Salient Crises, Quiet Crises*

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April 2019

Abstract

By constructing a new historical dataset of bank equity returns for 46 countries over the period 1870-2016, we find that large bank equity declines predict persistent credit contractions and output gaps, after controlling for nonfinancial equities, even outside banking crises defined by narrative approaches. Bank equity returns allow us to measure the potential hindsight biases of narrative-based approaches and to expand the sample of crises beyond those identified by narrative accounts, which tend to focus on salient crisis symptoms, such as panics and government interventions. We find that quiet crises, defined by large bank equity declines without panics, are also associated with substantial credit contractions and output gaps. We use bank equity returns to refine existing narrative chronologies by uncovering a number of forgotten banking crises and removing spurious crises. Large bank equity declines tend to precede other crisis indicators, suggesting that substantial bank losses are already present at the early stages of crises.

* The authors would like to thank Md Azharul Islam, Jamil Rahman, and Bryan Tam for their extraordinary research assistance. Isha Agarwal, Isaac Green, William Shao, Sylvia Lu, Felipe Silva, and the librarians at the Harvard Business School Historical Collections also provided valuable assistance. The authors would also like to thank Mikael Juselius, Arvind Krishnamurthy, Randy Kroszner, Moritz Schularick, Andrei Shleifer, and seminar participants at Cambridge University, Cornell University, Danmarks Nationalbank, Erasmus University Rotterdam, University of Bonn, University of Rochester, Yale University, the Federal Reserve Board, Richmond Fed, Boston Fed, OCC, Chicago Booth financial crises conference, fall 2018 NBER Corporate Finance meeting, 2018 AEA meeting, and 2019 AFA meeting for their comments and feedback. We thank Mika Vaihekoski and Frans Buelens for sharing data.

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The commonly observed association between banking crises and macroeconomic catastrophes has motivated a quickly growing literature of the economic impact of banking crises. The existing literature, e.g., Bordo et al. (2001), Caprio and Klingebiel (2003), Demirgüç-Kunt and Detragiache (2005), Reinhart and Rogoff (2009), Schularick and Taylor (2012), and Laeven and Valencia (2013), has primarily relied on narrative historical accounts to classify the sample of banking crises and analyze their causes and consequences. However, narrative accounts tend to be subjective, qualitative, and backward-looking. To overcome potential biases from these backward-looking accounts, Romer and Romer (2017) construct a real-time measure of financial distress from contemporaneous OECD economic reports for 24 advanced economies starting in 1967. However, OECD narrative accounts, written by outside observers, may still be subjective. Additionally, as narrative accounts tend to focus on salient crisis symptoms such as panics and government interventions, the existing narrative-based approaches may not capture quiet crises without these salient features. They may also overlook crises that were quickly averted.

In this paper, we explore a new approach based on bank equity returns. Bank equity returns offer several advantages, being objective, real-time, and quantitative. Bank equity is also conceptually appealing, as it is a key state variable in theories of banking crises that determines banks' capacity to intermediate funds from savers to firms and households, e.g., Holmstrom and Tirole (1997) and Gertler and Kiyotaki (2010). However, as many other factors beyond banking crises may also cause large fluctuations in bank equity prices, one cannot take for granted the empirical performance of bank equity returns in identifying crises and predicting subsequent economic outcomes. So far, the lack of historical bank equity returns for a large set of countries has prevented systematic studies of this important issue. This paper aims to address this gap.

We construct a new historical dataset on bank equity returns for 46 advanced and emerging economies going back to 1870. We supplement existing bank stock indexes with newly-constructed indexes built from hand-collected individual bank stock price and dividend data from historical newspapers to provide coverage that is as comprehensive as possible. Moreover, we control for broader stock market conditions by constructing new indexes for nonfinancial stocks over the same sample. Our dataset thus provides nearly 4000 country-years of information on bank equities, nonfinancial equities, and macroeconomic variables. In addition, we also systematically collect new information on other characteristics of each banking crises, such as deposit runs, bank failures, and government intervention, backed by over 400 pages of narrative documentation.

We first confirm that bank equity declines contain useful information about banking sector distress and the economy by testing whether bank equity returns have predictive content for future macroeconomic dynamics, beyond the information contained in nonfinancial equities. We find that bank equity declines predict persistently lower output. For example, a decline in bank equity of at least 30% predicts 2.5% lower output after three years. At the same time, bank equity declines predict sharp and persistent contractions in bank credit to the private sector. Three years after a bank equity decline, bank credit-to-GDP declines by 5.4%, relative to periods without a decline. The relation between bank equity returns and future output and credit growth is highly nonlinear. Declines in bank equity predict future output and credit contraction, whereas increases in bank equity do not predict stronger economic performance. These estimates control for nonfinancial equity returns, which capture investor expectations about broader macroeconomic conditions. Consistent with the literature, e.g. Stock and Watson (2003), nonfinancial equity declines also separately predict lower GDP, but, interestingly, have no relation to subsequent bank credit growth. Large bank equity declines thus likely pick up episodes when output contracts in part due to troubles in the banking sector.

We then examine potential hindsight biases of narrative accounts of banking crises by testing whether a *Narrative Crisis* indicator of roughly 300 banking crises, determined by the six aforementioned narrative-based banking crisis chronologies, has predictive content for subsequent bank equity returns and nonfinancial equity returns. The *Narrative Crisis* indicator predicts substantially positive nonfinancial returns in the subsequent one to six years, which confirms the large risk premium as documented by Muir (2017). In sharp contrast to the large risk premium in nonfinancial returns, the *Narrative Crisis* indicator predicts substantially negative bank equity returns. In four years after a narrative crisis, the predicted cumulative nonfinancial return is about 15%, while the predicted bank equity returns is less than -15%. As a placebo test, we also find that bank equity crashes predict uniformly positive returns of both nonfinancial and bank equity, which is again consistent with large risk premium after bank equity crashes. Thus, the negative bank equity returns predicted by the narrative-based crises indicate that narrative-based chronologies tend to contain episodes that turn out later to be more damaging to the banking sector than previously expected. In other words, they seem to contain a selection bias towards episodes that continued to worsen and against those that were averted or quickly recovered.

Bank equity returns allow us to screen out a sample of banking distress based on bank equity holders' real-time assessments of banks' present and future losses, without being confined by the historical narrative accounts and their potential biases. One related potential bias is that narrative-based chronologies tend to select crises with salient symptoms such as panics. However, panics without significant insolvency concerns may not necessarily be followed by severe macroeconomic consequences. Conversely, narrative-based chronologies may ignore or be unable to detect "quiet banking crises", i.e., times in which the banking sector becomes deeply undercapitalized even in the absence of creditor runs or panics. One may wonder whether panics are a necessary condition for severe macroeconomic consequences or whether quiet banking crises may also be followed by severe consequences. Addressing this issue requires a sample of banking distress without panics.

To construct such a sample, we define "banking distress" as bank equity declines of over 30% in a year and then separate these bank equity declines into "panic" versus "quiet" episodes based on a systematic reading of the narrative evidence for each of these episodes. While some of the "quiet" (non-panic) episodes might be driven by equity market noise, we show that many are well-documented episodes in which the financial system suffered major losses and was deeply undercapitalized, yet strong regulatory forbearance and implicit government guarantees prevented panics from emerging among bank creditors. Prominent historical examples include Japan in the early stage of its banking crisis in the 1990s and Canada's experience during the Great Depression.

Our analysis finds that while panic crises tend to be followed by greater credit contractions and lower output growth, quiet crises also predict substantial credit contractions and output drops. For example, even without any narrative account of panics, a decline in bank equity of at least 30% predicts that after three years, bank credit-to-GDP declines by 4.3% and output declines by 2.1%. In contrast, panic episodes *without* crashes in bank equity are not associated with significant subsequent declines in either output or bank credit, confirming that narrative accounts may pick up minor panics without substantial economic consequences. Bernanke (2018) recently attributes the unusual severity of the Great Recession primarily to the panics in funding and securitization markets, beyond damaged balance sheets of banks and households.[1] Our finding suggests that in a

[1] This argument builds on earlier studies by Ivashina and Scharfstein (2010) and Gorton and Metrick (2012), which attribute the dramatic contractions in the U.S. credit markets following the Lehman Brothers bankruptcy in September 2008 to panic runs on banks and repo markets, respectively.

large historical sample, panics are not necessary for severe economic consequences, as quiet crises can also lead to substantial credit contractions and output drops. This finding has an important policy implication that liquidity backstops by the government may not be sufficient to prevent severe economic consequences of banking crises.

In order to facilitate future studies of in-sample characteristics of banking crises, we provide a chronology of clear-cut crisis episodes confirmed by both narrative evidence and bank equity declines, even though this chronology ignores some quiet crises that occurred without any narrative evidence by construction. With the help of large bank equity declines as a screening tool, we uncover a number of "forgotten" banking crises that are strongly backed by the historical narrative. We also remove spurious episodes and minor panic episodes from previous narrative-based approaches that are not accompanied by bank equity crashes. Many of these deleted episodes are typos or historical errors from previous studies, while others are monetary or currency issues that have only minor effects on the banking sector. After removing these spurious crises, of which there are many, we find that previous narrative-based approaches actually slightly understate the average crisis severity, contrary to the conclusion of Romer and Romer (2017).

In the final part of the paper, using this clear-cut sample of crisis episodes, we examine the relative timing of bank equity versus other crisis indicators, such as nonfinancial equity and credit spreads, around banking crisis episodes. One important advantage of bank equity returns is that they allow for precise analysis of the turning points of historical crises and the dynamics of how crises evolve, as understood in real-time by equity investors. We find that bank equity tends to lead other indicators. In particular, bank equity tends to peak earlier than nonfinancial equity and starts to decline earlier as well, especially in the postwar period and in advanced economies. This finding suggests that many banking crises, especially those in advanced economies in the postwar era, tend to originate with losses specific to the banking sector (due to narrow but highly-concentrated exposures, e.g., subprime mortgage-backed securities in 2008) that are then transmitted to the broader economy, rather than through the reverse direction. Additionally, around banking crises, large bank equity declines tend to precede bank credit spread increases. This suggests that substantial bank losses are already present at the early stages of these crisis episodes and that these losses were not caused by panics.

Our paper is organized as follows. Section I discusses the conceptual issues and data. Section II presents the results on the informativeness of bank equity returns for macroeconomic

outcomes. Section III analyzes the predictive content of the crisis indicators given by the existing narrative-based crisis studies, while Section IV explores the macroeconomic implications of quiet crises. Section V presents our revised chronology of banking crises, while Section VI compares the timing of bank equity and other crisis indicators around banking crises.

I. Conceptual issues and data

A. Conceptual issues

Traditional approaches in the literature identify discrete episodes as banking crises based on the presence in narrative accounts of salient features such as bank runs, bank failures, and large-scale government interventions, e.g., Bordo et al (2001), Caprio and Klingebiel (2003) Demirguc-Kunt and Detragiache (2005), Laeven and Valencia (2013), Reinhart and Rogoff (2009), and Schularick and Taylor (2012). There are several potential drawbacks of these narrative approaches, including the treatment of crises as discrete episodes (when a continuum between "normal recessions" and banking crises might be a more accurate representation) and the lack of quantitative intensity measures to distinguish between minor versus major crises. The various narrative approaches also greatly disagree with one another about which episodes are regarded as banking crises, as seen in Table 1 and Table A1.[2] This strong disagreement is due in part to a lack of consistent definition of which features constitute a banking crisis. To make matters worse, these approaches (with the exception of Laeven and Valencia, 2013) have minimal documentation, making it difficult for other researchers to reconcile these differences or even to assess the basic facts of what happened during each crisis.[3] Romer and Romer (2017) point out that these narrative-based approaches may contain a look-back bias that leads to an overstatement of average banking crisis severity.

The general approach of this paper is to capture banking crises as times of large bank equity declines. This approach is motivated by a broad class of theoretical models of constrained financial intermediaries, in which a large decline in banking sector net worth constrains banks' ability to

[2] Jalil (2015) analyzes this issue in the case of pre-1929 banking crises in the U.S.

[3] Reinhart and Rogoff (2009) and Caprio and Klingebiel (2003) write only a few sentences about each crisis, while Bordo et al. (2001)'s database only presents macroeconomic variables. Schularick and Taylor (2012) do not provide publicly-available documentation to support their chronology; in personal correspondence, the authors say their chronology is constructed from surveying country-specific experts in banking history in each of 17 countries.

lend, e.g., Holmstrom and Tirole (1997), Gertler and Kiyotaki (2011), He and Krishnamurthy (2013), Brunnermeier and Sannikov (2014), and Rampini and Viswanathan (2018). Furthermore, due to the forward-looking nature of equity prices, bank equity declines not only reflect banks' current losses, but also their future losses anticipated by equity markets based on the best information available in real-time.[4]

Our approach has several important advantages. First, bank equity returns provide an objective, quantitative, real-time, and theoretically-motivated measure, overcoming the aforementioned concerns of the narrative-based approaches. As we will show, bank equity has strong forecasting power for macroeconomic consequences, both in terms of the magnitude of the prediction and signal-to-noise ratio.[5] Furthermore, it does not rely on observing salient features like policy interventions or panics, which are likely to occur only during the most severe crises.

Second, bank equity returns allow us to uncover the full spectrum of banking crises, including quiet crises (i.e. episodes of large banking sector losses without panics) and banking crises with quick recoveries, both of which may be missed by existing narrative-based approaches. In the case of quiet crises, large bank equity declines are able to identify episodes of large bank losses that do not lead to panics, which are usually due to regulatory forbearances and strong implicit creditor guarantees. Nevertheless, the banking sector might be severely impaired in its ability to lend. The narrative-based approaches often miss such episodes due to the difficulty of detecting banking losses in the absence of salient characteristics such as depositor runs, as acknowledged by early studies that use the narrative methodology (Caprio and Klingebiel, 1996, 2003). In the case of banking crises with quick recoveries, such as those with forceful early policy responses or favorable economic shocks, narrative-based approaches might overlook cases where ex-post outcomes are mild. Given that bank equity returns provide an objective measure of bank equity investors' real-time assessment of present and expected future profitability of publicly

[4] Another approach might be to use banks' book equity values or the share of nonperforming loans. However, book values and nonperforming loan measures are often slow to recognize losses. In a separate ongoing project, we find that in historical balance sheet data, banks rarely, if ever, recognize any losses, even during major crises like the Great Depression.

[5] Figure A2 shows that bank equity returns provide the best real-time signal of banking crises identified from existing narrative classifications, relative to a host of other variables including nonfinancial equity returns, credit spreads, and macroeconomic conditions. Specifically, bank equity declines best *coincide* with banking crises identified from existing classifications in terms of the signal-to-noise (i.e. a higher "true positive" rate and lower "false positive" relative to other indicators).

traded banks, we can observe these episodes as large but temporary declines in bank equity. Our approach thus obtains a more complete sample of crises for analyzing many important issues, such as whether panics are necessary for severe crises and whether forceful policy interventions might avert incipient crises.

Third, bank equity price and dividend data are readily available over much of our sample, covering 46 countries over the period 1870-2016. This abundance of data is due to the fact that, in the 19th and early 20th centuries, bank stocks were highly prominent, featured in newspapers and traded as much as railroad stocks. Despite many people's assumptions to the contrary, from 1870 to the 1930s, an era with a lot of historical banking crises, nearly all the major commercial banks in all the countries in our sample were publicly-traded joint stock banks (the only exception being the U.S., where banks were not widely traded until the mid-1920s). We are thus able to gather their stock prices and dividends from historical newspapers in each country.

At the same time, there are several potential concerns about bank equity prices. First, bank equity prices may contain "equity market noise." To help overcome this concern, in our analysis of how bank equity returns predict economic outcomes, we use nonfinancial equity returns to control for broad stock market fluctuations due to market "noise" or aggregate fluctuations affecting the entire stock market. Second, the prior literature has shown that returns from bond markets have predictive power for macroeconomic conditions (e.g., Gilchrist and Zakrajšek, 2012; Philippon, 2009). It is thus not clear that equity prices are more informative than bond prices. However, as bank creditors have higher cashflow priority than equity holders and are often better protected by regulators in the event of bank losses, bank equity tends to be more sensitive to future economic conditions, especially at the start of crises. Consistent with this basic notion, we show evidence that bank equity declines forecast banking crises ahead of bond market distress. In addition, bank equity returns are available for a larger sample of countries and time periods, while corporate and interbank spreads are relatively limited historically.[6]

[6] Bond markets in many countries have only been developed in recent decades. In the postwar period, corporate bond markets mainly existed in the U.S. and U.K., while in most non-Anglophone advanced economies, corporate bond markets were very limited or non-existent until deregulation in the 1980s (as corporate credit was channeled mainly through the banking system). For example, there was only a *single* corporate bond trading in Denmark and Japan before the 1980s (Det Store Nordiske Telegrafselskab and Nippon Telegraph and Telephone, respectively). Even organized interbank markets are a relative recent phenomenon, with data becoming available for most countries starting in the 1990s. As a result, Krishnamurthy and Muir (2017) analyze a more limited sample, since they do not

B. Measures of bank equity declines, credit spreads, and macroeconomic outcomes

We now describe how we gather and construct the historical database used in our analysis. We discuss, in turn, the following types of variables: bank and nonfinancial equity total returns, bank and nonfinancial credit spreads, and macroeconomic variables. All variables are annual (except those noted as monthly variables) and form an unbalanced country panel across 46 countries over the period 1870-2016.[7] The Appendix contains further details on data sources and data construction beyond what is presented here, and Tables B2 through B4 provide a comprehensive summary by country of all data sources used to construct the main variables.

Annual bank and nonfinancial stock returns. We construct a new historical dataset on bank equity prices and dividends for 46 advanced and emerging economies going back to 1870. For each country in the sample, we construct annual (as of December 31 of each year) price return and dividend return indexes for both bank and nonfinancial stocks. The price and dividend indexes in a given country may not necessarily correspond to the exact same underlying banks due to data availability, but they are either market-capitalization-weighted or price-weighted indexes of the broad domestic banking and nonfinancial sectors within each country.[8] Each of these series is pieced together from a variety of sources (documentation and source tables in the Appendix).[9] We start by collecting premade bank equity indexes from Global Financial Data (mainly price indexes), Datastream (price and dividend indexes), and Baron and Xiong (2017, newly constructed bank dividend indexes). In addition to using premade indexes, we construct bank equity price and dividend indexes from individual bank and nonfinancial companies' stock prices and dividends.

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have corporate credit spread data for emerging market countries or even for many advanced economies (Denmark, Italy, France, the Netherlands, and Switzerland) in the modern period.

[7] We exclude county-year observations during major wars. In particular we drop all countries during the world wars (1914-1918 and 1939-1949), Korea during 1950-53, Spain during 1936-1938, France and Germany in 1870, Mexico during 1910-1920, South Africa during 1899-1902, Japan during 1894-1895, Colombia during 1899-1902, Russia in 1917-1922, and Greece during 1946-1949.

[8] In price-weighted indexes, each stock is normalized to the same par value.

[9] The nonfinancial equity index is constructed to represent a diverse set of important large companies, mainly covering the following industries: iron steel, goods manufacturing, electrical equipment, textiles, chemicals, paper and pulp products, food suppliers and breweries, and retail. We generally avoid transportation stocks (railroads and shipping), commodity-related stocks (including mining), utilities, real estate companies, and foreign and colonial enterprises, due to their exposure to international factors or their concentrated exposure to real estate.

Our main source of new data on individual stocks comes from historical newspapers in each country. From these newspapers, we hand collected prices and dividends on an annual basis for the closing price closest to December 31.[10] Figure 1 provides examples of historical newspapers from Italy (*La Stampa*, 1904), the Netherlands (*De Telegraaf*, 1908), and Germany (*Berliner Boersen-Zeitung*, 1873).

Other data on individual stocks prices and dividends of banks and nonfinancial firms come from several databases from Yale's International Center for Finance (gathered and made publicly available by William Goetzmann and K. Geert Rouwenhorst) including *Investor's Monthly Manual* data (1869-1934), New York Stock Exchange data (1800-1871), and St. Petersburg Stock Exchange data (1865-1917). Finally, we collect individual stock and index returns data from a variety of additional sources including individual country studies and statistical yearbooks. Additional dividend data for individual bank and nonfinancial stocks is hand-collected from Moody's Banking Manuals (1928-2000) and from individual financial statements of banks accessed at the Harvard Business Library's Historical Collections. We add the bank equity price returns and dividend returns to get bank equity total returns and then adjust by the CPI for each country to get bank equity real total returns. Figure A1 plots the distribution of bank and nonfinancial equity returns around banking crises defined by narrative-based approaches.

The bank equity returns data start around 1870 for advanced economies such as Australia, Austria, Belgium, Canada, France, Germany, Ireland, Italy, New Zealand, Sweden, Switzerland, the U.K. and the U.S. and even for emerging market economies such as Argentina, Brazil, Egypt, Greece, Hong Kong, India, Mexico, Russia, and Ottoman Turkey. To assess the coverage of our bank index, Table B1 reports, for each country and decade, the number of underlying banks used to construct the bank equity return index, or, when premade indexes are available, the source of

[10] To give a sense of the sheer number and diversity of historical sources we uncovered, we list the main ones in this footnote (the full list is available in Table B2): *Journal de Bruxelles* for Belgium (1868-1935); *Dagens Nyheder* for Denmark (1868-1909); *De Telegraaf* and *De Standaard* for the Netherlands (1875-1933); *Le Temps* for France (1873-1939); *Berliner Borsen-Zeitung* and *Berliner Morgenpost* for Germany (1871-1933); *La Stampa* for Italy (1865-1934); *Japan Times* for Japan (1897-1915); *Diario de Lisboa* for Portugal (1921-1990); the *Straits Times* for Singapore (1965-1980); *ABC* for Spain (1909-1965); and *Gazette de Lausanne*, *Journal de Genève*, *Le Temps*, and *Neue Zürcher Zeitung* for Switzerland (1852-1936). We also collect stock returns data from a variety of additional sources: Argentinian stock returns data (1900-1935) from Nakamura and Zarazaga (2001); Belgian stock returns data from the SCOB database (University of Antwerp, Belgium); Danish stock returns data (1911-1956) from *Denmark Statistical Yearbooks*; Finnish stock returns data (1911-1974) from Nyberg and Vaihekoski (2010); and Swedish stock returns data (1870-1901) from Waldenstrom (2014).

the premade index. The exact range of included banks varies across countries and historical periods, due to historical data limitations. However, as can be seen both from Table B1 and the associated lists of individual constituent banks, the bank equity index generally contains a broad representation of the largest domestically-chartered commercial banks mainly located in the country's financial center and covering a substantial share of the country's bank assets and deposits. For most countries, our newly constructed bank equity index is based on underlying returns for at least five banks, almost always the largest. It is important to note that the focus on large commercial banks in the country's financial center may lead the bank equity measure to underrepresent banking crises centered on smaller or provincial banks and fail to capture distress of private banks.[11] As a result, the particular definition of banking crisis in this paper is one mainly focused on large, publicly-traded financial-center commercial banks.

Monthly stock returns and credit spreads for banks and nonfinancials. For episodes on the Revised Crisis List (a list of clearly identified crises as described in Section V), we also construct *monthly* series in a three-year window around each episode for the following four variables: bank equity index returns, nonfinancial equity index returns, bank credit spreads, and nonfinancial corporate credit spreads. Due to data availability issues, the monthly data is a substantially smaller subset of the larger annual data set on bank equity returns. For the period 1980-2016, we mainly use Datastream, which covers nearly all 46 countries.

For the period 1870-1979, the monthly data is limited to fifteen countries (Argentina, Australia, Belgium, Denmark, France, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, U.K., and U.S.) and three-year windows around banking crises are due to the difficulty of hand-collecting monthly data from historical records. In this period, monthly bank and nonfinancial stock prices are transcribed from the historical newspapers listed in the previous section or obtained from other historical sources such as *Investor's Monthly Manual* and Global Financial Data. Bank interest rates are typically overnight interbank lending rates, while corporate credit interest rates are from corporate bond yields. We subtract a short-term Treasury bill yield (typically three-month maturity) to get the bank credit spread and a long-term Treasury bond yield

[11] However, as mentioned, in the period 1870-1939, nearly all the major commercial banks in all these countries were publicly-traded joint stock banks, much more so than even today. Even most central banks were publicly traded. The private banks of that period were generally either merchant banks or mortgage banks, not commercial banks.

(typically 10-year maturity) to get the corporate credit spread. The complete list of sources for both month equity returns and credit spreads for each country is recorded in Table B3.

