of credit to finance the purchase of assets inflates prices above fundamental values, since any losses caused by the bursting of a bubble will be borne in part by lenders, due to an asset substitution problem.

Whatever mechanism is responsible for the lending boom and the bubble, the bursting of a credit-fueled bubble will almost certainly create significant problems for the banking system. The trigger of the crisis could be a change in government policy, a shock to the productivity of some borrowers (as in Kiyotaki and Moore, 1997), or a change in expectations leading to a shift toward a different equilibrium (as in Miao and Wang, 2018). A decline in asset values means that the collateral that had supported the expansion of credit is no longer sufficient to protect lenders against losses, and the banking system suffers.

The case of the Great Depression in the United States suggests a potentially different connection between bubbles and crises. That crisis was preceded by a real estate bubble in Florida, which crashed in 1926 (White, 2014), and other increases in real estate values that might constitute bubbles (Brocker and

[26] Kindleberger attributes this term to Hyman Minsky (Kindleberger and Aliber, 2011: 27). Yet Minsky uses the term 'displacements' to denote the shocks or "sharp financial reactions" that characterize the onset of a crisis and push the economy out of a stable equilibrium—in other words, the end of what Kindleberger calls a displacement (Minsky, 1970: 2). See the discussion in Mehrling (2023).

[27] Hirano and Toda (2025) show that the 'bubbles' in Miao and Wang (2018) do not conform to formal definitions of rational bubbles; their model might be better characterized as one of multiple equilibria, including some with very high credit-fueled asset prices. Kondor (2025) explores the theoretical mechanisms undergirding this explanation for credit cycles and crises.

Hanes, 2014). Yet the major bubble that preceded the depression was in the stock market, and the crash of the stock market in the fall of 1929 is commonly regarded as the beginning of the Great Depression. The financial crises of the Great Depression, however, did not begin until about a year later. Although 'call loans' to finance leveraged investment in stock were common, the banking system did not immediately suffer from the crash in stock values in the way that it did from the fall in real estate values in 2008.[28] Instead, the crash created high levels of uncertainty and a significant decline in economic activity, as consumers cut back on durables purchases (see Romer, 1993). The bubble had been fueled by optimistic beliefs that a 'new economy' powered by miraculous technological innovations had emerged; the crash shattered those expectations, and led consumers to fear for the future and cut back on their spending. The mechanism connecting the bursting of a bubble to the subsequent financial crisis was very different from the one in operation in 2008, when the bursting of a real estate bubble and rising insolvencies among borrowers directly impacted the banking system.

The cross-country evidence of Jordà et al. (2015) offers broader evidence on bubbles and crises. They find that bubbles associated with credit booms have much greater economic impacts than those that do not. This suggests that the significance of bubbles often hinges on their connections to the banking system. In bubbles fueled by lending, the banking system's solvency may be imperiled by the declines in asset prices resulting from a bust.

6. Bank Runs and Crises

Banking panics have been a central element of many financial crises, especially in the United States. In panics, bank runs break out and quickly spread. A frightening series of events unfolds, which causes people to fear the worst and change their expectations regarding their own banks—and respond by running. As panics spread, conditions worsen and the fear-driven expectations that caused the runs to spread are validated. The mechanisms responsible for bank runs and their spread are complex, but understanding them is important for the analysis of crises.

In a run on a commercial bank, a significant share of its account holders seeks to withdraw their deposits, forcing the bank to sell assets to produce cash to pay out. Historically, banks issued paper notes that were redeemable on demand, and runs consisted of noteholders seeking to redeem their notes—the

[28] The fact that call loans were short-term and collateralized likely helped protect lenders from the crash; another factor was likely the Federal Reserve Bank of New York's aggressive (and apparently unauthorized) efforts to provide liquidity following the crash through open-market purchases of securities and encouragement to banks to seek discount loans (see Friedman and Schwartz, 1963: 363).

instrument was different, but the dynamic was the same.[29] By the same token, any financial institution funded to a substantial degree by short-term liabilities that they roll over can face a version of a run, if lenders refuse to purchase new debt. For example, in modern financial markets, investment banks and other intermediaries finance part of their operations through sale and repurchase ("repo") agreements of short maturities that they roll over. A central part of the financial crisis of 2008 was a run on repo (Gorton and Metrick, 2012). Similarly, some eighteenth- and nineteenth-century financial institutions financed a substantial portion of their operations through bills of exchange of relatively short maturities. Liquidity crunches that were essentially runs on bills of exchange produced the Crisis of 1763 in Amsterdam (Quinn and Roberds, 2015).