Macroeconomic variables. To construct real GDP growth, we obtain annual data for each country on nominal or real GDP and the CPI from the Maddison database, the Jorda-Schularick-Taylor macrohistory database, Global Financial Data, and the OECD, IMF, and World Bank datasets. The same CPI used to deflate returns is used to obtain real GDP. Data on bank credit-to-GDP comes mainly from Jorda-Schularick-Taylor (which goes back to 1870 but for 17 countries only) and from the BIS long credit series for other countries. We supplement these existing datasets on bank credit-to-GDP with newly transcribed data from: (i) IMF print statistical manuals from the 1940s and 1950s, and (ii) "League of Nations: Money and Banking Statistics" volumes from 1925 to 1939. This allows us to form aggregate bank credit-to-GDP series going back to at least 1918 for almost all the countries in our sample. The complete list of sources for each variable is recorded in Table B4.

C. Narrative accounts of crises

To compare the information contained in bank equity declines with the information content from narrative-based approaches, we construct a list of Narrative Crises, defined as the union of all banking crises from six prominent papers: Bordo et al (2001), Caprio and Klingebiel (2003) Demirguc-Kunt and Detragiache (2005), Laeven and Valencia (2013), Reinhart and Rogoff (2009, and online update 2014), and Schularick and Taylor (2012, online update 2017). Table A1 reports the Narrative Crisis list. We define the Narrative Crisis date as the earliest reported starting year of each banking crisis across the six papers. We also create a Revised Crisis List in Section V.

We also construct a new database of banking crisis characteristics and policy responses, in which we record the various features and outcomes of banking crises, including the extent of depositor withdrawals, bank failures (in terms of number of banks, percent of total banking assets, and whether it involves one of the country's largest banks), nonperforming loans, and various forms of government policy responses (significant liability guarantees, liquidity support, bank nationalization, and government equity injections). We thus follow Laeven and Valencia (2013), who build a similar database for the period 1970-2012, but extend it back to 1870. This database covers all Narrative Crisis and Revised Crisis List episodes. We particularly focus on the absence

or presence of panics, as described in more detail in Section IV. We document the sources used for each piece of information in this database, along with writing up supporting detailed crisis chronologies for each crisis, drawing from both standard narrative accounts of crises and hundreds of new primary and secondary sources that we collect.[12] See the Appendix for details.

II. Bank equity declines and future macroeconomic dynamics

In this section, we examine the predictability of large bank equity declines for subsequent economic outcomes such as real GDP growth and bank credit-to-GDP growth, without being concerned by whether these declines are accompanied by banking crises identified by existing narrative approaches. By showing that large bank equity declines tend to proceed severe economic outcomes, this analysis serves to establish that bank equity declines are not simply equity market noise and instead carry important information. It thus justifies our use of large equity declines to analyze banking crises.

A. Bank equity declines and future GDP growth

We begin by examining the predictability of large bank equity declines for subsequent GDP growth. To flexibly estimate such predictability and explore potential nonlinearities, we estimate the following Jordà (2005) local projection specification for horizons h=1,…,6:

$$\Delta_{\mathrm{h}} y_{i,t+h} = \alpha_i^h + \gamma_t^h + \sum_j \beta_j^h \, 1[r_{i,t}^B \in B_j] + \sum_j \delta_j^h \, 1[r_{i,t}^N \in B_j] + \Gamma^{\mathrm{h}} X_{i,t} + \varepsilon_{i,t}^h, \qquad (1)$$

where $\Delta_{\mathrm{h}} y_{i,t+h}$ is real GDP growth from year t to $t+h$, α_i^h is a country fixed effect, γ_t^h is a year fixed effect, and $1[r_{i,t}^B \in B_j]$ is an indicator variable for whether the bank equity return in year t is within a range defined by bin B_j. $1[r_{i,t}^N \in B_j]$ is similarly defined but for nonfinancial equity returns. To examine the predictability across the full distribution of returns, we include eight evenly-spaced bins, B_j, for both bank and nonfinancial returns: less than -45%, -45% to -30%, -

[12] Given the wide disagreement across various narrative chronologies and the general lack of documentation, we intend our chronology to serve as a publicly-available "encyclopedia" of basic facts about each crisis, laying out for each crisis the chronology of events, suspected causes, and key institutions and people. Our chronologies in particular focus on: which specific banks saw deposit runs, failed, and/or were rescued; the specific action taken by central bankers and government officials; and other symptoms, causes, and consequences of each crisis. We have also amassed over 400+ primary and secondary sources, many of them newly-uncovered, spanning the history of banking crises in 46 countries from 1870 onward, which we intend to make readily accessible to future researchers.

30% to -15%, -15% to 0%, 0% to 15%, 15% to 30%, 30% to 45%, and greater than 45%. The omitted bin is the 0% to 15% range, which we think of as returns during "normal" times. $X_{i,t}$ represents controls for contemporaneous (*t-1* to *t*) and lagged real GDP growth and the bank credit-to-GDP change, as well as lags of the bank and nonfinancial equity bins. We include three annual lags for all variables, but the results are not sensitive to the lag length. Standard errors are double-clustered on country and year, which corrects for serial correlation in $\varepsilon_{i,t}^{h}$ that mechanically arises from overlapping observations at horizons h>1 and residual correlation across countries induced by common shocks. Relative to the traditional VAR framework, the advantage of the local projection method is that it is robust to misspecification and allows for the estimation of nonlinearities and state-dependence responses, as argued by Jordà (2005).

The key parameters of interest are the sequence of local projection impulse responses $\{\beta_j^h\}$ for each bin j, which capture the predictability of bank equity declines after controlling for nonfinancial returns and current and lagged economic conditions. Note that after controlling for contemporaneous nonfinancial returns, bank equity declines reflect shocks from two sources. First, they may reflect banks' loan losses in the current period. Second, as equity prices are forward-looking, they may also reflect the stock market's anticipation of banks' losses in future periods. Thus, the impulse responses capture not only the impact of banks' current losses on the broad economy, as a result of the banks' reduced capacity to lend to firms and households, but also the anticipated interactions between future economic downturns and future bank losses. For the purpose of our analysis, it is not particularly important to isolate these two effects.[13] It is also important to note that bank equity may also be informative for reasons other than a banking channel: for example, bank equity declines may also reflect the macroeconomic consequences of household balance-sheet distress, as households are on the other side of bank lending.

The left plot in Figure 2 Panel A depicts the cumulative response of real GDP to bank equity return innovations. Relative to "normal times" (0% to 15% returns), declines in bank equity of

[13] A more nuanced question is why bank equity declines contain information content about the broad economy not captured by contemporaneous nonfinancial equity returns, which are supposed to reflect all information available about nonfinancial sectors. We can think of at least two possible mechanisms. First, banks tend to provide credit to households and small firms, which may not be fully represented by equity returns of nonfinancial firms. Second, stock markets participants may not immediately recognize the full consequences of banking sector losses for the broad economy. The finance literature has offered extensive evidence that stock prices may often underreact to public information. For example, Baron and Xiong (2017) show that stock prices do not fully reflect risks brought by banks' credit expansions.

greater than 45% predict 4.5% lower output after three years. Note that Equation 1 simultaneously estimates the responses to changes of both bank and nonfinancial equities, so that the response plotted on the left side of Panel A is the additional response to bank equity over and above the response to nonfinancial equity returns (which is plotted in the right side of the panel). This negative effect is highly persistent, translating into a permanent loss in output after 6 years of about 4%. More moderate but still substantial shocks of -30% to -45% are followed by 2.4% lower output after 3 years, with some subsequent recovery. In contrast, smaller negative shocks of -15% to 0% and positive shocks lead to weaker effects on future GDP.

The strong impact of large *negative* bank equity returns but weaker impact of *positive* returns provides evidence that shocks to bank equity have nonlinear predictive content for the real economy. This nonlinear relationship between bank equity distress and output growth is consistent with models of constrained intermediaries such as He and Krishnamurthy (2013), and highlights the advantage of bank equity returns as a continuous measure of banking sector distress. Interestingly, Romer and Romer (2017) find no evidence of nonlinearity between a continuous narrative measure of financial distress and subsequent output.

The right plot in Figure 2 Panel A shows the GDP response to nonfinancial equity shocks. Not surprisingly, larger declines in nonfinancial equity predict lower subsequent output. In contrast with bank equity returns, there is less evidence of nonlinearity in the predictability of nonfinancial equity returns. The ability of nonfinancial equity returns to predict future GDP growth is consistent with Stock and Watson (2003), and justifies nonfinancial equity returns as a suitable control for shocks to the broad economy.

Table 2 presents the regression version of Figure 2 at the 1- and 3-year ahead horizons. For expositional purposes, we replace the eight return bins with an indicator variable for whether there is a bank equity crash, defined by an annual return below -30%:

$$\Delta_{\mathrm{h}} y_{i,t+h} = \alpha_i^h + \gamma_t^h + \beta^h [BE\ 30\%\ Crash]_{i,t} + \delta^h [NFE\ 30\%\ Crash]_{i,t} + \Gamma^{\mathrm{h}} X_{i,t} + \varepsilon_{i,t}^h \quad (2)$$

In Table 2 Panel A, a bank equity crash of at least 30% is associated with a decline in real GDP of about 1.9% after one year and 2.9% after three years, with the estimated coefficients being statistically significant. A crash of 30% in nonfinancial equity also predicts significant and persistently lower real output, and the magnitude is similar to the impact of a bank equity crash.

B. Bank equity declines and future bank credit growth

Why do bank equity declines predict lower future GDP growth, even controlling for nonfinancial equity returns? In this subsection, we show that bank credit to the private sector, i.e., the bank lending channel, may play a key role.

Figure 2 Panel B presents estimates of Equation 1 with the change in bank credit-to-GDP as the dependent variable. The left plot shows that, after 6 years, a bank equity decline of over 45% predicts a nearly 12-percentage point decline in credit-to-GDP, controlling for nonfinancial equity. Declines of between 30% and 45% also predict sizeable credit contractions, amounting to a credit-to-GDP decline of 8 percentage points after 6 years. Table 2 Panel B presents the regression version of Figure 2 Panel B using the 30% bank equity crash indicator. It shows that the decline in credit-to-GDP following a bank equity crash is statistically significant and robust to including controls.

Figure 2 Panel B also shows that the response of credit-to-GDP to bank equity return shocks is highly nonlinear. Large declines in bank equity are followed by sharp credit contraction, but smaller declines (0% to -15%) and increases in bank equity are followed by muted changes in bank credit. This nonlinearity in credit growth is again consistent with models in which banks are financially constrained. Larger shocks to bank net wealth are more likely to force banks against their capital constraint and therefore to contract the asset side of their balance sheet.

The right plot in Figure 2 Panel B presents the credit-to-GDP response to nonfinancial equity shocks. There is a striking contrast between bank equity and nonfinancial equity shocks. Nonfinancial equity shocks have essentially no predictive content for future credit-to-GDP. Even large declines or increases in nonfinancial equity returns have no impact on the subsequent credit-to-GDP ratio. This sharp contrast provides one explanation for why bank equity shocks matter for future growth, even after we control for nonfinancials. Bank equity declines likely capture shocks to bank net wealth, which translate into a credit-supply contraction that may depress household consumption, corporate investment, and production.

C. Robustness and subsamples

Tables A3 and A4 show that, *conditional* on Narrative Crisis episodes, the magnitude of the peak-to-trough bank equity decline of each episode is associated with an increased severity of deposit runs, nonperforming loans, bank failures, and likelihood of government interventions in

various forms to support the banking sector, as well as more severe recessions. These findings are not solely driven by general declines in equity markets, as they also hold, albeit not as strongly, when using bank returns in excess of nonfinancial equity returns. See the full discussion in Appendix Section II.B. These facts confirm that bank equity returns capture the salient features of banking crises and motivate their use in refining banking crisis chronologies in Section V.

Figure A3 explores robustness of the relation between bank equity crashes and macroeconomic outcomes to alternative specifications. Panel A shows that a simpler specification with just a single indicator variable for 30% bank equity crashes (as in Table 2) predicts persistent output gaps and credit-to-GDP contraction. Panel B presents another alternative specification showing the responses to *continuous* innovations in bank and nonfinancial equity returns, rather than using indicator variables. This specification assumes a linear relation between innovations to returns and subsequent outcomes. Panel B shows that shocks to both bank equity and nonfinancial equity predict higher subsequent growth. Interestingly, the magnitudes of the responses are similar. The right plot shows that only bank equity returns predict future credit-to-GDP. Again, nonfinancial equity returns have no predictive content for subsequent credit-to-GDP.

Figure A4 and Table A5 estimate the responses to 30% bank and nonfinancial equity crashes for various subsamples. Figure A4 Panel A excludes the Great Depression and Great Recession years. Specifically, we drop years 1927-1937 and 2005-2015 for all countries and find similar estimates to the full sample. Panel B focuses on the prewar sample and finds more modest effects of bank equity crashes on both real GDP and credit-to-GDP. In contrast, Panel C shows that effects are stronger in the postwar period. The postwar results hold in the Bretton Woods Era (1946-1970, Panel D) in recent decades (1971-2016, Panel E). The fact that we find that bank equity crashes predict output declines and credit contraction during the Bretton Woods Era, a period without major financial crises according to narrative histories, suggests a role of bank equity distress outside of formally-defined banking crises and during normal recessions. We explore this point further in Section IV. Finally, Figure A5 presents estimates for the United States only and finds qualitatively similar results, even when excluding the Great Depression and Great Recession.[14]

[14] Episodes of 30% annual bank equity crashes capture the most serious episodes of U.S. banking distress, namely years 1907, 1930, 1931, 1937, 1974, 1990, 2007, and 2008.

D. What happens prior to bank equity crashes?

For the rest of the paper, we will use an operational definition of an annual bank equity declines of more than 30% to define a "bank equity crash". In our full sample, there are 263 country-years with a 30% bank equity crash and 209 when we restrict the sample to observations with non-missing GDP growth, credit-to-GDP, and nonfinancial equity returns. We have seen than these bank equity crashes predict credit contraction and negative output gaps, but what happens prior to bank equity crashes? Is the evolution of real activity and credit different in the run-up to crashes compared to "normal times"?

In Figure 3, we present an event study around bank equity crashes. We compute the average cumulative change in log real GDP and credit-to-GDP around bank equity crashes relative to five years before the crash. Year t=0 is defined as the year of the bank equity crash. For reference, we also plot the average dynamics around normal times, defined as years without a crash. Figure 3 shows that, in the years leading up to a bank equity crash, GDP growth is similar to growth in normal times. In contrast, credit-to-GDP expands rapidly in the run-up to bank equity crashes. This pattern is consistent with the evidence in Baron and Xiong (2017) that credit expansions predict bank equity crashes and shows that this result holds for a broader and longer sample.

III. Predictive content of narrative accounts

In this section, we examine the predictive content of narrative accounts for bank equity returns. This analysis allows us to provide a statistical measure of potential selection bias in narrative accounts of banking crises. If narrative accounts of banking crises are based on information publicly available to equity investors, their predictability for bank equity returns represent potentially profitable trading opportunities to investors. As risk premium tends to rise during financial crises, e.g., Muir (2017), one would expect a banking crisis marked by narrative accounts to predict positive bank equity returns in the subsequent years. On the other hand, if banking crises marked by narrative accounts predict negative bank equity returns, then narrative accounts might display hindsight biases. Negative predictability would suggest that narrative accounts tend to select episodes that later turn out to be more severe and long lasting than initially anticipated.

Specifically, we estimate the following predictive regression:

$$r^{k}_{i,t,\,t+h} = \alpha^{h}_{0,i} + \alpha^{h}_{1} I_{i,NarrativeCrisis,t} + \alpha^{h}_{2} I_{i,BECrash,t} + \epsilon^{h}_{i,t} \quad (3)$$

where the left-hand side variable $r^{k}_{i,t,\,t+h}$ is the return of either the bank equity index or nonfinancial index of country i from year t to $t+h$. The two predictive variables $I_{i,NarrativeCrisis,t}$ and $I_{i,BECrash,t}$ indicate whether country i in year t experienced a banking crisis marked by any of the six prominent narrative-based chronologies and whether the country's bank equity experienced a crash of more than 30%, respectively. The correlation between the narrative crisis and bank equity crash indicators is 0.24.[15]

Figure 4 depicts the coefficients $\{\alpha^{h}_{1}\}$ when we use the narrative crisis indicator $I_{i,NarrativeCrisis,t}$ to predict in a univariate regression bank and nonfinancial equity returns in the subsequent 1 to 6 years. There is a sharp contrast in two curves. The dashed curve shows that the narrative crisis dummy predicts positive nonfinancial returns, and the predicted returns grow with the predicting horizon. This pattern is consistent with the finding of Muir (2017) and confirms that risk premium in the equity market tends to be high after Narrative Crises. Surprisingly, the solid curve shows that the Narrative Crisis dummy predicts *negative* bank equity returns, which cannot be attributed to a risk premium. Four years after a narrative crisis, the predicted nonfinancial return is about 15%, while the predicted bank equity return is less than -15%. This sharp contrast suggests that narrative accounts tend to select episodes that brought more severe damage to the banking sector than initially anticipated by the equity market.

Table 3 reports the bivariate regression coefficients estimated using Equation 3. At the 4-year horizon, for example, the Narrative Crisis indicator predicts subsequent cumulative bank equity returns of -23%, and the predictability is even more negative at longer horizons. The reported t-statistic for predictive horizons longer than 4 years are highly significant. Table 3 also reports the regression coefficient on the bank equity crash dummy. One may view this as a placebo test. Interestingly, the bank equity crash dummy predicts positive bank equity returns in the

[15] While a correlation of 0.24 appears modest, Figure A2 demonstrates that bank equity returns provide the best real time signal of Narrative Crises compared to a host of other financial and macroeconomic variables. Moreover, if we focus on "episodes" instead of country-years, 57% of Narrative Crises involve a bank equity crash of at least 30%. By examining episodes, we allow for the possibility that bank equity crashes in years adjacent to the year dated by the list of Narrative Crises.

subsequent 1 to 6 years, which again suggests that risk premia tend to be high after bank equity crashes. Again, this stands in contrast to the predictability of the Narrative Crisis dummy.

Despite potential biases, narrative accounts nevertheless provide important information, complementing the information reflected by bank equity returns.[16] However, the analysis in this section serves as a caution to take into account potential biases in future research designs when using narrative accounts of banking crises. In the following section, we focus on the information content of one particularly relevant narrative-based characteristic, a panic, and its interaction with bank equity returns.

IV. Quiet crises

The global financial crisis and Great Recession rekindled a discussion about the role of panics in banking crises. Bernanke (2018), for example, argues that the unusual depth and severity of the Great Recession was caused by the panic in funding and securitization markets that occurred in the fall of 2008 after the collapse of Lehman Brothers, which led to a sharp contraction in credit supply. He argues that distressed bank and nonfinancial private sector balance sheets alone would not have precipitated such a sharp decline in output. On the other hand, there are numerous historical episodes of banking sector distress that were followed by adverse macroeconomic outcomes but did not involve a panic, as we discuss further in the next subsection.[17] A prominent example is the early stages of Japan's banking crisis in the 1990s. Strong regulatory forbearance and implicit government guarantees to creditors were effective in forestalling panics, even though it was widely thought that the financial system had suffered major losses and was deeply undercapitalized. This raises the question: are episodes of non-panic distress also severe from a

[16] For further discussion of the substantial information content from narrative-based approaches, refer to the discussion in Appendix Section IV and the corresponding analysis in Figure A6 and Table A6.

[17] Caprio and Klingebiel (1996) use the term "silent form of financial distress" and point out that long periods of banking sector insolvency sustained by implicit or explicit guarantees are common in developing countries. "Financial distress of the banking system, when a significant portion of the system is insolvent but remains open, is perhaps the most pernicious type of insolvency. This problem is relatively common in developing and transition economies, where bank runs are averted by explicit or implicit (for example, when the state owns a large segment of the banking sector) deposit insurance. Financial distress can persist for years, overlooked by weak supervisory and regulatory systems and obscured by bankers' ability to make bad loans look good by granting new loans (de Juan 1987). Distress can continue indefinitely, but it may progress into overt runs if the public begins to doubt the validity of a government guarantee or the authorities come to recognize the costs of misallocating resources and intervene to restructure or otherwise resolve distressed institutions."

macroeconomic perspective, or is a panic necessary for a banking crisis to precipitate a severe downturn? Because bank equity returns allow us to capture a broad spectrum of periods of financial distress, we can compare the macroeconomic consequences of periods of panic and non-panic distress.

A. Bank equity declines versus panics

As in Section II, we perform macroeconomic forecasting, in which we estimate impulse responses subsequent to bank equity crashes. However, this time, we interact bank equity crashes with a "panic" indicator. This specification thus allows us to analyze bank equity crashes without panics ("quiet crises"), along with the converse, panics without bank equity crashes.

To capture episodes of bank distress without panics, we systematically go through all cumulative -30% bank equity declines and Narrative Crises, classifying each episode as a "panic" or "non-panic." See Table A2. We research each individual episode, drawing both on standard narrative accounts of crises and also new narrative sources (e.g., newspaper articles, research papers, IMF and governmental reports), which we carefully document (see Appendix Section I.G). In practice, it is difficult to define a panic, given that traditional depositor runs are rare in modern banking crises due in part to the advent of deposit insurance and because banks do not generally report their funding status at daily or weekly frequencies. There are many potential definitions of what modern banking panics look like. Furthermore, there are differing notions of concepts such as "liquidity" and "contagion" in the theoretical literature, and it is difficult to gauge them empirically by looking at balance sheet quantities or prices such as interbank lending spreads.

Our goal is to be overly-inclusive and include all potential types in our definition of a panic. We thus define a "panic" as an episode containing any of the following criteria appearing in narrative accounts: 1) widespread sudden depositor or creditor withdrawals at several of a country's largest banks, large enough to threaten these banks' ability to stay open; 2) severe and sudden strains in interbank lending markets; or 3) severe and sudden foreign-currency capital outflows from the banking sector.[18] In short, we define panic episodes as an episode when banks

[18] The follow criteria would not, by themselves, be enough to classify an episode as a panic: 1) low or moderate levels of depositor outflows or central bank liquidity support to banks, or 2) a run on a single institution or a handful of small banks.

experienced sudden salient funding pressures. By being overly-inclusive, we ensure that the "non-panic" episodes that we are most interested in do not include any of these characteristics.

To examine the consequences of banking sector distress by whether they coincided with a panic, we estimate a macroeconomic forecasting regression similar to Equation 2, but now interact the 30% bank equity crash indicator, $BECrash_{i,t}$, with an indicator for whether there is narrative evidence of panic in the year of the crash or the preceding three years. The specification we estimate is:

$$\Delta_{\mathrm{h}} y_{i,t+h} = \alpha_i^h + \gamma_t^h + \beta_1^h BECrash_{i,t} + \beta_2^h Panic_{i,t} + \beta_3^h BECrash_{i,t} \times Panic_{i,t} + \\ + \Gamma^{\mathrm{h}} X_{i,t} + \varepsilon_{i,t}^h, \quad (4)$$

As in Equation 2, the Equation 4 also includes a 30% nonfinancial equity crash indicator, *NFE Crash*$_{i,t}$, along with the standard control variables (country and year fixed effects, three lags in the bank equity crash, nonfinancial equity crash, panic measure, and the panic measured interacted with the bank equity, as well as contemporaneous and lagged real GDP growth and credit-to-GDP change). We emphasize that estimation of Equation 4 does not provide causal evidence on the effects of panics, but rather provides evidence about whether episodes of non-panic distress are also associated with subsequent downturns. Furthermore, as we define a panic based on narrative information, the potential selection bias might inflate the subsequent downturns after panics, but goes against finding substantial downturns after non-panic banking distress.

Impulse responses of real GDP and bank credit-to-GDP are plotted in Figure 5. The responses represent the impact of: (i) non-panic bank equity distress episodes (β_1^h), (ii) panic episodes without a bank equity distress (β_2^h), and (iii) panic episodes with bank equity distress ($\beta_1^h + \beta_2^h + \beta_3^h$). The corresponding coefficient estimates at the *t+3* horizon are reported in Table 4 Panel A.

Figure 5 Panel A shows that both panic and non-panic bank distress predict lower subsequent output and credit contraction, though the magnitudes are stronger for panic bank distress episodes. Non-panic bank distress predicts 2.1% lower output and 2.7 percentage points lower credit-to-GDP after three years. Episodes of panic bank distress are associated 4.0% lower output and 8 percentage points lower credit-to-GDP after three years.[19] While it is not surprising

[19] For robustness, Figure A7 plots the full nonlinear specification for bank equity return (similar to Figure 2), but excluding all panic episodes, and Figure A8 estimates a specification with continuous bank equity returns. These

that panic episodes are worse, these estimates suggest that even non-panic distress episodes are associated with deeper recessions and persistently tight credit conditions.