Models of bank runs are among the best developed areas of economic theory. Especially following Diamond and Dybvig (1983), theoretical explorations of the mechanisms responsible for bank runs flourished, as scholars sought to refine their models to better reflect important theoretical or real-world issues. This literature is too extensive and sophisticated to summarize succinctly; in what follows, I discuss some of the most important contributions to that literature, and relate the insights of those models to historical experience. The discussion is presented using the case of depositors and commercial banks, but it generalizes to other contexts of lenders and short-term liabilities.

6.1 Models of Bank Runs

The most important model of bank runs is that of Diamond and Dybvig (1983). In their model, if depositors believe that sufficient numbers of other depositors will withdraw their funds from the bank, then they themselves will withdraw their own deposits. The first-come, first-serve nature of bank withdrawals, formally known as the sequential service constraint, makes it important to get in line early; those at the back of the line may not get paid at all, since the banks' assets are illiquid and cannot be converted into cash without incurring losses. The expectation of a large amount of withdrawals thus creates an incentive for depositors to protect themselves, and a run transpires. Seemingly random events that cause depositors to expect that other depositors will run on the bank can therefore cause a run to break out, even if depositors know that the bank is completely solvent and would be happy to keep their deposits in the bank if they did not expect other depositors to run.

The importance of Diamond and Dybvig (1983) is twofold: it establishes a connection between the liquidity transformation of banking and the phenomenon of depositor runs, and it establishes that runs can be a 'bad equilibrium,' the product of self-fulfilling expectations or coordination failures among

[29] In the United States, the problem of runs by noteholders was essentially solved by requirements built into state and later federal banking laws requiring that banknotes were fully collateralized by safe securities.

depositors. Yet the random, purely self-fulfilling nature of the runs in their model is inconsistent with the historical experience of runs occurring in the wake of economic shocks or the bursting of bubbles. Runs and panics may indeed be driven by expectations, but expectations of runs or of conditions that will precipitate runs do not occur randomly.

In the years since Diamond and Dybvig, the theoretical literature on bank runs developed models in which deteriorating conditions could precipitate a run, although sometimes at the loss of a meaningful role for liquidity transformation within the model. Much of this work focuses on asymmetric information problems in banking, which results from the inability of depositors to observe the true condition of their banks. Instead, they may receive noisy signals about a bank's condition to make inferences about the state of the bank. In response to a sufficiently negative signal, the depositors run on the bank (e.g., Gorton, 1985).[30] This leads to fundamental-driven runs, rather than expectations-driven runs.

In some of this work, a subset of depositors receives the signal, and their response to a negative signal can potentially trigger a run among all depositors (e.g., Chari and Jagannathan, 1988; Jacklin and Battacharya, 1988). Calomiris and Kahn (1991) model access to these signals as the product of monitoring the bank, which is costly. The depositors who actually pay the cost to monitor the bank withdraw their funds in response to a sufficiently negative signal, and the uninformed depositors then see the line forming at the bank and join it, creating a full-fledged run. Since the informed depositors are at the front of the line, they are likely to be paid in full, and thus rewarded for monitoring the bank.

Later papers modeled the risks of banks' investments as a source of runs (e.g., Allen and Gale, 1998). Among the most important of these is that of Goldstein and Pauzer (2005). In their model, a signal regarding economic fundamentals is the ultimate source of runs. Yet the signal does not directly determine whether a run occurs, as is the case in many earlier models; instead, the signal coordinates depositors' beliefs. As in Diamond and Dybvig (1983), runs are the product of self-fulfilling expectations, but a negative shock coordinates those expectations. This seems to capture the historical patterns of panic-driven runs occurring in response to negative economic shocks reasonably well.

6.2 Empirical Studies of Bank Runs

A number of analyses of historical financial crises have empirically investigated the determinants of panics or cross-sectional variation in the degree to which banks in a crisis have lost deposits. For example, Calomiris and Gorton (1991) study the panics of the National Banking Era in the U.S., Calomiris and Mason (2003) study the sources of bank distress during the Great Depression, and Carlson

[30] In these models, a run occurs if there is a high enough probability that a bank is insolvent, but it is not known whether the bank is actually insolvent. A bank that is known with certainty to be insolvent would likely be closed.