Bank equity crashes allow us to pick up periods of banking sector distress that are not associated with headline events such as a bank panic. However, one concern with Equation 4 is that some 30% bank equity crashes may reflect equity market "noise" that is not associated with banking sector undercapitalization or tight credit conditions. That is, many of the so-called "quiet crises" may not be banking crises at all, but simply equity market crashes.

To address this concern, we can further refine the set of bank distress episodes into those that also include narrative evidence of widespread bank failures. Banks may still fail in the absence of panics; these cases are due to orderly bank resolutions, e.g., government-directed purchase-and-assumptions, nationalizations, and restructurings. We again interact bank distress episodes conditional on widespread bank failures with the panic indicator and re-estimate Equation 4. Figure 5 Panel B presents the results, which are also reported in Table 4 Panel B. Once we condition on episodes of bank failures, non-panic distress episodes are nearly as severe as episodes of panic distress. For example, three years after the start of a non-panic distress episode, real GDP is 3.6% below the previous trend, compared to 4.1% for panic distress episodes. Over the same horizon, non-panic distress predicts a 7.6 percentage point decline in bank credit-to-GDP, compared to 7.9 percentages points for panic distress episodes.[20]

Figure 5 also analyzes the reverse case: panics without bank equity crashes. The impulse response for these episodes is actually slightly positive, though not statistically different from zero. Thus, panics without bank equity crashes are not associated with any adverse macroeconomic consequences. This finding is consistent with Calomiris (2010) that most pre-Depression panics in the U.S. were driven by relatively small fundamental shocks, which created "temporary confusion" but no long-term damage to the banking system or economy. As a result, minor panics without

results reinforce the finding that bank equity distress outside of panic episodes are also associated with weaker macroeconomic performance.

[20] One possibility, raised by the model of Gertler and Kiyotaki (2015), is that low output in non-panic bank distress episodes may partly reflect *anticipated* panics that do not materialize. Anticipated panics that do not occur ex post can increase bank funding costs, reduce bank net worth, and decrease credit supply. In some settings, explicit government guarantees for distressed banks, including state-owned banks, likely imply that creditors would assign close to zero probability on a panic occurring. In practice, it is difficult to ascertain whether bank creditors assign a positive probability of a panic in our non-panic bank distress episodes. Nevertheless, our results show that banking distress can be associated with adverse macroeconomic outcomes without the occurrence of a panic.

bank equity declines are likely over-represented in narrative chronologies, due to the salience of panics, even though their macroeconomic consequences are mild. On the other hand, bank equity declines without panics are under-represented in narrative chronologies, due to the difficulties of detection, even though the consequences can be quite dire. The resulting bias towards salient but inconsequential panics may actually lead standard narrative chronologies to underestimate the costs of banking crises driven by severe solvency concerns, which we will see in Section V.

B. Non-panic episodes

We highlight several prominent episodes of non-panic bank distress.[21] A well-known example is the initial stages of the Japan's banking crisis (1991-1996). In this phase of Japan's crisis, most of the major banks were thought to be near insolvency, but significant regulatory forbearance and perceptions of strong government guarantees to creditors forestalled a creditor panic. (In general, strong government guarantees characterize many episodes of "non-panic bank distress".) This situation lasted until the fall of 1997, when the collapse of two major securities firms and the Hokkaido Takushoku Bank led interbank markets to seize up, ushering in the panic phase of the crisis (1997-8).

Other selected examples of non-panic bank distress from our list are as follows:

- Canada during the Great Depression. There were no bank panics, and the single bank to fail, Weyburn Security Bank, was tiny (though several trust companies did fail). Nevertheless, there was a steep decline in bank stock prices. Kryzanowski and Roberts (1993) argue that the large and widespread bank losses in Canada, as reflected by the large fall in bank stock prices, may help explain the severity of the Great Depression in Canada, in which the fall in GDP and rise in unemployment rivalled similar conditions in the U.S.[22]

[21] Although the Great Depression in the U.S. featured severe panics, Gorton, Laarits, and Muir (2018) describe the U.S. banking system in 1930, before the panics, as similar to a "quiet crisis." They argue that as discount window lending was stigmatized, banks cut lending instead of borrowing from the Fed, which led to a severe credit contraction. They argue this period of non-panic distress explains why industrial production fell by 20% in 1930, even though there were no runs until 1931.

[22] Kryzanowski and Roberts (1993) note that the large Canadian banks "were insolvent at market values and remained in business only due to the forbearance of regulators coupled with an implicit guarantee of all deposit", both policies being held over from the previous Canadian banking crisis of 1923. The report the largest Canadian bank at the time, the Bank of Montreal, had estimated nonperforming loans in excess of 40%.

- 1973-5: Many countries experienced bank distress during the global downturn of 1973-5. There was an overt banking crisis in the U.K., which followed a major real estate boom and bust. However, there were lesser, though still problematic, episodes of non-panic bank distress in countries such as Australia, Finland, France, Greece, Hong Kong, Ireland, Italy, Singapore, Switzerland, Turkey, and the U.S., which saw large drops in bank equity, both in absolute terms and relative to nonfinancial equity.[23, 24] The recessions in these countries were relatively severe and prolonged, compared to other postwar recessions up until then.
- 2002-3: There were episodes of non-panic bank distress in several countries including Germany, Greece, Israel, Italy, Japan, and Portugal, which saw large drops in bank equity, both in absolute terms and relative to nonfinancial equity. In Germany, for example, according to the IMF's financial stability report for Germany in 2003, three out of the four largest German private commercial banks suffered major losses in 2002, and a number of small and medium sized institutions had to be merged, closed by the regulator or assisted, due to serious difficulties. In Israel, banks suffered large credit losses, with the collapse of Trade Bank, depositor outflows at Industrial Development Bank, and large losses at Discount Bank. And in Japan, still recovering from the banking crisis of the 1990s, new problem loans were disclosed across the banking sector; in particular, the government

[23] Among these non-panic episodes, the banking problems were perhaps the most severe in Australia, which saw a large real estate bust and numerous failures of building societies and small banks between 1974 and 1979 (Fitz-Gibbon and Gizycki, 2001). In Western Europe, countries faced balance-of-payment crises, which impacted the banking sector especially through large foreign exchange losses at banks and tight Eurodollar funding (Coombs, 1973). In particular, Germany's Herstatt Bank failed in 1974, and Germany's Westdeutsche Landesbank and Switzerland's UBS suffered large losses in foreign exchange markets (Schwartz, 1987). In Singapore, the Chung Khiaw Bank, then part of United Overseas Bank, was rumored to be close to bankruptcy.

[24] In the U.S., in particular, there were large aggregate bank losses, widespread symptoms of financial distress, and several prominent failures of large regional banks. Doyran (2016) summarizes the situation of U.S. banks in 1973-5 as follows: "Although bank profits subsided in 1974 because of high interest rates and foreign competition, US banks were particularly hard hit by had loan portfolios, poor regulatory oversight over foreign exchange transactions. inadequate capital (high loan/capital ratio), deficient internal controls and audit procedures, and aggressive expansion through the use of short-term borrowed funds, especially Eurodollar funds, money market CDs and federal funds. In early 1974, a tightened monetary policy surprised banks expecting eased interest rates. This led to short-term borrowing for large real estate projects as many large banks borrowed billions on a daily basis to collateralize short-term loans. When higher interest rates were announced, they suffered enormous losses. The concern over the effects of financial instability increased greatly as regulators reported substantial increases in the number of 'problem banks' under their supervision… In December 1973, the US banking system experienced its first billion-dollar bank failure—the US National Bank of San Diego. Four large bank failures worth $4 billion in deposits, including Franklin National Bank of New York … by far the largest and most serious bank failure since the Great Depression…."

injected 2 trillion yen into Resona Bank, one of Japan's largest banks which was effectively insolvent, and nationalized Ashikaga Bank, a large regional bank.

C. Bank equity declines predict macroeconomic outcomes outside Narrative Crises

In this subsection, we ask whether large bank equity declines predict subsequent output and credit contractions even when excluding *all* Narrative Crises from the sample. This analysis serves to strengthen the key message that large bank equity declines represent substantial damage to the banking sector and the economy even in the absence of any banking crisis recorded by narrative chronologies, not just panics. We re-estimate Equation 1 as in Section II, but now exclude country-year observations within a ±3-year window around Narrative Crisis episodes. As before, we control for nonfinancial equity return indicators, along with the standard control variables.

Figure 6 plots impulse responses from local projections for future real GDP and bank credit to GDP. As can be seen in this non-parametric specification, the magnitudes of the real GDP decline are just as large outside of banking crises as they are in the full sample (Figure 2).[25] Thus, the predictive content of bank equity declines is not simply driven by narrative banking crises and holds nearly as strongly outside of them. This finding reinforces the result that episodes of non-panic bank distress are also associated with adverse macroeconomic consequences. Moreover, it suggests that banking sector distress may play an important role in driving business cycles more generally.

V. Revising the crisis list

While bank equity declines allow us to screen out a relatively complete set of banking distress with or without salient narrative evidence, some of these episodes may be unrelated to banking distress. For some in-sample studies of banking crises, it is therefore useful to create a chronology of *clear-cut* crisis episodes, which are free of these false positives, albeit at the expense of selecting more severe episodes. In creating such a chronology, we also point out that the existing narrative crisis chronologies tend to include a surprising number of historical errors, potentially due to a *"hearsay" bias*. That is, many crisis chronologies call an episode a crisis because previous

[25] Table A7 presents the evidence in tabular form and formally tests differences between the predictive content of bank equity crashes in narrative crisis versus non-crisis episodes.

chronologies do, without actually looking at primary sources or quantitative data. This leads to the perpetuation of historical error or the overemphasis on minor panics. For example, Reinhart and Rogoff (2009) call Italy 1935 a crisis, because Bordo et al. (2001) considers it a crisis, because, in turn, Bernanke and James (1991) consider it a crisis, though it unlikely that any banking crisis, however defined, started in 1935.[26]

In this section, we use bank equity returns, along with other narrative information on crises, to refine the existing chronology of banking crises. Bank equity declines provide an objective criterion to screen crisis episodes and thus help us remove the "hearsay bias," which is quantitatively important. As we will see below, there are a large number of spurious episodes, which feature little evidence of any of the features commonly associated with banking crises.

In order to create a chronology of clear-cut crisis episodes, we start with the existing Narrative Crises list to include any event that has ever been labeled a crisis. Our general procedure is to add newly-uncovered crises and then delete spurious events, to arrive at our Revised Crisis List. Using the data in Table A2, we add a new episodes as a banking crisis by first screening for cumulative 30% decline in bank equity, which may indicate *potential* banking crisis episodes; we then investigate each of these bank equity crashes individually and only add the subset in which there is also clear narrative evidence of widespread bank failures. Similarly, we remove a crisis by screening Narrative Crises for those with cumulative bank equity declines of less than 30%, which may indicate a *potential* spurious crisis; we then investigate each of these cases individually and only delete one if there is no narrative evidence widespread bank failures. The philosophy behind our approach is to be conservative when adding and deleting episodes. Our approach only makes a change when there is both clear-cut quantitative evidence (a bank equity decline) *and* narrative evidence (widespread bank failures) so that we do not introduce any false positives. "Widespread

[26] Bernanke and James (1991) consider it a crisis mainly due to a sharp drop in bank credit that year in the League of Nations banking statistics. However, this drop is likely a data artifact, as it is not reflected in the historical balance sheets of Italy's largest banks, which we examined. In fact, the main banking crisis in Italy erupted in 1930 and by 1935 was largely resolved (the entire banking sector had largely been nationalized). The only bank to fail in 1935 was Credito Marittimo, which had been nationalized years earlier and was only finally liquidated by the government in 1935.

bank failures" is defined as an episode of more than one major bank failing or a substantially higher-than-usual rate of smaller banks failing.[27]

The 27 newly identified crises are listed in Table 5 Panel A, and below we provide several examples of these newly-uncovered banking crises. The 55 spurious (or extremely minor) banking crises that we remove are listed in Table 5 Panel B. Finally, the Revised Crisis List is presented in Table 5 Panel C. We date the start of each crisis as the year in which the bank equity real total return first falls more than -30% from its peak. We also list the bank equity return (i.e. the peak-to-trough real total return) as a measure of the severity of each banking crisis.[28]

There is obviously no single correct definition of a banking crisis, but our goal is to provide one possible construction of clear-cut crisis episodes based on systematic criteria emphasizing bank equity losses and failures. With the data in Table A2, one can likewise construct alternative lists of crises based on other dimensions we document: e.g., the presence of panics, bank failures, large bank equity declines, and various forms of government intervention.

We highlight several examples of newly-uncovered crises (episodes added to our Revised Crisis List) and spurious crises (episodes deleted) to showcase some of the improvements of our chronology.[29] Three interesting newly-uncovered crises from Table 5 Panel A are as follows.

- Belgium in 1876. As reported by Grossman (2010): "the boom in Belgium after Franco-Prussian war led to the establishment of new banks. Several of these failed when the international crisis of 1873 arrived in Belgium. A few smaller banks went into receivership, and the larger Banque de Belgique, Banque de Bruxelles, and Banque Central Anversoise had to be re-organized. Durviaux (1947) calls this a serious crisis, while Chelpner (1943) suggests it may have been less serious."

[27] A "bank failure" is defined broadly to include: forced mergers, restructurings, government equity injections, and nationalizations of nearly failing banks. See the historical documentation for each episode in Appendix Section I.G.

[28] We also revise the starting years of all bank crises (see Table A9 Panel A) to correspond with the initial year of 30% bank stocks declines. Of course, there are important reasons why the narrative accounts date the starting year when they do. With the new dates, our goal is simply to offer additional and alternative information about when markets first recognized the bank equity losses. See Table A2 for a comparison with the Narrative Crisis dates, which in most cases are very similar. Also, on the Revised Crisis List, we occasionally combined several pairs of episodes occurring close together in time (see Table A9 Panel B), when it seemed more appropriate to consider them as a single crisis (i.e. when bank equity prices did not show two separate declines and when the narrative evidence on bank failures and panics conveyed a continuous sequence of banking distress across time, not clustered into two phases).

[29] In Appendix Section VI.B and Figure A8, we use these crisis severity measures to analyze episodes from the Great Depression, in which there is some debate about which countries experienced severe banking crises.

- Japan in 1922. This episode is distinct from the Japanese banking crises of 1920 and 1923. Shizume (2012) writes: "Ishii Corporation, a lumber company engaged in speculative activities, went bankrupt at the end of February 1922, triggering bank runs in Kochi Prefecture (in south-western part of Japan) and Kansai region (Osaka, Kyoto and their environs). Then, from October through December 1922, bank runs spread far across the country, from Kyushu (the westernmost part of Japan) through Kanto (Tokyo and its environs in eastern Japan)… The BOJ extended 'special loans' to 20 banks from December 1922 to April 1923."
- Portugal in 1876. As reported by the Banker's Magazine (October 1876) in an article titled "The Banking Crisis in Portugal": "The first announcement of this trouble was made in London, 19th August, when the telegraph announced that a general run on the banks had begun on the previous day, and that the banks had suspended payments. The explanation was given that the trouble arose from the failure of some financing banks in Oporto, last May, when several of the weak institutions were assisted by the Bank of Portugal… It thus became apparent that the banks of Lisbon, by aiding the suspended banks of Oporto, had so weakened themselves that suspension was inevitable. Under these circumstances, two expedients were adopted by the Portuguese Government. The first was to issue a decree suspending for sixty days the payment of debts… The second expedient was to use the credit of the Government in London, and to obtain from several financial houses there advances of about $5,000,000. An export of gold to Lisbon was thus begun, and for the present the financial excitement seems almost to have ceased."

We next highlight three examples from Table 5 Panel B of spurious banking crises that we delete from the Revised Crisis List, in addition to the case of Italy 1935 noted previously. Many of these deleted events in Panel B are typos or historical errors, monetary or currency issues that had only minor effects on the banking sector, or panic crises that were very small (e.g. a few small provincial banks were affected). Removing spurious crises reflects the concerns of Schwartz (1987) on distinguishing real crises from pseudo-crises.

- Germany 1977. Reinhart and Rogoff (2009) simply report that "Giro institutions faced problems," though we could not find any independent verification from contemporaneous newspaper accounts of any unusual problems affecting the banking sector at the time. The peak-to-trough bank equity decline was small (-11.7%).

- Netherlands 1893 and 1897. According to Sumner (1896), 1893 was a monetary crisis but did not feature depositor panics or bank failures. There was a large outflow of gold, which necessitated the Netherlands Bank and foreign banks to raise their discount rates to stem the outflow. The discount rate was lowered to normal levels after three months when the gold outflows had subsided. There was no decline in annual bank equity prices. As for 1897, we could not find any reference to a banking crisis, and there was no decline in annual bank equity prices.[30]

We summarize the properties of all the added and deleted episodes in Table 6 Panel A, which is further supporting evidence that the added banking crises are real and the deleted banking crises are extremely minor or spurious. Column 1 shows that the added crises have an average peak-to-trough bank equity decline of -57.2%, an average peak-to-trough real GDP decline of -7.4%, a high likelihood of deposit runs, liability guarantees, and liquidity support, and high nonperforming loans and deposit outflows. These numbers are comparable to, or greater than, the average for episodes from the Revised Crisis List (column 3), suggesting that these added episodes are truly crises. Column 2 has statistics for deleted crises: an average peak-to-trough bank equity decline of -10.1, an average peak-to-trough real GDP decline of -2.4%, a low likelihood of deposit runs, liability guarantees, and liquidity support, and low nonperforming loans and deposit outflows. These numbers are considerably less than the average for episodes from the Revised Crisis List (column 3), suggesting that these deleted episodes are not actually banking crises.

To assess potential biases of the narrative lists, we compare the Revised Crisis List with various narrative crisis lists. Figure 7 compares the macroeconomic consequences of Revised Crisis List episodes with those from Reinhart and Rogoff (2009) and Laeven and Valencia (2013). Table 6 Panels B and C compare along various banking crisis dimensions. Compared to Reinhart and Rogoff's list of banking crises, for example, we find the consequences of the Revised Crisis List episodes are actually *more* severe, both in terms of GDP, credit contraction, and characteristics of crises. These results are discussed in detail in Appendix Section VI.D. The fact that the Revised Crisis List is on average more severe is, in large part, due to eliminating many spurious crises from

[30] Reinhart and Rogoff (2009) justify this banking crisis by citing Bordo et al. (2001) and Homer and Sylla (1991). However, Bordo et al. (2001) gives no explanation regarding this crisis, and Homer and Sylla (1991) only show in a graph that short-term interest rates were high; Homer and Sylla (1991) do not refer to 1897 as a crisis year.

their list.[31] And if one restricts our list to episodes featuring a 30% decline in bank equity, the Revised Crisis List is even more severe than Reinhart and Rogoff's crises.[32]

VI. Relative timing of bank equity declines and other indicators

In this section, we use monthly data around banking crises on the Revised Crisis List to provide an in-sample study of the relative timing of various crisis indicators, including bank equity declines, nonfinancial equity declines, and credit spreads. This analysis also serves to showcase how bank equity prices can be useful in providing information on the timing of banking crises. Monthly data tell us about the turning points of crises and the dynamics of how crises evolve, as understood in real-time by equity investors. This higher-frequency information allows us to show that large bank equity declines precede credit spread increases and narrative crisis dates.

As the U.S. 2007-8 banking crisis provides a vivid illustration of the key results, we start with previewing this case before showing the results more generally. Figure 8 shows that, for the 2007-8 U.S. crisis, bank equity prices detected the impending crisis before nonfinancial equity and before credit spread measures. Bank equity peaked in January 2007, ten months before the nonfinancial index peak in October 2007, and then sharply declined. Additionally, the rise of corporate spreads (the AAA-Govt and BAA-AAA spreads) and interbank lending spreads (the LIBOR-OIS spread) relative to baseline levels remained under one percentage-point until September 2008, a full 21 months after bank equity had declined.[33]

We next analyze the dynamics of bank equity prices relative to nonfinancial equity prices and credit spreads more systematically across all crises on the Revised Crisis List. To do this, we

[31] On the Revised Crisis List, we delete 51 events from Reinhart and Rogoff's list, having an average GDP decline of -2.6%. This small average GDP decline from spurious crises drags down the average severity for Reinhart and Rogoff's crises.

[32] Similarly, Revised Crisis List episodes are more severe than Schularick and Taylor's (when compared on their sample of 14 countries) and Bordo's, but slightly less severe than Laeven and Valencia's (when compared on their time sample 1970-2012), perhaps because Laeven and Valencia only identify crises that are serious enough to warrant several forms of major government intervention.

[33] Equity and bond prices for Lehman Brothers, whose failure precipitated the panic phase of the 2007-08 crisis, display similar dynamics. Lehman Brothers' stock price saw a gradual but large decline of 67% relative to the S&P 500 from its peak in January 2008 to the week before its bankruptcy in September 2008. In contrast, returns on Lehman bonds were much more stable throughout the spring and summer of 2008. Relative to January 2008, the cumulative abnormal return on Lehman bonds was only -3% one week before its bankruptcy. Lehman Bonds then fell sharply in the week leading up to its bankruptcy (Denison, Fleming, and Sarkar 2019).

turn to our monthly dataset, which contains four series for each country: bank equity index returns, nonfinancial equity index returns, a bank credit spread index, and a nonfinancial corporate credit spread index. We focus on a three-year window around narrative crises on the Revised Crisis List.

Figure 9 explores the timing and magnitude of bank and nonfinancial equity declines by plotting the average dynamics of monthly bank and nonfinancial equities around narrative banking crises. Time 0 in event time is defined as January of the narrative crisis year, based on the Revised Crisis List. Panel A shows that bank equity (the blue line) peaks before nonfinancial equity (the red line) and starts declining earlier.

One can verify the robustness of this result in other ways. For example, in Table 7 Panel A, we record a bank (nonfinancial) equity decline as the first month in which the index falls a cumulative 30% in real total returns from its peak. Column 1 in Table 7 Panel A shows that, on average, across banking crisis episodes on the Revised Crisis List, bank equity experienced a 30% decline 1.84 months before nonfinancial equity experienced a 30% decline. This average is statistically significant. Column 1 also shows that in 64 out of 127 crises, the bank equity index is the first to fall 30% when compared the nonfinancial equity index ("Pos"). In contrast, nonfinancial equity falls by 30% first in 46 crises ("Neg"), and the two series fall by 30% in the same month in 17 cases ("Zero"). Bank equity thus declines before nonfinancials in 58.2% of cases. This ratio is statistically significant based on a p-value calculated under the null hypothesis that the "bank equity declines first" is Bernoulli-distributed with parameter 0.50.

Column 2 in Table 7 Panel A performs the same analysis, but compares the month that the bank equity index peaks, relative to the month of the peak in the nonfinancial equity index. On average, the bank equity index peaks 1.71 months before the nonfinancials index. Across Revised Crisis List banking crises, bank equity peaks first in 60.4% of crises, and the difference is statistically significantly different from 50%.

These findings are consistent with the view that banking crises originate with shocks to a narrow sector of the economy, leading to banking sector losses, that are then transmitted to the broader economy through a bank lending channel. If instead most banking crises were caused by broad macroeconomic shocks that then led to banking sector losses, we would expect nonfinancial equities to decline before or at the same time as bank equity.

However, this pattern is true mainly for post-World War II crises in advanced economies and is often the opposite for prewar crises. Table 7 Panel B studies the relative timing of bank and nonfinancial 30% equity declines in various subsamples. Bank equity tends to decline before nonfinancial equities in the postwar period and in advanced economies. In contrast, in the prewar and in emerging economies, nonfinancial equities are more likely decline by 30% first. Panels B and C in Figure 9 show the distinction across the pre- and postwar sample graphically. One interpretation of this is that the initial causes of crises have changed over time, with more recent crises starting with distress in the banking sector exposed to narrow segment of the economy, as opposed to broader macroeconomic shocks, which may have been more common for prewar banking crises (as shown in the case of the U.S. by Calomiris and Gorton, 1991).

What about the relationship between bank equity declines and credit spread increases, the latter being a potential indicator of panics? Figure 9 shows that, in all subsamples of the data, bank equity falls by large amounts well ahead of the credit spread increases. Both interbank lending spreads (the green line) and corporate credit spreads (the black line) increase after the start of the crisis, while bank equity falls prior. This result suggests that a non-trivial proportion of bank losses are already present at the early stages of the crisis before the panic, suggesting that large banking sector losses are already "baked in" before the panic even starts.

Table 9 further reinforces this evidence by showing the distribution of credit spread increases conditional on bank equity falling by a certain amount during a Revised Crisis List episode. For example, Panel A shows that, in a Revised Crisis List episode, when bank equity first falls, for example, by more than 30% (row 3), the median credit spread increase is only 55 basis points (bps). In more than 20% of cases, bank credit spreads have not increased at all at this point. Only in 30% of cases has the bank credit spread increased by more than 1 percentage point. For reference, the median trough-to-peak bank credit spread spike across Revised Crisis List episodes is 2.6%. Panel B shows similar results but for corporate credit spreads rather than bank credit spreads. Similar to the results in Panel A, when bank equity first falls by more than 30% (row 3), the median corporate credit spread increase is only 25 bps, and in over 40% of cases corporate credit spreads have not increased at all. For reference, the median of the trough-to-peak corporate credit spread spike across Revised Crisis List episodes is and 1.7%.[34]

[34] As a robustness check, Table 7 Panel C compares the timing of 30% bank equity declines to the timing of credit spreads spikes. We record a credit spread "spike" as the first month in which credit spreads increase at least 1

Do bank equity declines pick up crises before or after the dates from the previous narrative approaches to dating crises? Table 7 Panel C shows that 30% bank declines pick up a banking crisis before the *Narrative Crisis* dates, suggesting that narrative accounts tend to date the crisis late. This result is consistent with Boyd, De Nicolo, and Rodionova (2019), who show that bank lending contracts before crises are dated.

Figure 9 also reveals several additional new facts about bank equity around banking crises in postwar economies. First, bank equity returns decline substantially more than nonfinancial equity returns, even though, unconditional on a crisis, bank equity has a beta of 0.8 in our sample, so bank equity is actually less volatile than the market most of the time. Second, bank equity declines are "permanent," in the sense that they do not recover post-crisis, presumably reflecting permanent credit losses, a cash flow effect. In contrast, nonfinancial equities recover after the crisis, suggesting nonfinancial equity declines are mainly driven by a discount rate effect. These facts are clear for the U.S. case in Figure 8 and can be seen more generally in Figures 9 A10.

VII. Conclusion

In this paper, we construct a new historical dataset of bank equity returns for 46 countries going back to 1870 to better understand the nature of banking crises. Large bank equity declines provide a wide range of information to study historical banking crises, in addition to being appealing from a conceptual standpoint. We begin by showing that a large decline in bank equity is a powerful predictor of lower subsequent GDP growth and bank credit-to-GDP, even after controlling for nonfinancial equity returns. The relation between bank equity returns and subsequent macroeconomic outcomes is highly nonlinear, showing that bank equity is particularly informative about severe negative macroeconomic events involving a decline in intermediated credit. Bank equity returns also allow us to identify and overcome lookback and selection biases in narrative approaches.

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percentage point above their pre-crisis average levels. Since a 1 percentage point increase is somewhat arbitrary, we present this evidence mainly as robustness analysis confirming the result in Figure 9. Nevertheless, Table 7 Panel C, shows that 30% bank equity declines detect the crisis 2.91 months before a 1% spike in bank credit spreads (column 2) and 5.00 months before a 1% spike in corporate credit spreads (column 4). These differences are statistically significant, and suggest that bank losses tend to be realized by bank equity investors before panics or other factors that would lead to a spike in bank credit spreads.

The informativeness of large declines in bank equity allows us to map out a broader sample of crises. These include banking crises with salient characteristics such as panics or major government interventions that have been the focus of narrative approaches, but also "quiet banking crises" when the banking sector is undercapitalized but headline events such as panics are avoided. The ability to pick of a broader sample of events allows us to ask whether panics are necessary for severe macroeconomic outcomes or whether periods of banking sector distress without panics, "quiet crises," are also associated with lower output and credit growth. We find that while large bank equity declines coupled with narrative evidence of panics are followed by the most severe macroeconomic downturns, episodes of non-panic banking distress also translate into non-trivial slowdowns. In contrast, panics without a large decline in bank equity are not followed by lower output or credit growth, highlighting a tendency for narrative accounts to record minor panics of limited macroeconomic significance.

Large bank equity declines, combined with new narrative information on historical events such as panics and bank failures, allows us to uncover forgotten historical banking crises and remove spurious or extremely minor crises. We use this feature to present a refined chronology of clear-cut banking crises that we believe will be useful for future in-sample studies of banking crises. While our results emphasize that narrative approaches contain lookback and selection biases, as well as the potential for basic errors, narrative methods also capture additional information beyond what can be extracted from purely statistical approaches. As a result, we believe hybrid approaches combining hard data and narrative information can be fruitful. For example, using monthly data around our Revised Crisis List, we find that bank equity returns generally lead other indicators such as nonfinancial equity returns and credit spreads. This gives new clues into the causes of banking crises by suggesting that losses are already present at the early stages of crises.

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Figure 1: Sample historical data

This figure shows scans of three historical newspapers containing bank stock price data. Panel A shows Italian bank stock prices at the end of 1904 from the newspaper *La Stampa*. Panel B shows Dutch bank stock prices at the end of 1908 from the newspaper *De Telegraaf*. Panel C shows German bank stock prices at the end of 1873 from the newspaper *Berliner Boersen-Zeitung*. The full list of historical primary sources for bank stock prices and dividends can be found in the Data Appendix.

(A) Italian bank stock prices, 1904

BORSE ITALIANE.

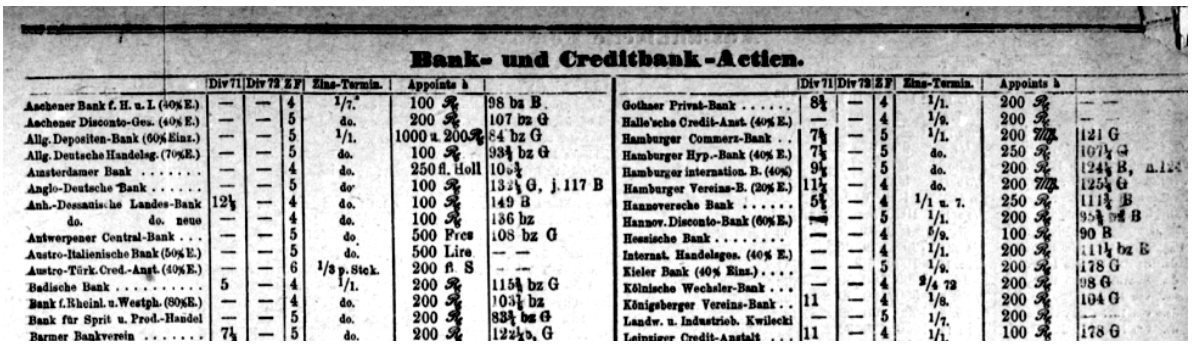
Corsi di chiusura del 28 dicembre 1904.

Valori	Roma	Milano	Genova	Firenze
Rend. it. 5 0/0 perc.	105 35	105 25	105 32 1/2	105 87
» f.m.	105 50	105 38	105 37 1/2	105 82 1/2
3 1/2 0/0 p.c.	103 45 1/2	—	—	103 85
» f.m.	103 35	103 32 1/2	103 37 1/2	103 80
Az. Banca d'It.	1132 —	1134 50	1135 50	— —
» Banca Comm.	629 —	628 50	629 —	— —
» Credito Ital.	611 —	611 —	612 —	— —
» Meridionali	736 —	736 —	736 —	736 —
» Mediterranee	— —	459 —	460 —	460 50
» Rubattino	— —	468 50	470 —	— —
» Terni	— —	1945 —	1949 —	— —
» Elba	— —	— —	— —	— —
» Savona	— —	— —	— —	— —
» Molini Alta It.	— —	— —	— —	— —
» Fridania	— —	— —	— —	— —
» Carburo Rom.	— —	— —	— —	— —

(B) Dutch bank stock prices, 1908

	V.K.	L.K.	H.K.
Amst. Liq.-Kas. dito...	115	—	—
Buit. Bankver. A-U. dito	64	—	—
Cent. Bankv. L. & N. dito	—	—	—
Cen. Cred.-Bank S.....4½	99⅜	—	—
Cent. Werkg. Ris.-B. O.4½	100¾	100¾	—
Crediet-Vereen. A.....	101½	—	—
Disc. en Eff.b. 1&2ser.do.	112	—	—
Disc.-Mij te Rotterd. do.	—	—	—
Fin. Mij v. Zuid-Afr. do.	95	—	—
Geld. Credietvereenig.	165	—	—
Gemeente-Cred. Obl. 4	101½	—	—
dito dito dito 3½	96½	96⅛	—
dito dito dito 3	85¾	85⅝	—
dito dito dito 2½	—	—	—
Holl. Belegg. Cie. dito 4	98	—	—
Holl. Voorsch. Bk. S. b..	100	—	—
Incasso Bank Aand...	116½	—	—
Ind. Bnk. te Haarl. dito	—	—	—
Kas Vereeniging Aand.	142	142½	—

(C) German bank stock prices, 1873



Bank- und Creditbank-Actien.

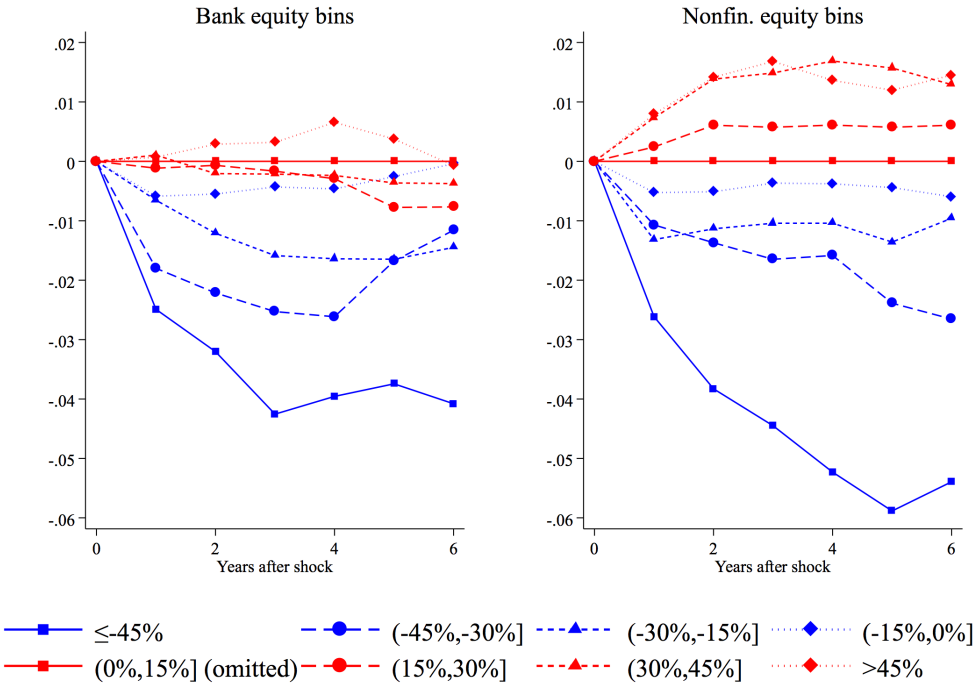
	Div 71	Div 72	E F	Einz-Termin.	Appoints b	
Aachener Bank f. H. u. L. (40% E.)	—	—	4	1/7.	100 ℛ	98 bz B.
Aachener Disconto-Ges. (40% E.)	—	—	5	do.	200 ℛ	107 bz G
Allg. Depositen-Bank (60% Einz.)	—	—	5	1/1.	1000 u. 200 ℛ	84 bz G
Allg. Deutsche Handelsg. (70% E.)	—	—	5	do.	100 ℛ	93⅛ bz G
Amsterdamer Bank	—	—	4	do.	250 fl. Holl	10⅝
Anglo-Deutsche Bank	—	—	5	do	100 ℛ	132½ G, j. 117 B
Anh.-Dessauische Landes-Bank	12⅛	—	4	do.	100 ℛ	149 B
do. do. neue	—	—	4	do.	100 ℛ	136 bz
Antwerpener Central-Bank	—	—	5	do.	500 Frcs	108 bz G
Austro-Italienische Bank (50% E.)	—	—	5	do.	500 Lire	— —
Austro-Türk. Cred.-Angt. (40% E.)	—	—	6	1/8 p. Stck.	200 fl S	— —
Badische Bank	5	—	4	1/1.	200 ℛ	115⅝ bz G
Bank f. Rheinl. u. Westph. (80% E.)	—	—	4	do.	200 ℛ	103½ bz
Bank für Sprit u. Prod.-Handel	—	—	5	do.	200 ℛ	83⅜ bz G
Barmer Bankverein	7⅛	—	5	do.	200 ℛ	122½b. G

	Div 71	Div 72	E F	Einz-Termin.	Appoints b	
Gothaer Privat-Bank	8⅛	—	4	1/1.	200 ℛ	— —
Halle'sche Credit-Anst. (40% E.)	—	—	4	1/9.	200 ℛ	— —
Hamburger Commerz-Bank ..	7⅛	—	5	1/1.	200 ℛ	121 G
Hamburger Hyp.-Bank (40% E.)	7⅛	—	5	do.	250 ℛ	107½ G
Hamburger internation. B. (40%)	9⅛	—	5	do.	200 ℛ	124⅛ B, a. 124
Hamburger Vereins-B. (20% E.)	11½	—	4	do.	200 ℛ	125⅛ G
Hannoversche Bank	5⅛	—	4	1/1 u. 7.	250 ℛ	111⅛ B
Hannov. Disconto-Bank (60% E.)	—	—	5	1/1.	200 ℛ	95⅛ bz B
Hessische Bank	—	—	4	5/9.	100 ℛ	90 B
Internat. Handelsges. (40% E.)	—	—	4	1/1.	200 ℛ	111½ bz B
Kieler Bank (40% Einz.)	—	—	5	1/9.	200 ℛ	178 G
Kölnische Wechsler-Bank ...	—	—	4	2/4 72	200 ℛ	98 G
Königsberger Vereins-Bank ..	11	—	4	1/8.	200 ℛ	104 G
Landw. u. Industrieb. Kwilecki	—	—	5	1/7.	200 ℛ	— —
Leipziger Credit-Anstalt ...	11	—	4	1/1.	100 ℛ	178 G

Figure 2: Bank equity crashes forecast output gaps and credit contraction

This figure plots the impact of bank equity and nonfinancial equity returns on real GDP (Panel A) and bank credit-to-GDP (Panel B). The responses are estimated jointly using Equation 1, controlling for contemporaneous and lagged real GDP growth and the change in credit-to-GDP. All specifications also control for country and year fixed effects. The responses to bank equity and nonfinancial equity returns are estimated jointly. The x-axis is time in years, and the y-axis is real GDP or bank credit-to-GDP relative to the omitted return bin (return between 0% and 15%).

(A) Real GDP response



(B) Credit-to-GDP response

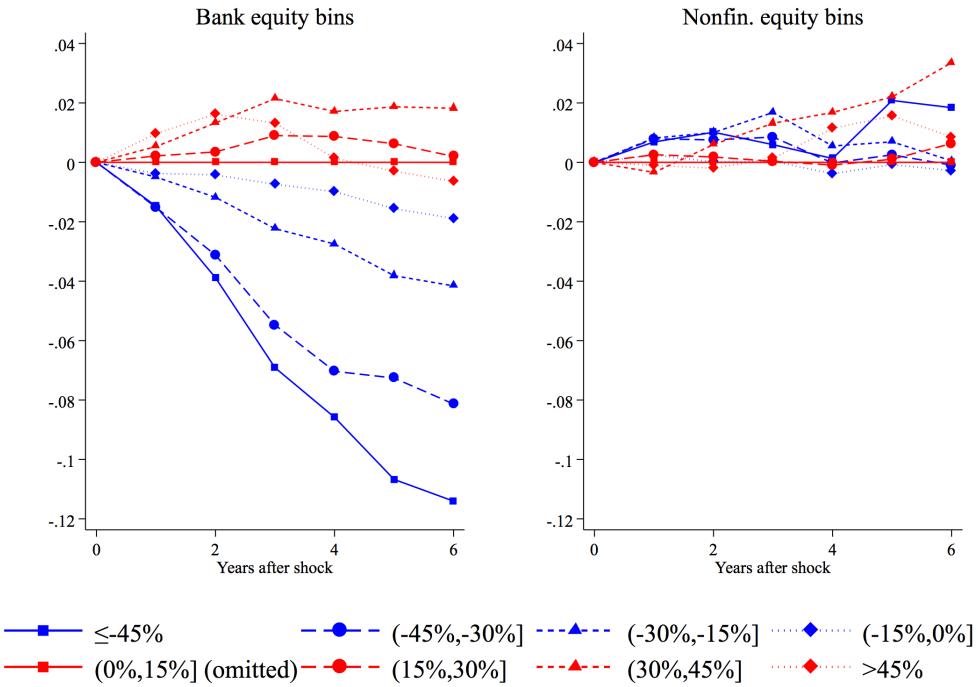
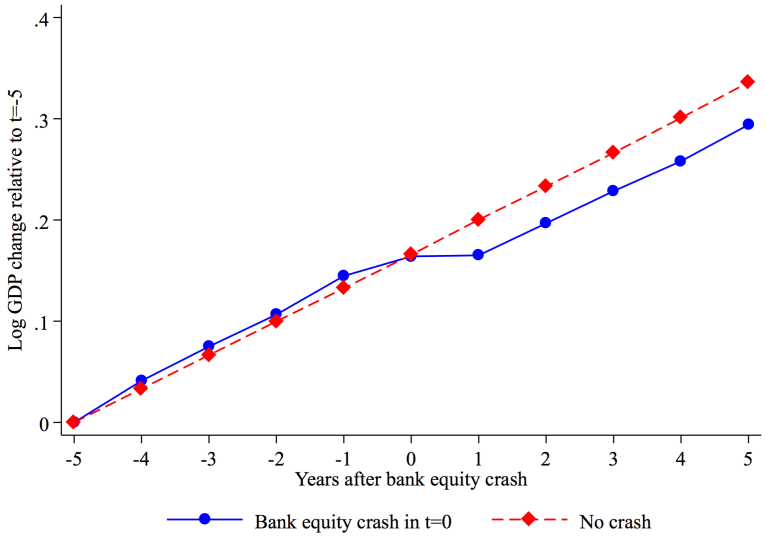


Figure 3: Dynamics of output and credit around bank equity crashes

This figure presents the average dynamics of real GDP and credit-to-GDP around 30% bank equity crashes. Bank equity crashes are defined to occur in year $t = 0$. Each panel plots cumulative growth in a given variable from five years before a bank equity crash ($t = -5$) to five years after the crash ($t = 5$). For comparison, average dynamics around years with no crash are presented in red.

(A) Real GDP



(B) Credit-to-GDP

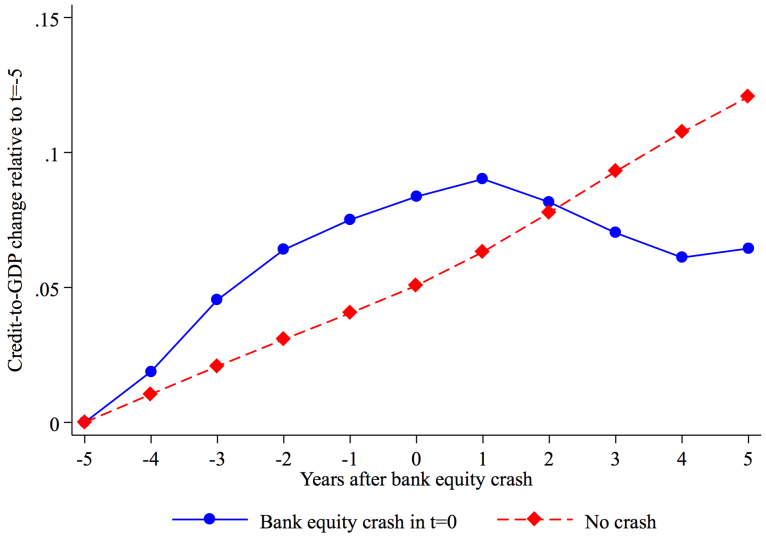
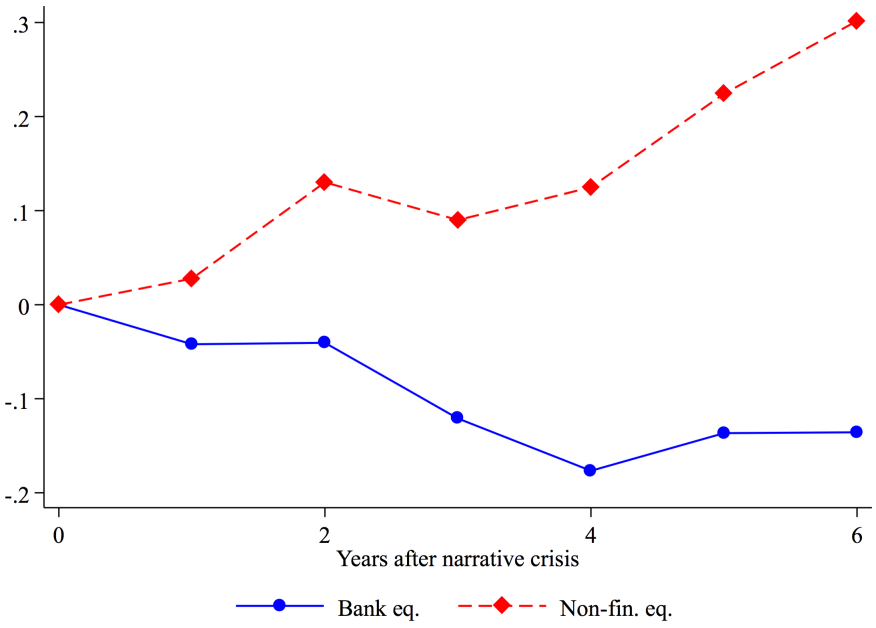


Figure 4: Selection bias in narrative-based crisis chronologies?

This figure presents an event study of average subsequent bank or nonfinancial equity returns from t to $t+h$ conditional on the *Narrative Crisis* indicator (in Panel A) or on a 30% bank equity crash (in Panel B). These results are estimated using Equation 3. The figure suggests that the *Narrative Crises* indicator contains information about future bank equity returns, suggesting that the narrative accounts may contain a selection bias of episodes that continued to worsen.

(A) Conditional on *Narrative Crisis* indicator



(B) Conditional on bank equity crash

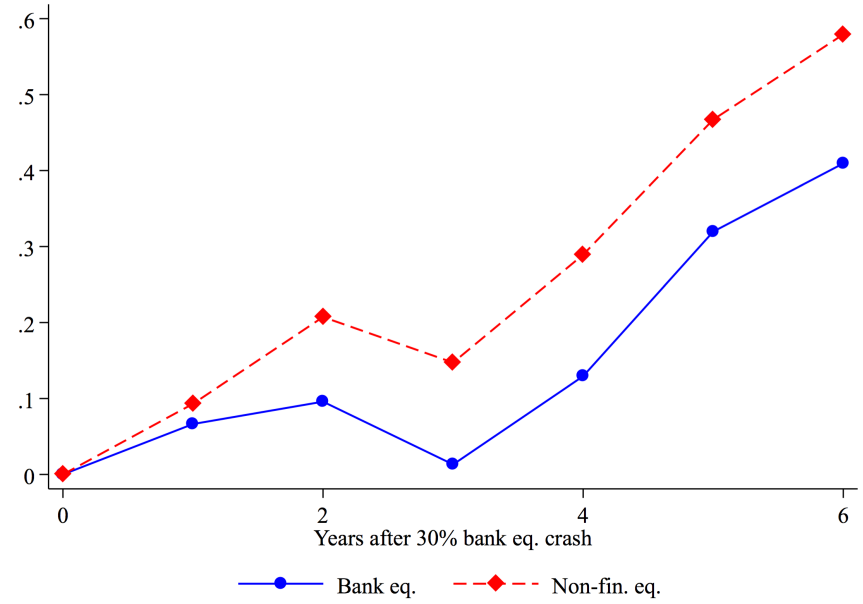
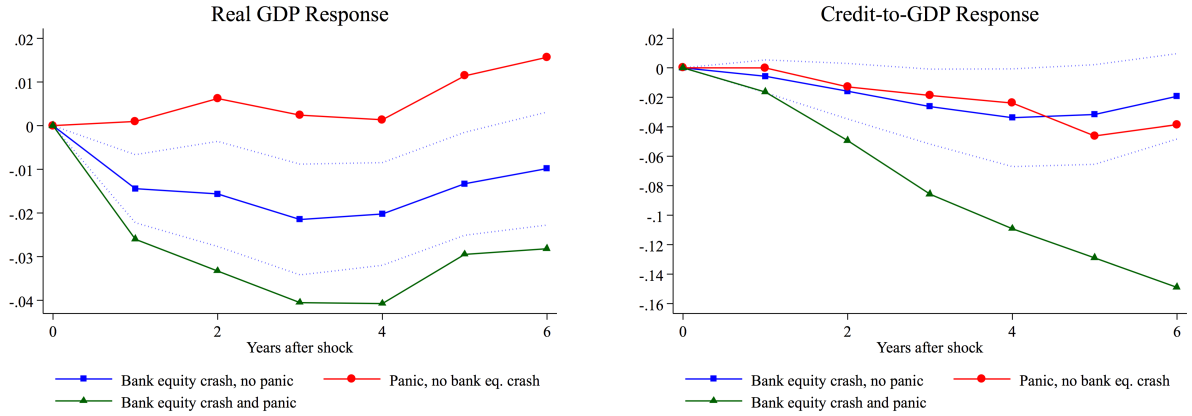


Figure 5: Impact of non-panic banking distress

This figure presents the response of real GDP and credit-to-GDP to 30% bank equity crashes, distinguishing between 30% bank equity crashes that coincide with a bank panic and crashes that are not associated with a panic. The impulse responses are estimated from Equation 4. Panel A presents the results from the baseline specification. Panel B defines episodes of banking sector distress as years with a 30% bank equity crash *and* narrative evidence of widespread bank failures. The responses are estimated using local projections, controlling for contemporaneous and lagged nonfinancial equity crash indicators, real GDP growth, and the change in credit-to-GDP. All specifications also control for country and year fixed effects. The dashed lines represent 95% confidence intervals based on standard errors double-clustered on country and year.