(2005) analyzes bank-level data in the context of the Panic of 1893 in the U.S. Other studies include Grodecka-Messi et al.'s (2021) analysis of Swedish banks in the 1907 crisis, and Colvin et al.'s (2015) study of banks in the Netherlands in the 1920s. Much of this research has confirmed that banking crises tend to follow negative economic shocks such as asset price declines, and that banks with weaker fundamentals lose a greater share of their deposits. These results are inconsistent with the notion that bank runs or panics were the product of purely self-fulfilling expectations.[31]

Some episodes of contagion, or the transmission of runs across financial institutions in panics, may potentially create examples of purely self-fulfilling runs. This is not always the case with episodes of contagion, which may be driven by declines in the values of assets held by multiple banks, or by withdrawals of interbank deposits.[32] Yet in some cases, a run on one bank has apparently led depositors to run on a different bank, for reasons that were unrelated to its soundness or to economic fundamentals. For example, O Gráda and White's (2003) analysis of detailed deposit records of the Emigrant Savings Industrial Bank (EISB) of New York in the 1850s revealed that in 1854, depositors ran on that institution and other savings banks in response to the collapse of the Knickerbocker Savings Bank in that city, even though there was apparently no reason to believe the EISB had any connection to the Knickerbocker other than sharing the same institutional structure.[33]

Yet clearly establishing that a run was the product of self-fulfilling expectations is challenging, since it requires an understanding of depositors' mental reasoning for seeking to withdraw their funds from banks. If the EISB depositors feared that their bank's assets were similar to those of Knickerbocker's, for example, their decision to run could have been driven or at least coordinated by fundamentals.

7. Economic Impacts of Financial Crises

There are several different channels through which distress among financial institutions can impact economic activity. The modern literature on this topic began with Friedman and Schwartz (1963), which disputed the long-held view that the financial crises of 1930-33 were an *effect* of the Great

[31] Correia et al.'s (2024) study of failing banks in the U.S. since 1863 finds that most failed banks were fundamentally insolvent, casting doubt on the theory that runs on solvent banks has caused them to fail.
[32] Mitchener and Richardson (2019) analyze the withdrawals of interbank deposits in the Great Depression in the U.S., and Anderson et al. (2019) study the role of the National Banking Acts in creating greater risks of contagion through its influence on the structure of interbank deposits. Contagion can also spread via bank assets, as the failure of one institution directly impacts the assets of others. The 1763 crisis in Amsterdam spread as bankruptcies and protested bills of exchange cascaded among interlinked merchant banking houses (Schnabel and Shin, 2004).
[33] O Gráda and White (2003) also find that it was generally the uninformed depositors running on EISB 1854, which is consistent with an arbitrary event leading to self-fulfilling expectations of a run. Calomiris and Mason (1997) study contagion among Chicago banks during the Great Depression.

Depression, and argued instead that the crises were its major *cause*. The specific mechanism identified by Friedman and Schwartz as the main link between financial crises and economic conditions was the tighter monetary conditions created by the withdrawal of deposits from the banking system. By contrast, Bernanke (1983) highlighted distinct, non-monetary mechanisms transmitting the crisis into the economy originating in the breakdown of financial intermediation. In response to bank runs and rising insolvencies among borrowers, Bernanke noted that financial institutions restricted lending to safer borrowers, and also shifted their balance sheets away from loans and toward safe securities. Bernanke (2025) revisits that work, and presents an overview of the voluminous subsequent literature on the impact of the credit crisis on the Great Depression.

Panics are not the only mechanism through which financial crises impact the economy, however. Not all financial crises trigger panics, and financial intermediation can be severely disrupted even if panics do not occur. Instead, banks may suffer losses on loans or other investments, which reduces their capital, and impairs their ability to lend. This channel is the focus of Baron et al. (2021). If, for example, banks make loans to risky borrowers during credit booms, and those loans lose substantial value as a boom goes bust, their balance sheets may be severely impaired. This mechanism seems likely to have been important in the Japanese financial crisis of the 1990s, in which financial institutions suffered very significant losses on loans made in the 'bubble economy' of 1980s Japan (Nakaso, 2001). Consistent with the importance of this channel, Correia et al. (2024) find that most failed banks in the U.S. were fundamentally insolvent, which implies that it is unlikely that panic-driven liquidity pressures were responsible for their failures.

In spite of the clear reasons why one would expect financial crises to contract economic activity, actually isolating their impacts and measuring them is challenging. Crises are often triggered by negative economic shocks, and it can be difficult to distinguish the effects of a crisis from the effects of the shock that provoked it. For example, the crisis in Norway in the late 1980s and early 1990s was triggered in part by a fall in oil prices, along with increases in interest rates in Europe (Moe et al., 2004). Those shocks would likely have induced an economic contraction in Norway even in the absence of any financial crisis. In crises where a bubble bursts, the decline in asset values constitutes an important element of the crisis, but one that is nonetheless distinct from the effects of a credit crisis that may result from the bubble bursting.

One approach to isolating the effect of financial crises, pioneered by Friedman and Schwartz (1963), is to carefully study the historical record to identify episodes in which banking distress or other financial shocks occurred for reasons unrelated to other major economic events—what has been called a

"narrative approach."[34] An alternative strategy is to look for quasi-experimental exposure to a crisis among financial institutions, non-financial firms, or geographical locations, in order to study the effects of varying levels of exposure to a crisis. Ideally, this strategy compares units that were all exposed to the shock that triggered the crisis, but varied in their exposure to the financial contraction.