(A) Baseline



(B) Conditioning on bank failures

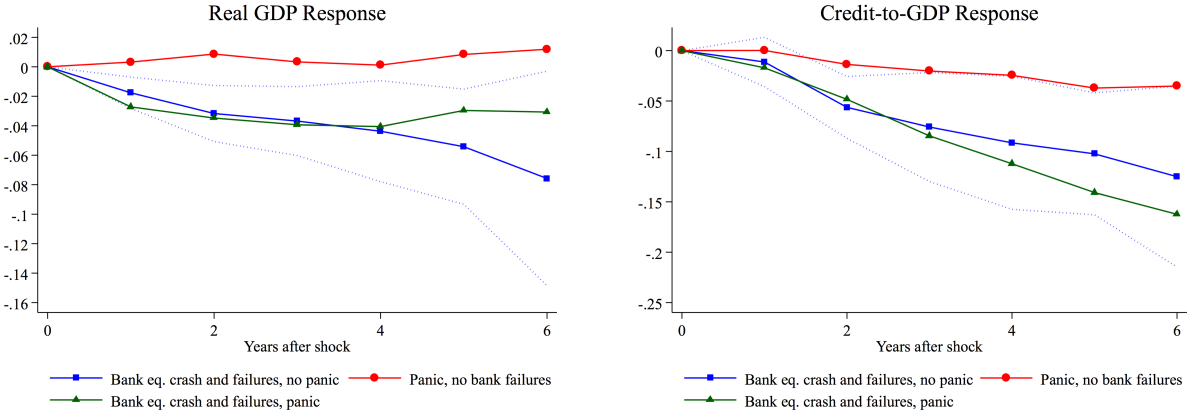
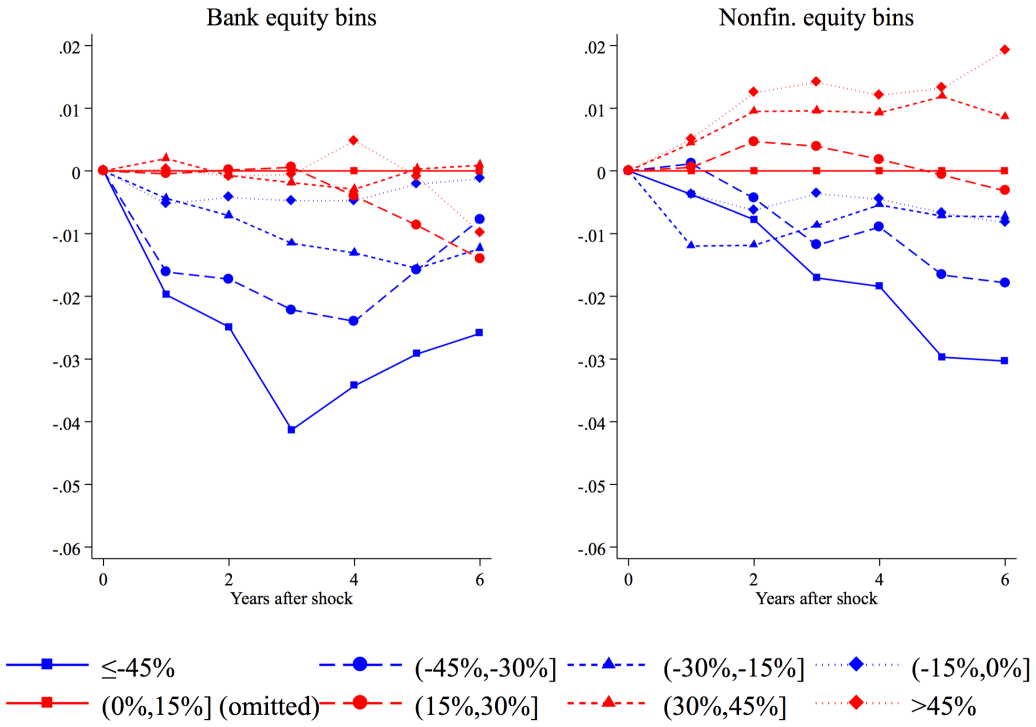


Figure 6: Impact of bank equity crashes outside of narrative-based crises

This figure shows that bank equity crashes predict output gaps and credit contraction even excluding narrative-based banking crisis episodes. Local projection impulse responses are estimated as in Figure 2 but exclude observations within a ±3-year window around Narrative Crises.

(A) Real GDP response



(B) Credit-to-GDP response

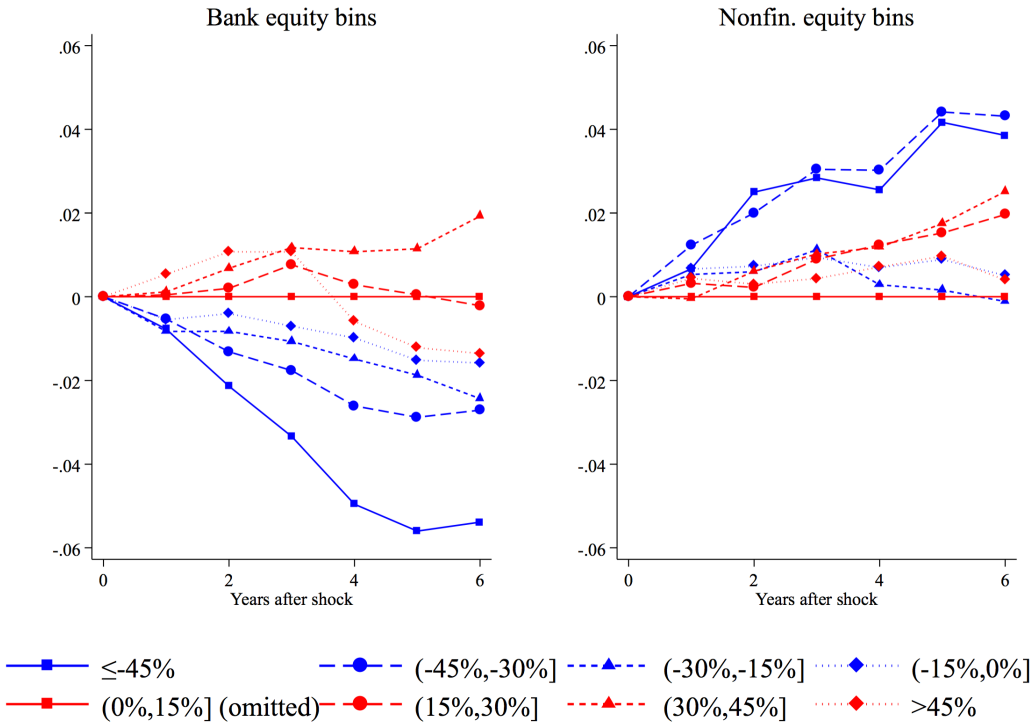
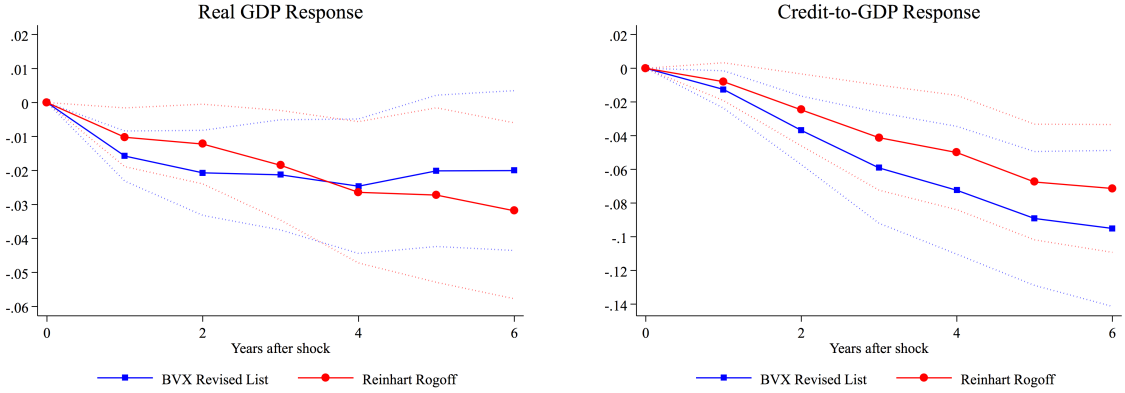


Figure 7: Comparison with other banking crisis chronologies

This figure compares the Revised Crisis List with the Reinhart and Rogoff (2009) and Laeven and Valencia (2013) banking crisis chronologies. The comparisons in each panel are estimated separately using local projections on consistent samples (i.e. the same sample covered by Reinhart and Rogoff (2009) or Laeven and Valencia (2013)). All specifications control for country and year fixed effects, along with contemporaneous and three-year lagged real GDP growth and change in credit-to-GDP.

(A) Comparison with Reinhart and Rogoff



(B) Comparison with Laeven and Valencia

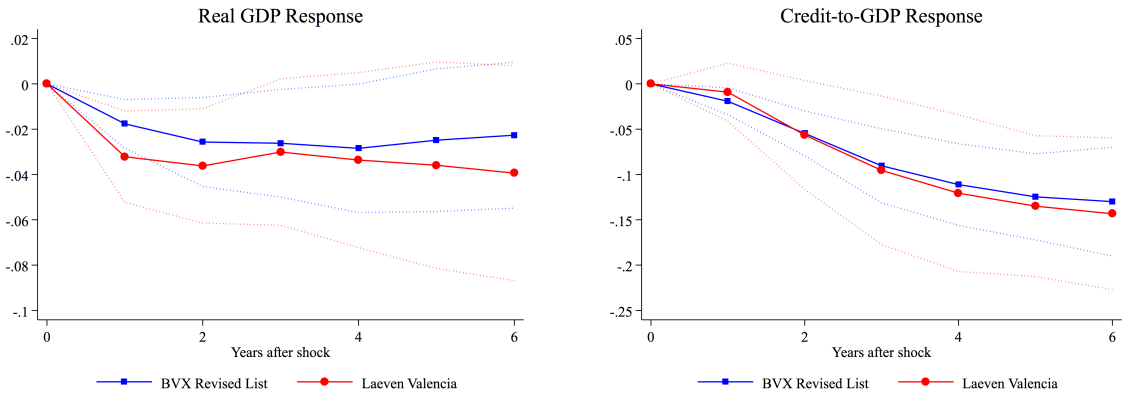


Figure 8: Equity returns and credit spreads around the U.S. 2007-8 banking crisis

This figure plots bank and nonfinancial equity total return indexes and credit spreads around the U.S. 2007-8 banking crisis. The bank equity index is in blue, the nonfinancial equity index is in red, corporate credit spreads are in black (dashed is the AAA 10-year Corporate minus 10-year Treasury spread, solid is the BAA minus AAA 10-year Corporate spread), and the 3-month LIBOR minus OIS spread is in green. The scale on the left corresponds to equity returns, and the scale on the right corresponds to bond yield spreads.

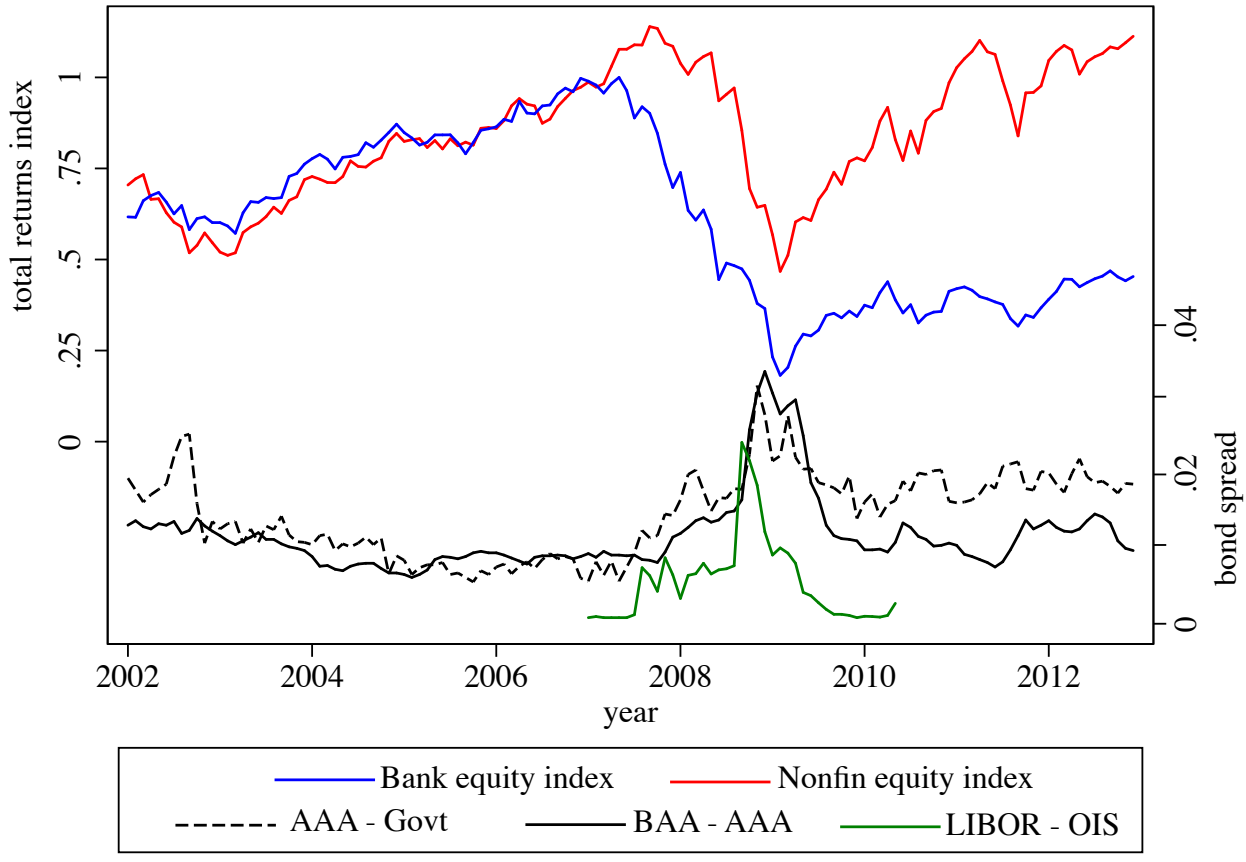
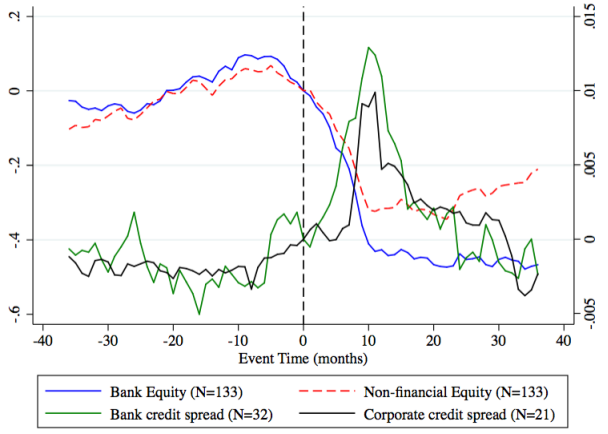


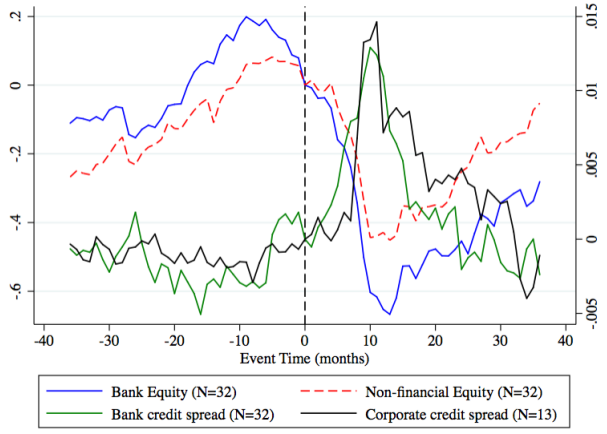
Figure 9: Timing of bank equity crashes relative to nonfinancial equity crashes and credit spread increases

This figure compares the average evolution of monthly bank equity, nonfinancial equity, bank credit spreads, and corporate credit spreads around banking crises on the Revised Crisis List. Equity indexes are normalized to 1 and credit spreads are normalized to 0 in event month 0, defined as January of the crisis year. Panel A presents results for the full sample, Panel B uses a sample where bank equity, nonfinancial equity, and bank credit spreads are all non-missing, and Panels C-E present results across subsamples.

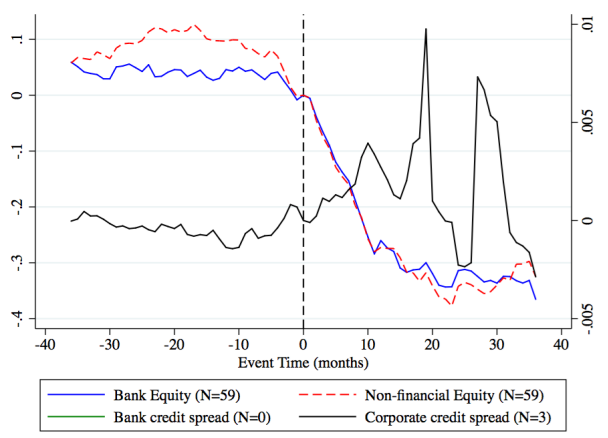
(A) Full sample



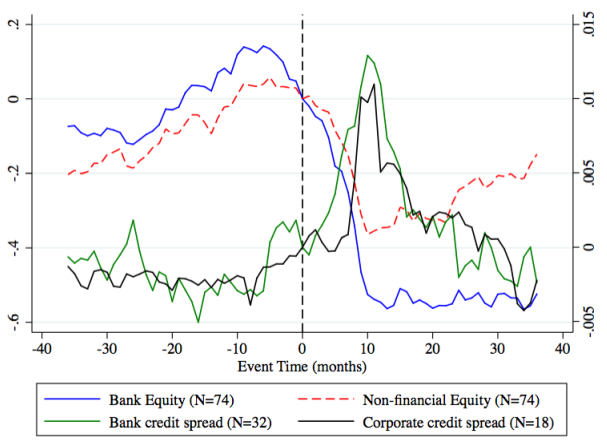
(B) Consistent sample



(C) 1870-1939



(D) 1940-2016



(E) 1940-2006

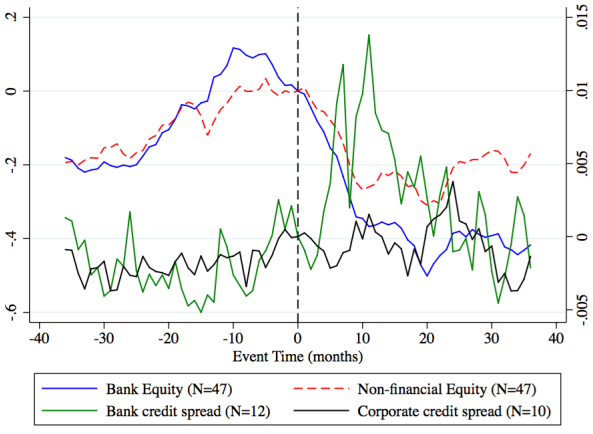


Table 1: Narrative-based banking crises in Germany

This table illustrates disagreement among narrative-based chronologies regarding the occurrence of historical banking crises, focusing on the case of Germany (similar results hold for other countries, see Appendix Table A1). It lists the occurrence of banking crises according to six prominent papers. Years listed correspond to the starting year of the banking crisis, according to each paper. A "0" means that the source reports no banking crisis in a given year, while a blank cell means that the crisis is not covered in the sample period.

Reinhart Rogoff	Schularick Taylor	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt & Detragiache
0	1873				
1880	0				
1891	1891		0		
1901	1901		1901		
0	1907		0		
1925	0		0		
1929	1931		1931		
1977	0	0	0	late 1970s	
2008	2008	2008		0	

Table 2: Bank equity crashes forecast output gaps and credit contraction

This table shows that bank equity crashes predict lower subsequent real GDP and credit-to-GDP. The results are estimated from Equation 2. A bank (nonfinancial) equity crash is defined as 30% decline in the bank (nonfinancial) equity total return index from year $t-1$ to year t. Controls are contemporaneous real GDP growth and credit-to-GDP change, as well as three lags in the bank equity crash indicator, nonfinancial equity crash indicator, credit-to-GDP change, and real GDP growth. t-statistics in brackets are computed from standard errors double-clustered on country and year. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Real GDP growth

	Real GDP growth$_{t,t+1}$		Real GDP growth$_{t,t+3}$	
	(1)	(2)	(3)	(4)
Bank equity crash	-0.033***	-0.019***	-0.045***	-0.029***
	[-6.73]	[-4.98]	[-5.92]	[-5.84]
Nonfinancial equity crash	-0.023***	-0.010**	-0.031***	-0.023**
	[-3.80]	[-2.32]	[-2.79]	[-2.44]
Country fixed effects	✓	✓	✓	✓
Controls		✓		✓
Year fixed effects		✓		✓
Adj. R^2 (within)	0.11	0.085	0.049	0.069
N	2548	2548	2548	2548

Panel B: Credit-to-GDP change

	Credit-to-GDP change$_{t,t+1}$		Credit-to-GDP change$_{t,t+3}$	
	(1)	(2)	(3)	(4)
Bank equity crash	-0.020***	-0.011*	-0.077***	-0.051***
	[-2.71]	[-1.87]	[-4.75]	[-3.72]
Nonfinancial equity crash	0.010**	0.0031	0.0077	-0.0038
	[2.26]	[0.69]	[0.73]	[-0.29]
Country fixed effects	✓	✓	✓	✓
Controls		✓		✓
Year fixed effects		✓		✓
Adj. R^2 (within)	0.0065	0.21	0.027	0.13
N	2535	2535	2535	2535

Table 3: Selection bias in narrative-based crisis chronologies?

This table presents regressions of future cumulative bank equity returns from t to $t+h$ on an indicator of a *Narrative Crisis* in year t and an indicator of a 30% bank equity crash in year t. Each column controls for country fixed effects. t-statistics in brackets are computed from standard errors double-clustered on country and year. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	Bank eq. return, t to $t+h$					
	(1) $r^B_{t,t+1}$	(2) $r^B_{t,t+2}$	(3) $r^B_{t,t+3}$	(4) $r^B_{t,t+4}$	(5) $r^B_{t,t+5}$	(6) $r^B_{t,t+6}$
Narrative crisis in t [1]	-0.065	-0.072	-0.13	-0.23**	-0.25**	-0.28*
	[-1.38]	[-1.12]	[-1.54]	[-2.24]	[-2.08]	[-1.82]
Bank equity crash in t [2]	0.079	0.11	0.040	0.18**	0.37**	0.47**
	[0.84]	[1.14]	[0.65]	[2.19]	[2.40]	[2.15]
Test for equality of						
[1] and [2], p-value	.151	.1921	.142	.0078	.014	.0294
Adj. R^2 (within)	0.0039	0.0024	0.00083	0.0036	0.0071	0.0077
N	2536	2525	2500	2408	2317	2228

Table 4: Impact of non-panic banking distress

This table presents the response of real GDP and credit-to-GDP to 30% bank equity crashes, distinguishing between 30% bank equity crashes that coincide with a bank panic and crashes that are not associated with a panic. The coefficients are estimated from Equation 4. Panel A presents the results from the baseline specification. Panel B defines episodes of banking sector distress as years with a 30% bank equity crash *and* narrative evidence of widespread bank failures. Controls include three lags of all right-hand-side variables reported in the table, as well as contemporaneous and lagged real GDP growth and credit-to-GDP change. t-statistics in brackets are computed from standard errors double-clustered on country and year. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Baseline

	Real GDP growth$_{t,t+3}$		Credit-GDP change$_{t,t+3}$	
	(1)	(2)	(3)	(4)
Bank equity crash	-0.0211**	-0.0215***	-0.0431***	-0.0263**
	[-2.63]	[-3.32]	[-3.45]	[-2.03]
Panic	-0.00191	0.00240	-0.00120	-0.0188
	[-0.19]	[0.22]	[-0.093]	[-0.97]
Bank equity crash × Panic	-0.0337***	-0.0214*	-0.0704***	-0.0406
	[-2.76]	[-2.02]	[-2.79]	[-1.68]
Nonfinancial equity crash	-0.0232**	-0.0234**	-0.000697	-0.00274
	[-2.25]	[-2.41]	[-0.056]	[-0.20]
Country fixed effects	✓	✓	✓	✓
Controls		✓		✓
Year fixed effects		✓		✓
Adj. R^2 (within)	0.0366	0.0715	0.0294	0.136
N	2548	2548	2536	2536

Panel B: Conditioning on bank failures

	Real GDP growth$_{t,t+3}$		Credit-GDP change$_{t,t+3}$	
	(1)	(2)	(3)	(4)
Bank eq. crash and failures	-0.0341***	-0.0368***	-0.0936***	-0.0758***
	[-3.09]	[-3.09]	[-3.64]	[-2.75]
Panic	-0.00282	0.00333	-0.00445	-0.0202
	[-0.29]	[0.30]	[-0.31]	[-1.03]
Bank eq. crash and failures × Panic	-0.0188	-0.00584	-0.0134	0.0115
	[-1.15]	[-0.35]	[-0.39]	[0.30]
Nonfinancial equity crash	-0.0276**	-0.0274**	-0.00972	-0.00783
	[-2.55]	[-2.61]	[-0.82]	[-0.62]
Country fixed effects	✓	✓	✓	✓
Controls		✓		✓
Year fixed effects		✓		✓
Adj. R^2 (within)	0.0341	0.0743	0.0268	0.141
N	2548	2548	2536	2536

Table 5: Newly-identified crises, spurious banking crises, and the Revised Crisis List

This table lists the newly-identified banking crises in Panel A, spurious banking crises in Panel B, and the Revised Crisis List in Panel C. The bank equity return is the arithmetic peak-to-trough real total return. "0" indicates no decline in bank equity. A blank entry indicates a lack of bank equity return data for that episode.

Panel A: Newly-identified banking crises

Country	Starting year of crisis	Bank equity return
Austria	2011	-0.509
Belgium	1876	-0.565
	2011	-0.755
Chile	1878	
	1931	-0.356
Colombia	1931	-0.675
Czech	1923	
Denmark	2011	-0.444
Egypt	1914	-0.407
Greece	2010	-0.961
Hong Kong	1891	-0.565
Hungary	1873	-0.518
	1995	-0.398
Iceland	1920	-0.875
	1930	
Ireland	2011	-0.908
Italy	2011	-0.601
Japan	1922	-0.404
	2001	-0.808
Netherlands	1931	-0.418
Peru	1914	-0.612
	1931	-0.373
Portugal	1876	
	2011	-0.725
Spain	2010	-0.411
Switzerland	1914	
Turkey	1914	-0.654
Average		**-0.588**

Panel B: Spurious banking crises

Country	Starting year of crisis	Bank equity return	Country	Starting year of crisis	Bank equity return
Argentina	1885	0	India (cont.)	1929	0
	1985			1947	
Australia	1931	-0.23	Israel	1977	0
Belgium	1870	-0.031	Italy	1935	
	1925	-0.193	Japan	1871	
Brazil	1897	0		1914	-0.232
	1926	0		1917	-0.239
	1929	-0.182	Korea	1986	0
	1963		Mexico	1992	0
	1985		Netherlands	1893	0
Canada	1906	0		1897	0
	1912	-0.002		1939	
Chile	1889	-0.254	Norway	1914	
Czech	1931	-0.099		1927	0
Denmark	1902	0		1936	-0.209
	1914	-0.296	Portugal	1986	
	1931	-0.102	Singapore	1982	-0.275
Egypt	1980		South Africa	1877	-0.004
	1990			1977	-0.153
Finland	1939	-0.111		1989	0
France	1871		Spain	1913	-0.038
	1904	0	Sweden	1897	-0.183
	1907	-0.049	Switzerland	1910	0
	1939	-0.121	U.K.	1908	-0.011
Germany	1880	0		1984	0
	1907	-0.051		1995	-0.159
	1977	-0.117	U.S.	1914	-0.158
India	1908	0			
			Average		**-0.083**

Panel C: A revised chronology of banking crises in 46 countries, 1870-2016

Country	Starting year of crisis	Bank equity return
Argentina	1891	-0.307
	1914	-0.473
	1930	-0.819
	1934	-0.563
	1980	
	1989	
	1995	-0.305
	2000	-0.656
Australia	1893	-0.469
	1989	-0.281
Austria	1873	-0.715
	1924	-0.24
	1931	-0.566
	2008	-0.673
	2011	-0.509
Belgium	1876	-0.565
	1883	0
	1914	
	1929	-0.831
	1939	-0.511
	2008	-0.842
	2011	-0.755
Brazil	1890	-0.275
	1900	0
	1914	-0.374
	1923	-0.131
	1990	
	1994	
Canada	1873	0
	1907	-0.081
	1920	-0.426
	1983	-0.164
Chile	1878	
	1898	-0.003
	1907	
	1914	
	1925	
Chile (cont.)	1931	-0.356
	1976	0
	1982	-0.837
Colombia	1931	-0.675
	1982	-0.831
	1998	-0.813
Czech	1923	
	1991	
	1995	-0.904
Denmark	1877	-0.207
	1885	-0.043
	1907	-0.269
	1919	-0.347
	1992	-0.425
	2008	-0.739
	2011	-0.444
Egypt	1907	-0.132
	1914	-0.407
	1931	-0.608
Finland	1877	
	1900	
	1921	-0.569
	1931	-0.252
	1990	-0.814
France	1882	-0.456
	1889	-0.106
	1914	-0.475
	1930	-0.571
	1994	-0.246
	2008	-0.64
Germany	1874	-0.371
	1891	-0.23
	1901	-0.05
	1925	-0.42
	1930	-0.489
	2008	-0.728
Greece	1929	-0.727
	1992	-0.391
	2008	-0.671
	2010	-0.961
Hong Kong	1892	-0.565
	1982	-0.445
	1998	-0.464
Hungary	1873	-0.518
	1931	
	1991	
	1995	-0.398
	2008	-0.671
Iceland	1920	-0.875
	1930	
	1985	
	1993	
	2008	-0.963
India	1913	-0.249
	1920	-0.495
	1993	-0.561
Indonesia	1990	-0.659
	1998	-0.88
Ireland	2007	-0.918
	2010	-0.908
Israel	1983	-0.499
Italy	1873	-0.237
	1889	-0.348
	1891	-0.453
	1907	-0.24
	1914	-0.333
	1921	-0.55
	1930	-0.073
	1992	-0.397
	2008	-0.575
	2011	-0.601
Japan	1882	
	1890	

Panel C: A revised chronology of banking crises in 46 countries, 1870-2016 (cont.)

Country	Starting year of crisis	Bank equity return
Japan (cont.)	1901	-0.221
	1907	-0.377
	1920	-0.405
	1922	-0.405
	1923	-0.157
	1927	-0.168
	1990	-0.546
	1997	-0.605
	2001	-0.808
Korea	1984	-0.326
	1997	-0.726
Luxembourg	2008	-0.474
Malaysia	1985	-0.368
	1997	-0.686
Mexico	1883	
	1893	-0.325
	1908	-0.029
	1913	-0.596
	1921	
	1928	-0.839
	1981	
	1994	-0.602
Netherlands	1907	-0.083
	1914	-0.093
	1921	-0.251
	1931	-0.418
	2008	-0.562
New Zealand	1888	-0.549
	1894	-0.337
	1987	-0.892
Norway	1898	
	1919	-0.71
	1931	0
	1987	-0.464
Peru	1876	
	1914	-0.612

Country	Starting year of crisis	Bank equity return
Peru (cont.)	1931	-0.373
	1981	-0.98
	1998	-0.396
Philippines	1981	-0.719
	1997	-0.687
Portugal	1876	
	1890	
	1921	-0.643
	1923	-0.684
	1931	-0.597
	2008	-0.613
	2011	-0.725
Russia	1875	-0.188
	1900	-0.401
	1995	
	1998	-0.751
	2008	-0.723
Singapore	(no crises)	
South Africa	1881	-0.27
	1890	-0.062
	1984	-0.492
Spain	1882	-0.349
	1890	-0.124
	1920	-0.14
	1924	-0.222
	1931	-0.336
	1975	-0.814
	2008	-0.466
	2010	-0.411
Sweden	1878	
	1907	-0.135
	1919	-0.395
	1932	-0.431
	1991	-0.787
	2008	-0.519

Country	Starting year of crisis	Bank equity return
Switzerland	1870	-0.418
	1914	
	1919	-0.432
	1931	-0.559
	1990	-0.326
	2008	-0.676
Taiwan	1923	
	1927	
	1983	
	1995	-0.307
	1998	-0.557
Thailand	1979	-0.461
	1983	0
	1997	-0.734
Turkey	1914	-0.758
	1930	-0.719
	1980	-0.409
	1991	
	1994	-0.203
	2001	-0.622
U.K.	1878	-0.132
	1890	-0.128
	1914	
	1973	-0.737
	1991	-0.147
	2008	-0.707
U.S.	1873	-0.172
	1884	0
	1890	0
	1893	-0.29
	1907	-0.334
	1930	-0.654
	1984	-0.263
	1990	-0.332
	2007	-0.676
Venezuela	1981	-0.34
	1992	-0.839
	2008	-0.614

Table 6: Comparison of narrative banking crisis chronologies

This table compares key outcomes of episodes on the Revised Crisis List to those of other crisis chronologies. Panel A compares average outcomes of added episodes (newly-uncovered banking crises), deleted episodes (spurious banking crises), Revised Crisis List episodes, and Revised Crisis List episodes having a bank equity decline of more than -30%. Panel B compares episodes from Reinhart and Rogoff's (2009) chronology to episodes on the Revised Crisis List. Panel C compares episodes from Laeven and Valencia's (2013) chronology to episodes on the Revised Crisis List. Differences in averages are computed, along with t-statistics in brackets (which are computed using a pooled standard deviation across the differenced groups).

Panel A: Summary statistics of added, deleted, and Revised Crisis List episodes

	Added	Deleted	Revised Crisis List	Revised Crisis List (Bank equity decline $< -30\%$)
Bank equity decline	-0.588	-0.083	-0.461	-0.603
Abnormal bank equity decline	-0.388	-0.160	-0.352	-0.423
Bank market cap decline	-0.563	-0.088	-0.409	-0.516
Real GDP decline (pk to tr)	-0.080	-0.024	-0.054	-0.063
Real GDP growth decline (pk to tr)	-0.083	-0.055	-0.086	-0.091
Real GDP growth (max dev from trend)	-0.073	-0.037	-0.060	-0.066
Failed banks (% of total bank assets)	0.322	0.062	0.293	0.303
NPL at peak	0.113	0.046	0.165	0.149
Decline in deposits (pre-war only)	-0.115	-0.066	-0.184	-0.199
Significant liability guarantees	1.000	0.333	0.537	0.641
Significant liquidity support	0.667	0.375	0.729	0.826

Panel B: Comparison of Reinhart and Rogoff episodes with Revised Crisis List episodes

	Reinhart Rogoff	Difference with Revised Crisis List		Difference with Revised Crisis List having bank eq. decline $< -30\%$	
Bank equity decline	-0.376	0.086	[6.29]	0.227	[16.65]
Abnormal bank equity decline	-0.312	0.040	[2.81]	0.112	[7.13]
Bank market cap decline	-0.316	0.093	[4.67]	0.200	[9.94]
Real GDP decline (pk to tr)	-0.046	0.008	[2.52]	0.017	[4.65]
Real GDP growth decline (pk to tr)	-0.080	0.005	[2.01]	0.011	[3.9]
Real GDP growth (max dev from trend)	-0.055	0.005	[2.34]	0.011	[4.16]
Failed banks (% of total bank assets)	0.259	-0.034	[-1.61]	-0.044	[-1.83]
NPL at peak	0.158	-0.007	[-0.66]	0.010	[0.89]
Decline in deposits (pre-war only)	-0.163	0.020	[1.49]	0.036	[2.36]
Significant liability guarantees	0.496	-0.041	[-1.31]	-0.144	[-4.14]
Significant liquidity support	0.676	-0.053	[-1.94]	-0.150	[-4.96]

Panel C: Comparison of Laeven and Valencia episodes with Revised Crisis List episodes

	Laeven Valencia	Difference with Revised Crisis List		Difference with Revised Crisis List having bank eq. decline $<$ -30%	
Bank equity decline	-0.641	-0.058	[-2.9]	0.005	[0.28]
Abnormal bank equity decline	-0.472	-0.031	[-1.15]	0.000	[-0.01]
Bank market cap decline	-0.625	-0.092	[-3.83]	-0.049	[-2.23]
Real GDP decline (pk to tr)	-0.056	-0.010	[-2.38]	-0.010	[-2.13]
Real GDP growth decline (pk to tr)	-0.094	-0.016	[-4.16]	-0.015	[-3.68]
Real GDP growth (max dev from trend)	-0.071	-0.012	[-3.65]	-0.010	[-2.65]
Failed banks (% of total bank assets)	0.407	0.041	[1.12]	0.007	[0.17]
NPL at peak	0.167	0.000	[-0.03]	0.008	[0.57]
Decline in deposits (pre-war only)	N/A				
Significant liability guarantees	0.600	-0.025	[-0.50]	-0.130	[-2.40]
Significant liquidity support	0.900	0.079	[2.17]	-0.046	[-1.49]

Table 7: Timing of bank equity crashes

This table analyzes monthly data around Revised Crisis List episodes to compare when crises are first detected using different variables. Panel A column 1 records the average time difference in months between detecting a 30% bank equity crash relative to a 30% nonfinancial equity crash. Column 2 records the average time difference in months between a bank equity peak and a nonfinancial equity peak. Column 3 records the average duration of a bank equity crash from peak to trough. Panel B performs the same analysis as Panel A column 1 for separate subsamples. Panel C compares the timing of 30% bank equity crashes with credit spread spikes and narrative start dates. The time difference is positive if the bank equity crash is recorded before the other event and negative if after the event. For each column, a t-statistic is calculated under the null hypothesis that the average time difference is zero. As an alternative non-parametric test, we also count in how many of the banking crisis the bank equity decline is recorded first ("pos"), the other event is recorded first ("neg"), or both events are recorded in the same month ("zero"). We then calculate the fraction of times that the bank equity decline happens first ("pos / (pos + neg)") and calculate a p-value under the null hypothesis that the bank equity decline happening first is Bernoulli-distributed with parameter 0.50. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Bank equity crashes picks up the crisis first before nonfinancial equity crashes

	Before nonfin. eq. crash	Bank equity peak before nonfin eq peak	Duration of bank equity decline
Average (in months, signed)	1.77**	1.15*	27.52***
t-stat	2.13	1.75	24.60
N	129	140	141
Pos	66	57	Duration $\geq$ 24 mo. = 86 episodes
Zero	16	39	
Neg	47	44	Duration $<$ 24 mo. = 55 episodes
Pos / (Pos + Neg)	58.4%**	56.4%	% Duration $\geq$24 mo. = 61%***
p-value	0.045	0.116	0.006

Panel B: Subsample analysis

	Prewar	Postwar	Postwar & Emerging	Postwar & Advanced	Postwar (pre-2006) & Advanced
Average (in months, signed)	-0.32	3.09***	0.15	6.10***	4.38**
t-stat	-0.23	3.09	0.10	5.04	2.06
N	50	79	40	39	16
Pos	21	45	18	27	10
Zero	4	12	5	7	2
Neg	25	22	17	5	4
Pos / (Pos + Neg)	45.7%	67.2%	51.4%	84.4%	71.4%
p-value	0.769	0.003	0.500	0.000	0.090

Panel C: Bank equity crashes relative to credit spread spikes and narrative crisis dates

	Before 2% spike in bank credit spread	Before 1% spike in bank credit spread	Before 2% spike in corp credit spread	Before 1% spike in corp credit spread	Before Reinhart-Rogoff start dates	Before earliest narrative start dates
Average (in months, signed)	6.23***	3.43*	9.25***	4.5**	2.88**	2.54**
t-stat	5.89	1.95	7.07	1.99	2.31	2.16
N	39	40	20	20	97	106
Pos	31	22	17	13	38	32
Zero	4	2	1	0	36	56
Neg	4	16	2	7	23	18
Pos / (Pos + Neg)	88.6%***	57.9%	89.5%***	65.0%	62.3%	64.0%
p-value	0.000	0.209	0.000	0.132	0.036	0.032

Table 8: Distribution of credit spread increases just after bank equity crashes

This table presents the distribution of credit spread increases just after bank equity crashes around Revised Crisis List episodes. Each row presents the distribution in credit increases in the month following a given decrease in bank stocks (relative to the previous bank stock peak). For example, row 3 shows the distribution of credit spread increases when the bank equity index first falls by more than -30%. Panel A presents the analysis for bank credit spreads, and Panel B presents the analysis for corporate credit spreads.

Panel A: The distribution of bank credit spread increases subsequent to bank equity crashes

	... bank credit spreads increase by (in percentage points):								
	10^{th} pctile	20^{th} pctile	30^{th} pctile	40^{th} pctile	50^{th} pctile	60^{th} pctile	70^{th} pctile	80^{th} pctile	90^{th} pctile
When banks stocks fall more than...									
-20%	0	0	0	0.30	0.52	0.70	0.99	1.20	3.46
-25%	0	0	0	0.33	0.52	0.73	0.99	1.20	3.46
-30%	0	0	0.21	0.43	0.55	0.81	1.02	2.34	15.11
-35%	0	0.01	0.34	0.52	0.63	0.91	1.30	2.95	18.19
-40%	0	0.26	0.50	0.61	0.79	1.18	2.16	4.15	64.71
-45%	0	0.34	0.54	0.66	0.85	1.31	2.31	4.15	64.71
-50%	0.09	0.48	0.60	0.85	1.16	1.76	2.99	6.95	80.75
-55%	0.29	0.57	0.83	1.10	1.30	2.41	3.44	6.50	39.08
-60%	0.38	0.63	1.08	1.26	1.84	2.79	5.81	7.23	42.28

Panel B: The distribution of corporate credit spread increases subsequent to bank equity crashes

	... corporate credit spreads increase by (in percentage points):								
	10^{th} pctile	20^{th} pctile	30^{th} pctile	40^{th} pctile	50^{th} pctile	60^{th} pctile	70^{th} pctile	80^{th} pctile	90^{th} pctile
When banks stocks fall more than...									
-20%	0	0	0	0	0	0.29	0.80	1.06	1.80
-25%	0	0	0	0	0	0.29	0.80	1.06	1.80
-30%	0	0	0	0	0.25	0.45	1.06	1.52	1.80
-35%	0	0	0	0.11	0.27	0.59	1.16	1.54	2.03
-40%	0	0	0	0.19	0.36	0.73	1.25	1.57	2.40
-45%	0	0	0.03	0.31	0.41	0.86	1.35	1.59	2.70
-50%	0	0	0.23	0.34	0.45	0.96	1.41	1.61	2.94
-55%	0	0	0.15	0.32	0.41	1.06	1.45	2.67	4.70
-60%	0.09	0.39	1.00	1.14	1.30	1.49	1.88	3.31	4.87

ONLINE APPENDIX

Salient Crises, Quiet Crises

Matthew Baron, Emil Verner, and Wei Xiong

I. Data

A. Narrative Crises

Table A1 reports the list of Narrative Crises, defined as the union of all banking crises from six prominent papers: Bordo et al (2001), Caprio and Klingebiel (2003) Demirguc-Kunt and Detragiache (2005), Laeven and Valencia (2013), Reinhart and Rogoff (2009, and online spreadsheets updated 2014)[1], and Schularick and Taylor (2012, online update 2017). We use the most recent update of each paper.

The years listed correspond to the starting year of the banking crisis, according to each paper. The starting year of the Narrative Crisis list (i.e. the combined list, reported in the right-most column) is the earliest year across all six papers. In the table, a "0" means that the source reports no banking crisis in a given year, while a blank cell means that the crisis is not covered in the sample period (i.e. no information provided either way as to whether a banking crisis occurred).

B. Master list of episodes

Table A2 reports the master list of episodes, which is intended to be a very broad list, not necessarily all of which might be defined as "banking crises" episodes. It is the union of: a) the Narrative Crises list defined in Table A1, and b) years in which the bank equity real total return index *cumulatively* declines by more than -30% (relative to its previous peak). The year of each episode, reported in column 2, is defined as the first year in which the bank equity index *cumulatively* falls by more than -30% from its peak. In cases in which the bank equity index does not decline by -30% or more, the year in column 2 is the year from the Narrative Crises list. Column 3 indicates whether the episode is a Narrative Crisis. If the year from the Narrative Crisis list is

[1] Reinhart and Rogoff (2009) present three slightly different banking crisis lists: in their Appendix A3, Appendix A4, and online spreadsheets (we use the latest 2014 update). We generally take the union of these lists; however, when there is a small disagreement regarding the starting date of a banking crisis, we use the most recent online update.

different from the year defined by the bank equity decline (Column 2), that is also indicated in Column 3.

Other columns split the sample along important dimensions. Column 4 splits the sample into episodes with and without banking "panics", where a "panic" is defined in Section IV of the main text. Column 5 records whether there is a 30% cumulative bank equity decline associated with a given episode. Column 6 splits the sample in those with and without narrative evidence of widespread bank failures, defined broadly as an episode of more than one major bank failing or a substantially higher-than-usual rate of smaller banks failing (we define a "bank failure" broadly to include forced mergers, restructurings, nationalization, etc. of nearly failing banks). Detailed narrative evidence of panics and widespread bank failures, to support the classification in Table A2, is documented in Appendix Section I.G below.

C. Documentation of sources

Table B1 provides an overview of the coverage and sources for the bank equity index total return variable. Cells with numbers indicate the number of underlying banks used to construct new bank equity return indexes. Shaded areas refer to pre-made bank equity indexes, which are constructed from a large number of banks.

Table B2 lists in detail all the sources used to construct the *annual* equity variables: yearly bank stock prices, year bank stock dividends, yearly nonfinancial stock prices, and yearly nonfinancial stock dividends.

As noted in Table B2, some of the annual bank price return and dividend yield indexes are constructed from individual stock data that we gathered. The individual bank names, sample coverage, and the original data sources for the bank stocks used to construct these annual indexes are listed in the following document:

https://blogs.cornell.edu/baron/individual-banks-used-for-yearly-price-and-dividend-indexes-1n23632/

Table B3 lists in detail all the sources used to construct the *monthly* equity and credit spread variables: monthly bank stock returns, monthly nonfinancial stock returns, monthly bank credit spreads, and monthly corporate credit spreads.

As noted in Table B3, some of the monthly data is constructed from individual securities from banks or nonfinancials firms. The banks' and nonfinancials' company names, sample coverage, and the original data sources used to construct these indexes are listed in the following document:

https://blogs.cornell.edu/baron/individual-stocks-and-bonds-for-monthly-data-1phvomt/

Table B4 lists in detail all the sources used to construct the yearly macroeconomic variables, such as bank credit, nominal GDP, inflation, unemployment, and other variables.

D. Distribution of bank and non-financial equity returns

Figure A1 presents histograms of annual bank and nonfinancial equity real total returns during Narrative Crisis years. For comparison, we also present the histogram during other years ("No crisis"). The figure shows that the bank equity return distribution for Narrative Crisis years relative to non-crisis years is shifted further left and more left-skewed. These patterns are qualitatively similar but quantitatively weaker for the nonfinancial equity return distribution.

E. A new database of banking crises characteristics and policy responses

We construct a new historical database of banking crises. Our dataset is similar to that of Laeven and Valencia (2013), which covers the period 1970 – 2012, though we extend their database back to 1870. This database consists of episodes both on the Narrative Crisis list (i.e. episodes that others have classified as banking crises) and on the Revised Crisis List (i.e. episodes we consider banking crises). The former is included since it is important to have information to justify why we do *not* consider some episodes on the Narrative Crisis list to be banking crises.