One strand of research utilizing this quasi-experimental approach focuses on the international transmission of crises, and isolates the effects of a crisis from any economic shocks in the country where the crisis occurred by following financial linkages across countries. For example, Peek and Rosengren (2000) studied the impact of the Japanese banking crisis of the early 1990s on real estate markets in the U.S. Comparing among real estate markets in the U.S. where Japanese banks had varying market shares, they found that declining lending by Japanese banks had substantial impacts on construction in the U.S. Similarly, Xu (2022) studied the international impacts of the Overend & Gurney crisis in London in 1866. Overend & Gurney was an important interbank lender, and its collapse triggered a crisis that led to the failure of other London banks with subsidiaries in other countries that were important sources of finance for international trade. Xu's analysis found that countries with greater exposure to failed banks in London saw their exports decline substantially following the crisis.

Other strands of this research focus on comparisons between firms with different degrees of exposure to a failing financial institutions within the same country. For example, Frydman et al. (2015) use variation in the exposure of publicly traded corporations to the trust companies that faced runs in the Panic of 1907, and find that the impact on their interest costs and investment was substantial. Similarly, Fernando et al. (2012) and Chodorow-Reich (2013) find significant impacts among firms affiliated with Lehman Brothers following the financial crisis of 2008. In work that is similar in spirit, Ziebarth (2013) compares manufacturing firms located in counties in Mississippi that were part of the Federal Reserve Bank of Atlanta's (6^{th}) District to firms in counties the Federal Reserve Bank of St. Louis' (8^{th}) District in Mississippi during the Great Depression. The Atlanta Fed provided generous liquidity assistance to banks in its district, whereas the St. Louis Fed did not.[35] Ziebarth finds that firms in the St. Louis Fed's district received lower revenues and their workers were employed for fewer hours, although those effects were not persistent. Similarly, Quincy (2024) finds that individuals residing in towns with more resilient banks in California (defined by the presence of Bank of America branches) during the Great Depression had better employment opportunities and higher wages over subsequent years.

Another approach to isolating quasi-experimental exposure has been to identify firms with exogenously greater needs for external finance during a time of a crisis, caused by maturing debt. Benmelech et al. (2019) use this approach to study the effects of the Great Depression on the employment

[34] Romer and Romer (2004) use the narrative approach to study the effects of Fed policy.
[35] Richardson and Troost (2009) study the effect of these policies on bank survival.

patterns of firms. Janas (2025) uses a similar approach to study the effects of the credit crisis during the Great Depression on municipal spending.

Finally, a different strand of the literature has used international panel data to study crises, comparing countries with and without crises in the same years. Prominent works in this line of inquiry include Schularick and Taylor (2012) and Jordà, et al. (2013). More recent work using international panel data have focused on isolating the effects of capital losses in crises from the effects of panics. Baron et al. (2021) use cross-country data on the equity returns of large banks to identify such crises, and find that their economic impacts are substantial. Baron et al. (2025) find that large capital losses are generally due to write-downs of nonperforming assets, rather than fire sales during panics.

8. Conclusion

After the decades of the middle of the twentieth century, during which finance was heavily regulated and crises did not occur, the late twentieth and early twenty-first centuries witnessed the return of financial crises, many of which were extremely severe. It might be tempting to think that the financial regulations of the 1940s to the 1970s would be a valuable source of inspiration for a modern policy agenda aimed at promoting financial stability. Yet those years were an anomalous era of very heavy-handed control over finance, and modern financial markets have experienced decades of growth and innovation since then. The policies of the mid-twentieth century are not compatible with the realities of twenty-first century financial institutions and markets. Thus, crises will likely remain a recurring problem, and may evolve into new variants as financial markets continue to evolve. Yet the dynamics of those future crises will likely resemble those of historical crises, and the lessons that can be learned from the study of financial history may prove valuable.

Of course, policy makers have already had many opportunities to learn from history in responding to crises, with mixed success. For example, in the U.S., the response to the financial crisis of 2008 was partly informed by policy makers' understandings of what happened in the 1930s.[36] The world was fortunate that a leading scholar of the financial impact of the Great Depression was the Chair of the Board of Governors of the Federal Reserve at the time, and although the response to the crisis was in some respects inadequate (Eichengreen, 2015), there was certainly no new Great Depression. The impact of the next financial crisis will depend in part on who the key policy makers are at the time, and what understanding they have of the lessons of historical crises.

[36] Eichengreen (2015) analyzes the relationship between the two crises and responses. Cassis and Shenck, eds., (2021) analyze how crises are remembered and what lessons are drawn from historical crises.

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