We code the various characteristics of banking crises, including the extent of: deposit runs, bank failures, non-performing loans, contagion, and various forms of government intervention into the banking sector like liquidity support and equity injections. Following Laeven and Valencia (2013), we define the following variables for each potential crisis in our sample:

- Decline in deposits (the peak-to-trough % decline in aggregate deposits of the banking sector, only calculated for pre-1945 banking crises, since postwar crises are generally not associated with a loss in aggregate deposits);

- Significant bank closures (1 if a number of significant banks fail or are closed or absorbed by other institutions or the government because they are about to fail, 0 otherwise);
- Failed banks (% of total bank assets or deposits);
- Largest banks failing (1 if any of the failed banks are among the very largest banks in the country, 0 otherwise)
- NPL at peak (the peak level of non-performing loans of the banking sector or of the largest banks);
- Significant liability guarantees (1 if the central bank or government provides extraordinary guarantees of bank deposits and other short-term liabilities, 0 otherwise);
- Significant liquidity support (1 if the central bank or government provides extraordinary liquidity support to the banking sector, 0 otherwise);
- Banks nationalized (1 if the government nationalizes any major banks, 0 otherwise);
- Government equity injections (1 if the government purchases newly issued equity of major banks in an effort to recapitalize the banking sector, 0 otherwise).

The above variables are gathered for each of the crises on the Narrative Crises list and the Revised Crisis List, which involved a major data collection effort using an extensive number of primary and secondary sources. First, we started with the dataset of Laeven and Valencia (2013), which collected all the above variables for their set of crises over the period 1970-2012. To extend our dataset back further, we examined the descriptions of crises in the following secondary sources and gathered information on the above variables, whenever it was present; sources include Reinhart and Rogoff (2009, Appendix A3), Bordo et al. (2001), Caprio and Klingebiel (2003), Kindleberger (1993), Mehrez and Kaufmann (2000), Rocha and Solomou (2015), Conant (1915), Sumner (1896), and Grossman (2010).

We back up this new database of banking crises with extensive documentation derived from 400+ primary and secondary sources, including from a wealth of new archival sources that we have newly uncovered. These new set of sources cover the history of banking crises in 46 countries from 1870 onward. One important primary source is the "League of Nations: Money and Banking Statistics", volumes from 1925 to 1939, which is useful for gathering data on bank failures and deposit declines in a wide range of countries during the interwar period. We have hundreds of other individual primary sources (e.g., newspaper articles, contemporaneous accounts, bank financial reports, corporate manuals) covering individual countries and specific banking crisis

episodes, along with hundreds of secondary sources by historians written about specific crisis episodes.

All sources are carefully documented in the linked documents in Appendix Subsection I.F, and we plan to provide this new database to other researchers studying historical banking crises. We also plan to post the full bank and nonfinancial stock return series collected at the annual frequency (and, where available, at the monthly frequency). In addition, even though we do not use it in the paper, we also plan to post the individual banks' stock prices and dividends, as a useful resource for future researchers. There will always be some debate over what episodes will be called banking crises (different definitions can be useful in different circumstances), but, in providing the full data, our goal is to put forward the facts with extensive documentation, to ground future research on credible historical foundations with reliable quantitative measures.

F. Comprehensive narrative documentation of banking crises

As mentioned in the main text, most of the narrative chronologies of banking crises lack detailed narrative documentation regarding even basic facts about what happened and why that paper considers that episode a banking crisis. Thus, one fundamental issue is absence of detailed narrative documentation regarding the basic facts and events surrounding each banking crisis. We fill this gap by providing online comprehensive narrative documentation of the chronology, key institutions and persons, and suspected causes of each banking crises.

We intend the narrative documentation to serve as a publicly-available "encyclopedia" of basic facts, backed by extensive documentation from a variety of primary and secondary sources, including from a wealth of 400+ primary and secondary sources, including from a wealth of new archival sources that we have newly uncovered. Based on the narrative sources, noting that sources may disagree on some issues, we report: what factors were thought to cause the banking crises, which banks failed and why, how severe the crisis was along a number of different quantitative dimensions, and to what extent the government intervened in the financial sector.

Specifically, our narrative documentation comes in two parts. For each country, we have a short summary of each crisis, briefly covering the issues mentioned, which can be found here: [Add link here]

Additionally, we provide a long file for each country, with extensive documentation from a variety of primary and secondary sources, including the new archival sources that we have uncovered. The long file for each country can be found here:

[Add link here]

G. Narrative documentation of panics and widespread bank failures

We also provide, for each episode on the master list (Table A2), narrative documentation of the presence of panics (or their absence) and widespread bank failures (or their absence).

[Add link here]

II. Validation

We show two results, which help validate bank equity returns as an informative measure of banking crises. We first show that bank equity has a better signal-to-noise ratio than other financial and macroeconomic variables, in terms of identifying narrative crises in real-time. In other words, bank equity declines, compared to a host of other indicators, most closely coincide with the onset of Narrative Crises. Second, we show that, conditional on a Narrative Crisis episode, the magnitude of the peak-to-trough bank equity decline is highly correlated with the economic severity of banking crises and many of the characteristics and policy responses commonly associated with banking crises (e.g., deposit runs, bank failures, nonperforming loans).

A. Bank equity provides the best real-time signal of a banking crisis.

Using receiver operating characteristic (ROC) analysis, a standard tool for assessing classification performance, we find that bank equity returns provide the best real-time signal of narrative banking crisis relative to a host of other variables, including nonfinancial equity returns, credit spreads, and macroeconomic conditions. To be clear, the goal of this analysis not *predicting* banking crises, but simply asking which variable best *coincides* with banking crises identified from existing classifications.

ROC curves are plotted in Figure A2. A ROC curve is a simple tool that allows one to assess the signal-to-noise ratio of bank equity in identifying Narrative Crises in real-time. For a

given variable, say bank equity returns, ROC analysis works by classifying observations into "banking crises" or "non-banking crises" using a given threshold *X* (e.g., a more than -30% decline in bank equity). By using the *Narrative Crises* as our "true" list of banking crises, ROC analysis plots the "true positive" rate against the "false positive" rate using this classification threshold *X*.[2] Then, by varying the threshold *X* across *all possible thresholds*, it produces the full ROC curve. For a given classifying variable, a higher value of the ROC curve indicates a better classifying variable, as it implies a higher "true positive rate" for a given "false positive" rate. It is typical in this literature to use the area under the curve (AUC) as a summary measure of the performance of the classifying variable. Note that the 45-degree line represents the benchmark uninformative classifier for a variable having no information content, which has an AUC of 0.50.

Panel A compares the ROC curve constructed from bank equity returns with ROC curves constructed using other equity market variables, while Panels B and C perform the comparison with credit market and macroeconomic variables. Each panel uses the sample for which all variables are non-missing. The bank equity ROC curve therefore varies across panels.

All the panels in Figure A2 suggest that bank equity returns provide the best real-time signal of narrative banking crises. Panel A, which compares bank equity to returns on non-financial equity, broad market equity, and bank minus non-financial equity, shows that bank equity has the highest ROC curve and therefore the highest area under the curve (AUC=0.71) and thus the highest signal-to-noise ratio. Panel B shows that bank equity also provides a better signal of a crisis compared to bank credit spreads and corporate credit spreads. Bank credit spreads provide the next best signal of a Narrative Crisis after bank equity, with an AUC of 0.63 (compared to 0.69 for bank equity on this sample).[3] Finally, Panel C repeats the ROC analysis for several macroeconomic variables, showing that bank equity returns provide a more accurate real-time signal of a Narrative Crisis than the increase in the unemployment rate, the decline in GDP growth, and future credit contraction from t to t+5.[4] Adverse changes in macroeconomic conditions are not as useful for

[2] We use the Narrative Crisis list as the set of "true" banking crises, simply because it is a natural starting point from which to evaluate the informativeness of bank equity. We do not use the Revised Crisis List because it incorporates information from bank equity and might give bank equity returns an unfair advantage in picking up these crises.

[3] The ROC curve for corporate credit spreads in Figure A2 uses the *level* of corporate credit spreads. The diagnostic performance of corporate credit spreads is similar, albeit slightly weaker, using the change in the spread or the spread relative to its five-year moving average. We should note that we only have credit spreads for about one-third of our overall sample.

[4] Boyd et al. (2019) use a bank credit contraction as their definition of a "systemic bank shock."

detecting narrative banking crises because they frequently also occur during "normal" recessions, thus generating many "false positives" and a lower signal-to-noise ratio.

B. Bank equity declines are correlated with the severity and symptoms of banking crises

We next validate the usefulness of bank equity declines by showing that they are highly correlated with the real economic severity of banking crises, conditional on a crisis as defined by narrative accounts. The regression equation is estimated with the unit of observation being a single banking crisis from the Narrative Crises list. Thus, we can ask whether banking crises with larger peak-to-trough bank equity declines are more severe across a number of dimensions.

We estimate from the following regression, with each of the observations being a single banking crisis from the Narrative Crises list,

$$y_{i,t} = \alpha_i + \beta r_{i,t}^{B} + \gamma 1_t^{postwar} + \varepsilon_{i,t} \quad \text{(A1)}$$

where α_i is a country fixed effect, $1_t^{postwar}$ is a dummy variable that takes on the value of 1 if the year of the crisis is greater than 1945, and r_{it}^{B} is the peak-to-trough change in the real bank equity total return index during the crisis. The sample size of regressions across the different dependent variables varies due to differences in data availability. As with the ROC analysis in the previous subsection, we take the Narrative Crises as a starting point from which to evaluate the informativeness of bank equity.

Panel A in Table A3 presents estimates of Equation A1 where the dependent variable is a measure of the decline in real GDP. The table shows that greater declines in bank equity prices are associated with larger output declines. For example, column 1 shows that a 100% peak-to-trough decline in bank equity returns is associated with a 13.3% peak-to-trough decline in real GDP, a 12.3 percentage point decline in the real GDP growth rate (peak-to-trough), and a 8.2 percentage point decline in the real GDP growth rate from its past 10-year average. Panel B reports similar results, also estimated from Equation A1, for other macroeconomic variables. For example, a 100% peak-to-trough decline in bank equity returns is associated with a 9.9% decline in real consumption per capita, a 5.1% decline in investment to GDP, a 19.9% decline in total bank loans, and a 28.9% decline in mortgage loans. The dependent variables used in Panel B come from the Jorda-Schularick-Taylor dataset, which only covers 17 countries.

Finally, Panel C shows that bank equity peak-to-trough declines during banking crises are strongly correlated with other characteristics of banking crises. Banking crises with larger bank equity declines are associated with a significantly larger declines in bank deposits, an increased incidence of failure of the largest banks, and higher nonperforming loans. Moreover, bank equity declines predict an increased probability of various forms of government intervention including significant liability guarantees, liquidity support, bank nationalization, and government equity injections. We conclude that, although crises are multidimensional and evolve in different ways, greater bank equity declines are associated with increased likelihood and severity of typical banking crisis characteristics and policy responses.

C. Using alternative measures of bank equity declines

We next show that the validation results in the previous subsection are robust to two alternative measures of bank equity declines: *bank abnormal returns* (bank minus nonfinancial returns) and *bank market capitalization returns* (which seeks to capture the total change in the market value of equity within the banking sector). It is important to note that *bank abnormal returns* and *bank market capitalization returns* can only be constructed on a subsample of the data, due to historical data limitations on the availability of nonfinancial equity indices and new bank equity issuance. As a result, we use these variables only for robustness analysis.

One may be concerned, for example, that in the validation analysis of the previous subsection, the bank equity decline simply reflects a general decline in equity markets, rather than something specific about bank equity. Therefore, Table A4 Panel A, shows that our results are robust to replacing bank equity returns with *bank abnormal returns* (defined as bank equity total returns minus nonfinancial equity total returns). *Bank market capitalization returns* is defined specifically as the bank equity price returns plus new issuance of bank equity. This variable seeks to capture the change in the market value of equity within the banking sector. Equity issuance is new capital raised by the bank, which may be important as banks seek to recapitalize. We use price returns rather than total returns, because dividends are paid out from the bank and hence deplete bank equity.

An index of bank equity issuance is constructed for each country using new historical data and the methodology from Baron (2018). Data sources include *Moody's Bank and Finance*

manuals, *Investor's Monthly Manual*, and Jane's and Beerman's manuals of European firms. It is important to note that "bank market capitalization returns" can only be constructed on a limited subsample of the data, due to historical data limitations.

Table A4 Panel A, shows that our results are robust to replacing bank equity returns with *bank abnormal returns*. However, it is important to note that, in terms of the magnitude of the estimates and the adjusted R^2, the bank equity return is a substantially better predictor of crisis severity than bank abnormal return. For example, the adjusted R^2 for real GDP peak-to-trough decline on the bank equity decline is 16.5%, compared to 7.9% for the bank abnormal returns. Thus, both as a signal of a Narrative Crisis and as a measure of crisis severity, bank equity returns dominate bank abnormal returns. Nonfinancial equities fall substantially during severe bank crisis, likely in part because of banking sector distress, and this overall level effect provides valuable information beyond the differential information contained in *bank abnormal returns*.

Panel B re-estimates Equation A1 with *bank market capitalization returns* as the independent variable. Panel B shows that *bank market capitalization* declines strongly predict output declines. Given that theory (e.g. Bernanke, Gertler, and Gilchrist, 1999; Brunnermeier and Sannikov, 2014) links the net equity of the banking sector to macroeconomic outcomes, we should expect *bank market capitalization returns* to have the strongest predictability for output. Indeed, this is the case, as Panel B shows adjusted R^2 values in the range of 18% to 24%, substantially higher than the 10% to 14% in Table A3. On the same sample, the *bank market capitalization return* variable's R^2 is only slightly higher than that of bank equity return (28.8% compared with 26.4%), so bank equity return provides a good proxy for *bank market capitalization returns*.

Panel C of Table A4 is similar to Table A3 but has an additional independent variable, the *bank equity recovery* (the positive returns in the bank equity total returns index subsequent to the trough within three years after a banking crisis). Rebounds in bank equity returns may be due to unexpected policy interventions or to the fact that the crisis may not have been as severe as initially perceived by equity investors. However, surprisingly, Panel C shows that the *bank equity recovery* has no forecasting power for economic output, a result which is robust to various other measures of bank equity recoveries.

III. Robustness analysis

A. Bank equity and subsequent macroeconomic outcomes: robustness to alternative specifications

Figure A3 demonstrates the robustness of the results in Figure 2, which plots the impact of bank equity and nonfinancial equity returns on real GDP and bank credit-to-GDP, to alternative specifications. As in Figure 2, impulse responses in Figure A3 are estimated using Jorda (2005) local projections with controls for three lags in the bank and nonfinancial equity variables, country fixed effects, year fixed effects, and contemporaneous and lagged of real GDP growth and credit-to-GDP change. The specifications are identical to those in Equations 1 and 2, except for using these alternative measures of bank and nonfinancial equity returns. The dashed lines represent 95% confidence intervals based on standard errors double-clustered on country and year.

Panel A plots the response of real GDP and credit-to-GDP to 30% crashes in bank equity and nonfinancial equity. It shows that a 30% crash in bank equity (controlling for the nonfinancial equity decline) is associated with a future decline in output of around 2 to 3 percentage points and future decline in credit-to-GDP of around 7 percentage points. Panel B plots the response to continuous innovations in bank and nonfinancial equity returns. It shows that a hypothetical 100% log-decline in bank equity is associated with a maximum 2.5 percentage point decrease in real GDP and 6 percentage point decrease in credit-to-GDP, though this specification does not distinguish between a positive or negative sign of the bank equity return or any potential nonlinearities.

B. Bank equity crashes and subsequent macroeconomic outcomes: subsample analysis

Figure A4 demonstrates the robustness of the results in Figure 2 to various subsamples of countries and time periods. Because of the limited data, we choose a simpler nonlinear specification in which we look at the impulse response subsequent to 30% declines in both bank and nonfinancial equity estimated jointly. Figure A4 demonstrates that, on the full sample, the results of this simpler specification are qualitatively similar to those from the full nonlinear specification.[5] Similar to Figure 2, impulse responses are estimated using Jorda (2005) local projections with controls for three lags in the bank and nonfinancial equity crash variables, country and year fixed effects, and contemporaneous and three-year lagged values of real GDP growth and

[5] One can estimate the full nonlinear specification on the subsamples, and the results are qualitatively similar to those in Figure A4. However, because of the large number of indicator variables used in the full nonlinear specification relative to the number of observations, the impulse responses are often noisy and have large confidence bands.

credit-to-GDP change. The dashed lines represent 95% confidence intervals based on standard errors double-clustered on country and year.

Figure A4 shows the results are qualitatively similar in the following subsamples: excluding the Great Depression and the Great Recession (Panel A), the pre-WW II subsample (Panel B), the post-WW II subsample (Panel C), the period 1946-1970 (Panel D), the period 1971 to 2016 (Panel E). These results are reported in regression table form in Table A5.

Figure A5 also reports the same results but for the U.S. only. Figure A5 is estimated just for the U.S. on the full sample (Panel A) and excluding the Great Depression and the Great Recession (Panel B). Results are qualitatively similar to those on the full panel.

IV. The information content of bank equity versus narrative approaches

The results from Section IV in the main text—that bank equity declines forecast macroeconomic outcomes even outside of formally-defined banking crises—may suggest that bank distress is a continuum that underlies many recessions and thus there is little use in a narrative approach to highlight the characteristics of discrete banking crisis episodes. While there is partial truth to this view, we present evidence in this section that there is substantial information from narrative accounts that can predict crisis severity beyond the information in bank stock prices. We recognize here that banking crises are heterogeneous in their characteristics, and this heterogeneity cannot be reduced to a single quantitative measure. Furthermore, we show that the information content from narrative chronologies is not entirely due to a look-back bias but is in part due to specific, quantifiable aspects from the narrative accounts. We therefore view bank equity information and narrative information as complementary.

We first examine how the information from bank equity crashes relates to the information from Narrative Crises indicators. We know from the validation analysis in Appendix Section II that bank equity declines correlate strongly with crises, but the overlap is far from perfect. Do bank equity declines subsume the information of narrative crisis dates? Or do narrative crises dates contain additional information?

Figure A6 explores these questions by jointly estimating the impact of 30% bank equity declines and Narrative Crisis dates using the following local projection specification:

$$\Delta_{\mathrm{h}} y_{i,t+h} = \alpha_i^h + \gamma_t^h + \beta^h BE\ Crash_{i,t}^j + \phi^h Narrative\ Crisis_{i,t}^j + \Gamma^{\mathrm{h}} X_{i,t} + \varepsilon_{i,t}^h. \qquad \text{(A2)}$$

In this specification, $X_{i,t}$ controls for lags in bank equity crash and Narrative Crisis indicators, as well as contemporaneous and lagged nonfinancial equity crash indicators, real GDP growth, and credit-to-GDP change.

The solid lines in Figure A6 Panel A, presents the sequence of estimates of $\{\beta^h\}$ and $\{\phi^h\}$ for GDP growth, and Table A6 Panel A, columns 1 and 2 report the regression versions at the three-year horizon. Both bank equity crash and Narrative Crisis indicators are associated with lower subsequent output growth, and the magnitudes are similar. Panel B shows the response of credit-to-GDP. Again, both bank equity crashes and Narrative Crises predict a credit-to-GDP contraction of similar magnitude. Note that the total effect from both the bank equity crash and Narrative Crisis indicator are obtained by adding these two coefficients, so the interpretation is that bank equity crashes and narrative crisis dates both individually contain information about future macroeconomic conditions. Table A6 is similar but in regression table form and reports the responses of real GDP (Panel A) and credit-to-GDP (Panel B) to 30% bank equity declines, 30% nonfinancial equity declines, and Narrative Crisis indicators. As in Figure A6, the responses are estimated jointly to compare the *additive* predictive content of each variable.

An implication of Figure A6 is that bank equity declines do not drive out the narrative crisis indicator. Instead, both estimates are negative and significant. Given that they are estimated jointly, this means that they both individually have forecasting power independent of the other. There are two potential reasons for this. The narrative crisis indicator may capture additional information not incorporated by bank equity, such as distress among non-banks or private banks, other characteristics of banking crises not fully captured by bank equity declines, or policy interventions such as liquidity support or equity injections. However, another reason may be that Narrative Crisis indicators select crises ex-post with more severe macroeconomic outcomes (a "look-back" bias), leading to biased estimates of the effects of banking sector distress on the real economy.

The dashed lines in Figure A6 provide some support for the former of these hypotheses that narrative crises capture additional information about the state of the banking sector and is not simply due to a look-back bias. To generate these, we re-estimate Equation A2, controlling for key symptoms of crises (significant liquidity support, government equity injections, and bank

nationalization) which may not be entirely captured by bank equity declines.[6] For example, crises with significant government liquidity support may force banks to suppress lending, but the intervention may cushion equity markets. The estimated effect of a narrative crisis is attenuated by one-third to one-half when these symptoms of crises are included as controls. However, this still means that a substantial fraction of the narrative effect cannot be accounted for by bank equity measures or crisis symptoms. Therefore, the narrative chronology also likely captures some "look-back" bias in identifying crises.

V. Additional results on nonpanic bank distress

A. Bank equity crashes outside of Narrative Crisis episodes

As discussed in the main text, Figure 6 plots impulse responses from local projections for future real GDP and bank credit to GDP, which we describe in more detail here. As can be seen in this non-parametric specification, the magnitudes of the real GDP decline are just as large outside of banking crises as they are in the full sample (Figure 2).

We report estimates from Equation 2, interacting the 30% bank equity crash indicator variable with an indicator variable for whether there is a banking crisis within a ±3-year window of events on the list of Narrative Crises. In particular, in Figure 6, bank equity declines of greater than 45% predict over 4% lower real GDP after three years. The magnitudes of the credit-to-GDP contraction are somewhat smaller outside of Narrative Crises, though they are still large in magnitude. For example, bank equity declines of greater than -45% predict a nearly 6 percentage point decline in credit-to-GDP after 6 years, compared to 12 percentage points in the full sample response in Figure 2. The predictive content of bank equity is also nonlinear outside of Narrative Crises. Bank equity *declines* predict subsequent output and credit contraction, but *increases* do not predict expansions.

According to the estimates at the $t+1$ and $t+3$ horizons reported in Table A7, the interaction term is small in magnitude and not statistically significant for output. Again, there is thus generally

[6] Why do we use these three characteristics of crises (significant liquidity support, government equity injections, and bank nationalization)? One can add the full list of banking crisis characteristics discussed in Appendix Section I.E as controls, or other subsets of them, but the results in Figure A6 are not meaningfully different. These three symptoms thus capture most of the information contained in the full set of symptoms (i.e. span the full information set).

little difference in the predictive content of bank equity between banking crisis and non-banking crisis episodes.

B. Bank equity crashes outside of panic episodes

Figure 6 in the main text demonstrates bank equity crashes predict output gaps and credit contraction even excluding narrative-based banking crisis episodes. We show here, as a robustness test and as a related result, that bank equity crashes also predict real output and credit contraction even excluding panic episodes.

Specifically, Figure A7 plots estimates of local projection impulse responses to bank equity returns across different bins, as in Figure 2, but excluding observations within a ±3-year window of a Panic as defined in Table A2. Similar results in tabular form are reported in Table A7. The results in Figure A7 are nearly identical to those in Figure 2, demonstrating that the predictability from bank equity returns holds even out of panic events.

C. Alternative specifications

Figure A8 demonstrates the robustness of the results in Figure 5, which plots the impact of bank equity declines on real GDP and bank credit-to-GDP around "panic" and "nonpanic" episodes, to alternative specifications. Specifically, Figure A8 presents local projection impulse responses estimated using a specification, detailed in the caption of Figure A8, that contains both an indicator variable of a "panic" episode and a continuous measure of (negative) bank equity returns. In Figure A8, the blue line plots the response to a bank equity return innovation and the red line plots the response to a "panic" episode. The dashed lines represent 95% confidence intervals based on standard errors double-clustered on country and year. Figure A8 demonstrates that both "panic" episodes and the continuous measure of (negative) bank equity returns forecast lower GDP and credit-to-GDP in an additive fashion. These results are reported in regression table form in Table A8.

VI. Revised Crisis List

A. Additional information on constructing the Revised Crisis List

We describe some additional information on constructing the Revised Crisis List reported in Table 5, Panel C. We compute the peak-to-trough decline in bank equity as an "intensity measure" of each banking crisis, also reported in Table 5, Panel C. We date the start of each crisis as the year in which the bank equity real total return first falls more than -30% from its peak. Of course, there are important reasons why the narrative accounts date the starting year when they do. With the new dates, our goal is simply to offer additional and alternative information about when markets first recognized the bank equity losses. Panel A of Table A9 lists all the changes to starting dates on the Revised Crisis List. See Table A2 for a comparison with the Narrative Crisis dates, which in most cases are very similar.

In constructing the Revised Crisis List, we delete certain spurious episodes, even when there is missing bank equity returns data. In these cases, we delete an episode if there is both a lack of widespread bank failures and panics and a complete lack of other banking crisis symptoms. In other words, in the absence of bank equity data, we delete episodes which are clear-cut cases of obvious historical errors. The reason we do this is to avoid having clear-cut historical errors on the Revised Crisis List.

We occasionally combined several pairs of episodes occurring close together in time, when it seems more appropriate to consider them as a single crisis (i.e. when bank equity prices did not show two separate declines and when the narrative evidence on bank failures and panics conveyed a continuous sequence of banking distress across time, not clustered into two phases). These combined episodes are listed in Table A9 Panel B.

B. Revisiting the global Great Depression

As an example to showcase the usefulness of our crisis intensity measures constructed from bank equity prices, we revisit the banking crises of the Great Depression. While there is no doubt of the presence of severe banking crises in some countries (e.g., Austria and the U.S.) and their absence in other countries (e.g., Japan and the U.K.), there is considerable debate about the presence and severity of banking crises in other countries. Additionally, because of previous data limitations, the literature has had difficulty assessing the degree to which banking crises help explain the severity of the Great Depression. For example, in their cross-country study, Bernanke and James (1991) write, "A weakness of our approach is that, lacking objective indicators of the

seriousness of financial problems, we are forced to rely on dummy variables to indicate periods of crisis."

We use bank equity declines to assess the severity of banking problems across countries in the Great Depression. Figure A9 plots the peak-to-trough decline in real GDP against the peak-to-trough bank equity decline over the period 1929-1933. This figure plots all countries in the sample for which data is available, not just those that may have experienced banking crises.[7]

The decline in bank equity has moderate explanatory power (R^2 = 18%), consistent with the evidence in Bernanke and James (1991) on the role of banking crises in explaining the severity of the Great Depression. However, from Figure A9, there is still substantial unexplained heterogeneity in outcomes. Much of this is surely measurement error in real GDP and other idiosyncratic country shocks. Other potential reasons for this heterogeneity, which are non-mutually exclusive, include: the duration of adherence to the gold standard (Eichengreen and Sachs, 1985), the sharp monetary contraction in certain countries (Friedman and Schwartz, 1963), the trade collapse (Madsen, 2001), and political instability (e.g., the 1930 coups in Argentina and Brazil). Nevertheless, the severity of banking crises explains an important part of the variation across countries.

Additionally, bank equity declines help resolve some of the controversy over which countries experienced banking crises during the Great Depression. First, we should point out areas of agreement. For example, Figure A9 shows large declines in bank equity for well-known examples of severe banking crises: Austria, Belgium, France, Germany, Switzerland, and the U.S. Similarly, Japan and the U.K. are considered not to have had banking crises during this period and have minimal bank equity declines.

However, in other countries, there is disagreement about the extent of banking crises. In the Revised Crisis List, we remove Australia, Denmark, and India (which we labeled as spurious in Table 5 Panel B), since these countries had mild bank stock declines (less than 30%) and the narrative evidence further confirms a lack of widespread bank failures. Two other interesting cases

[7] The picture is similar if one plots the peak-to-trough decline in industrial production on the y-axis. Using our data on real GDP (taken from Maddison's database and from Schularick and Taylor, 2012), in contrast to industrial production, makes the Great Depression look less severe in Belgium and the Netherlands (which may be attributable to the larger service sector in these economies) but much more severe in Latin America (attributable to the higher share of commodity production in these economies).

are Brazil and Finland, which both had mild bank equity decline (less than 30%); however, the narrative evidence on Brazil and Finland suggests widespread bank failures including the largest banks in these countries, so we retain these on our Revised Crisis List. Italy is the final country that had a relatively mild bank stock decline (though there was, in fact, a severe banking crisis), but this is due to the unusually early and vigorous policy intervention in 1931, culminating in a near-total nationalization of the banking sector by 1933. Thus, bank stock prices did not decline as much as in other countries.

We also add several newly-identified banking crises to the Revised Crisis List that are overlooked in the previous approaches: newly-identified banking crises in Chile, Colombia, Iceland, the Netherlands, and Peru during the Great Depression. All of these countries experienced large bank stock declines (greater than 30%), and the narrative evidence strongly supports widespread and serious bank failures in these countries.

Finally, there is the case of Canada in the Great Depression, which has previously been discussed in Section IV of the main text. While not labeled a banking crisis on the Revised Crisis List, since only a single tiny bank, Weyburn Security Bank, failed (though, as a historical side note, several trust companies did, in fact, fail), there was nevertheless a steep decline in bank stock prices. This evidence is consistent with the argument of Kryzanowski and Roberts (1993), that the large Canadian banks "were insolvent at market values and remained in business only due to the forbearance of regulators coupled with an implicit guarantee of all deposit", both policies being holdovers from the previous Canadian banking crisis of 1923.[8] As argued in the section on quiet banking crises, the large and widespread bank losses in Canada, as reflected by the large fall in bank stock prices, may help explain the severity of the Great Depression in Canada, in which the fall in real GDP and rise in unemployment rivalled the U.S. in severity.

C. Bank and non-financial equity in banking crisis and normal recessions

Figure A10 plots the average dynamics of bank equity and nonfinancial equity around banking crisis recessions and ordinary recessions. A recession is defined as a period in which real GDP declines: as in Jorda, Schularick, and Taylor (2013), the first year of the recession is marked

[8] The largest Canadian bank at the time, the Bank of Montreal, had estimated nonperforming loans in excess of 40% (Kryzanowski and Roberts, 1993).

as the real GDP peak, and if there are two peaks in three years, then it's the first peak. Banking crisis recessions are defined as recessions that coincide with a Revised Crisis List episode. Normal recessions are the remaining recessions in the sample.

Figure A10 Panel A, shows that the dynamics of bank and nonfinancial equity are similar around normal recessions, with a fall in both bank and nonfinancial equity of ~10% on average in the year prior to the start of the recession, followed by a quick recovery afterwards. If anything, bank equity falls slightly less than nonfinancial equity in a normal recession, which is consistent with the finding that the bank equity index has an unconditional beta (on the full sample) slightly less than 1.

Figure A10 Panel B, in contrast, show that, conditional on a banking crisis recession, bank equity falls substantially more than nonfinancial equity – over 60% on average for bank equity, compared to 30% for nonfinancial equity – and that the bank equity decline, unlike the nonfinancial equity decline, is persistent over the 5-year window. This result is consistent with the results in Figures 8 and 9 of the main text.

D. Comparisons to other chronologies of banking crises: additional discussion

How does our Revised Crisis List compare to other banking crisis chronologies? As mentioned in Section V of the main paper, we find that the consequences of the Revised Crisis List episodes are actually *more* severe, compared to Reinhart and Rogoff's list of banking crises, both in terms of GDP, credit contraction, and characteristics of crises. This is due, in large part, to eliminating many spurious crises from their list.

We discuss the evidence in more detail here. Table 6 Panels B and C compare the average severity of crises by looking at declines in real GDP and also selected symptoms of crises. Panel B compares the Revised Crisis List to Reinhart and Rogoff's chronology and Panel C to Laeven and Valencia's chronology. Similarly, Figure 7 plots impulse responses of GDP and credit-to-GDP subsequent to episodes on the Revised Crisis List compared to episodes on Reinhart and Rogoff's and Laeven and Valencia's chronologies.

In Revised Crisis List, the average crisis has a -5.4% peak-to-trough decline in real GDP. In comparison, Reinhart and Rogoff's (2014) headline number is an average peak-to-trough decline in real GDP per capita of -9.6%. However, Reinhart and Rogoff's headline statistic

overstates the severity of banking crises, since it is calculated over a subsample of 100 severe banking crises (it is unclear what criteria is used to select this sample, other than ex-post severity). Instead, estimating the consequences of banking crises on Reinhart and Rogoff's entire list of banking crises, the average fall in real GDP that we calculate for Reinhart and Rogoff in Table 6 Panel B is -4.6% — in fact *less* severe than using the Revised Crisis List (a difference of 0.8% with a t-statistic of 2.52). Looking at the likelihood and magnitude of other symptoms of crises and policy interventions – including liability guarantees, liquidity support, deposit runs, non-performing loans, and declines in deposits – the Revised Crisis List is also more severe. We also note that, in untabulated results, the Revised Crisis List episodes are more severe than Schularick and Taylor's (when compared on their sample of 14 countries) and Bordo's.

Panel C, which compares the Revised Crisis List to Laeven and Valencia's chronology, shows the opposite, that the Revised Crisis List is slightly less severe than Laeven and Valencia's (when compared on their time sample 1970-2012), perhaps because Laeven and Valencia only identify crises that are serious enough to warrant several forms of major government intervention.

In general, we conclude that, comparing the Revised Crisis List to previous chronologies, the aftermath of banking crises tends to be *more* severe (the exception being to Laeven and Valencia), especially when restricting our chronology to crises featuring large bank equity declines. However, it's important to note that the evidence is nuanced and also that the comparisons are sensitive to the sample studied.

E. Other episodes of minor bank distress from narrative accounts

We list in Table A10 additional episodes of minor bank distress from narrative accounts. These episodes are listed purely for historical interest and for the aid of future researchers who are interested in other periods of minor financial distress. These episodes are not used in any of the analysis of this paper and only appear here.

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ONLINE APPENDIX

Matthew Baron, Emil Verner, and Wei Xiong

Additional Tables and Figures

Figure A1: Distribution of bank and nonfinancial equity returns

This figure presents histograms of annual bank and nonfinancial equity returns during Narrative Crisis episodes. For comparison, it also presents the histogram during other years ("No crisis"). Bank and nonfinancial equity returns are annual real total returns. The figure shows that the bank equity return distribution for Narrative Crises relative to non-crisis years is shifted further left and more left-skewed. These patterns are qualitatively similar but quantitatively weaker for the nonfinancial equity return distribution.

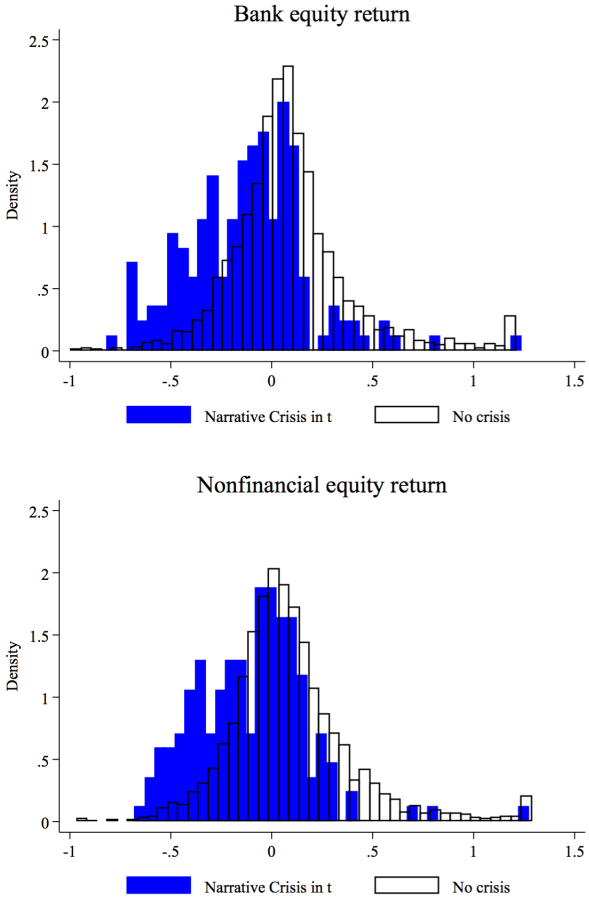
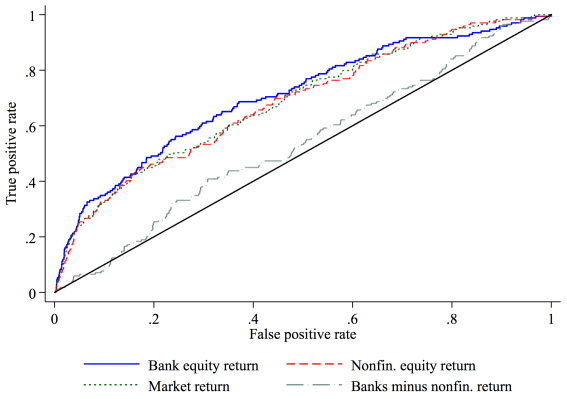


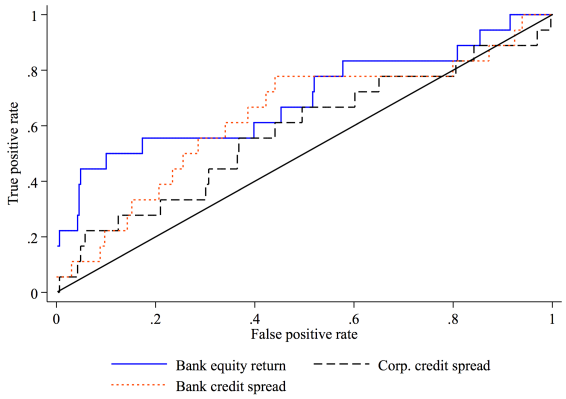
Figure A2: Bank equity returns provide the best real-time signal of narrative banking crises: ROC analysis

This figure presents receiver operating characteristic (ROC) analysis to understand which variables best coincide with banking crises from the Narrative Crisis list. The higher the ROC curve, the better a given variable is at coinciding with a crisis. Panel A compares the ROC curve constructed from bank equity returns with the ROC curves constructed using other equity market variables. Panels B and C perform the comparison with credit market and macroeconomic variables. Each panel uses the sample for which all variables are non-missing. The bank equity ROC curve therefore varies across panels.

(A) Bank equity compared with other equity market variables



(B) Bank equity compared with credit market variables



(C) Bank equity compared with macroeconomic variables

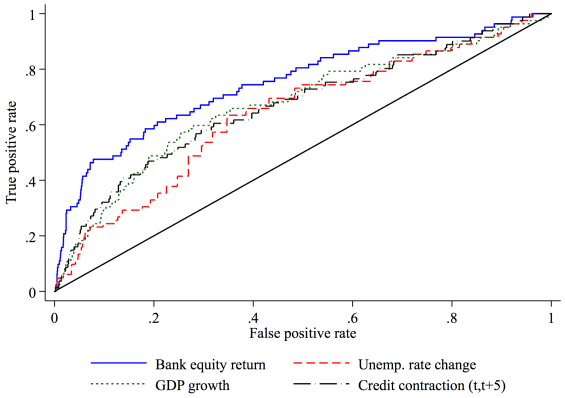
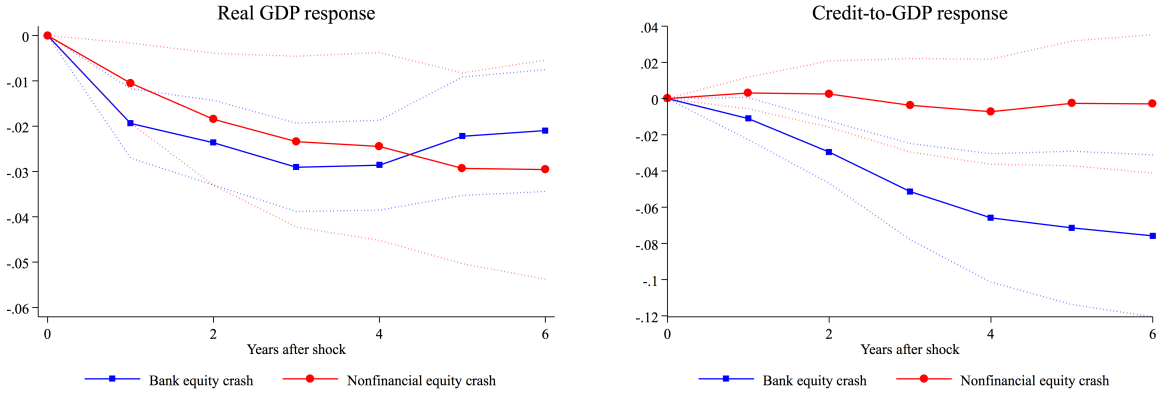


Figure A3: Bank equity and subsequent macroeconomic outcomes: robustness to alternative specifications

Panel A plots the response of real GDP and credit-to-GDP to 30% crashes in bank equity and nonfinancial equity. Panel B plots the response to innovations in bank and nonfinancial equity continuous returns. Impulse responses are estimated using Jordà (2005) local projections with controls for three lags in the bank and nonfinancial equity variables, country and year fixed effects, and contemporaneous and lagged values of real GDP growth and change in credit-to-GDP. The dashed lines represent 95% confidence intervals based on standard errors double-clustered on country and year.

(A) 30% bank equity crashes



(B) Bank equity continuous return innovations

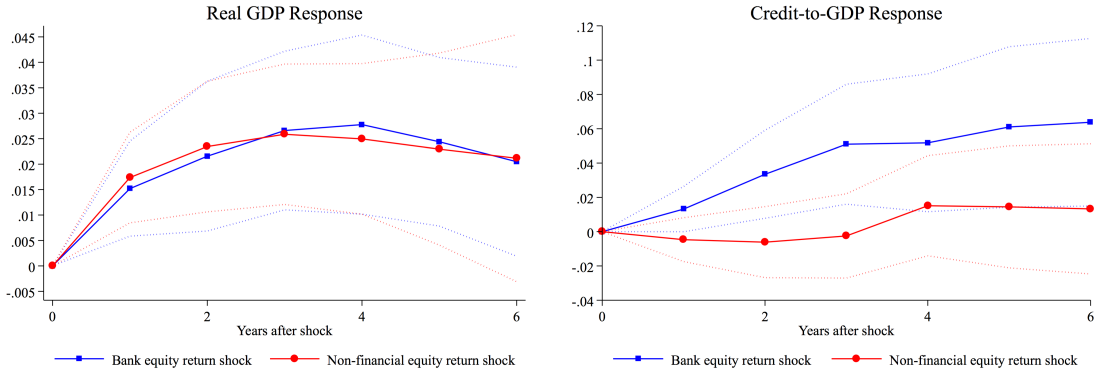
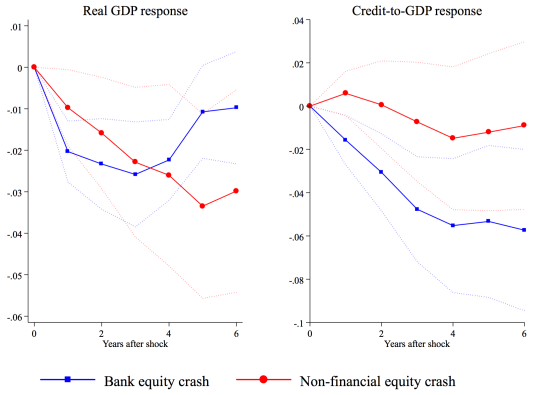


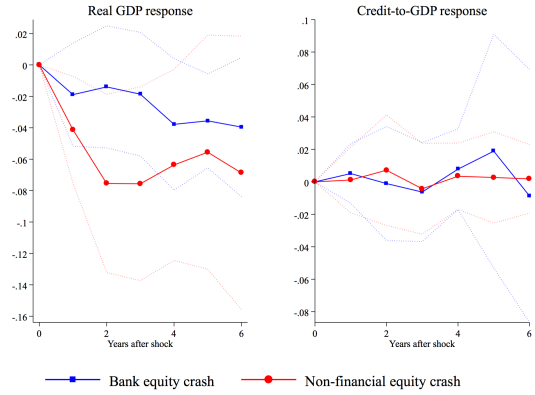
Figure A4: Bank equity crashes and subsequent macroeconomic outcomes: subsamples

This figure plots the response of real GDP and credit-to-GDP to 30% crashes in bank equity and nonfinancial equity across various subsamples. Impulse responses are estimated using Jordà (2005) local projections with controls for three lags in the bank and nonfinancial equity crash variables, country and year fixed effects, and contemporaneous and lagged values of real GDP growth and change in credit-to-GDP. The dashed lines represent 95% confidence intervals based on standard errors double-clustered on country and year.

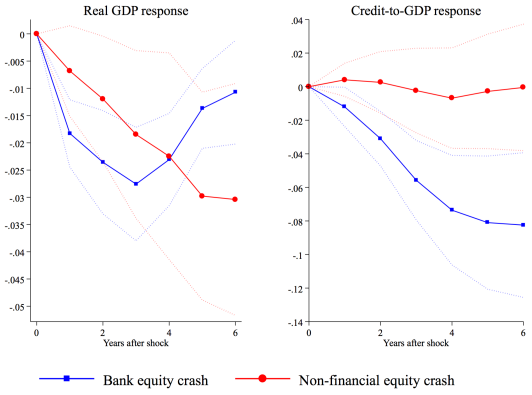
(A) Excluding the Great Depression and Great Recession



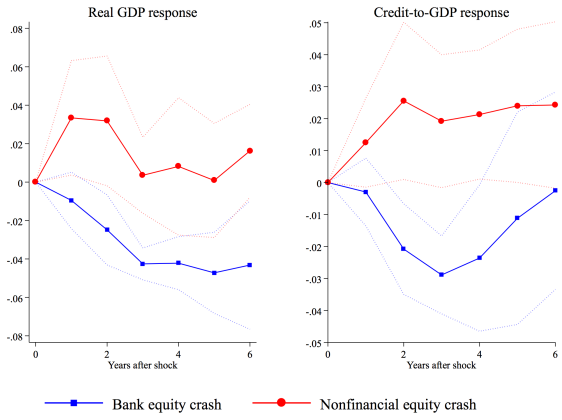
(B) Pre-WWII subsample



(C) Post-WWII subsample



(D) 1946-1970



(E) 1971-2016

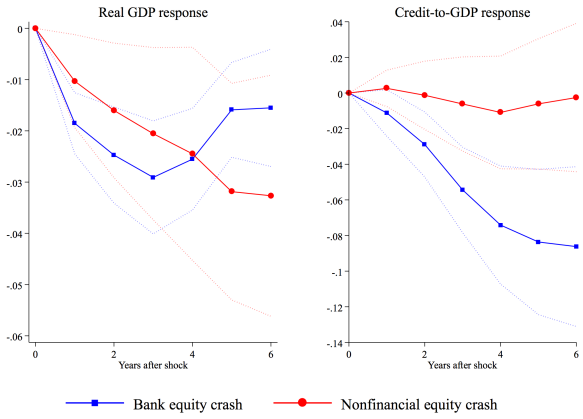
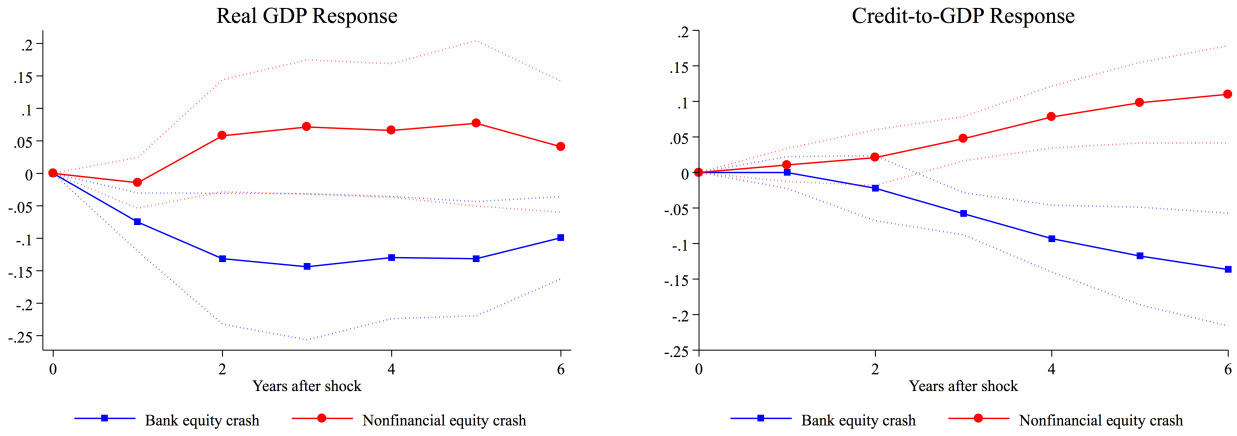


Figure A5: Bank equity crashes and subsequent macroeconomic outcomes: U.S. only

This figure plots the response of real GDP and credit-to-GDP to 30% crashes in bank equity and nonfinancial equity for the U.S. time series. The dashed lines represent 95% confidence intervals based on Newey-West standard errors with six lags.

(A) Full sample



(B) Excluding the Great Recession and Great Depression

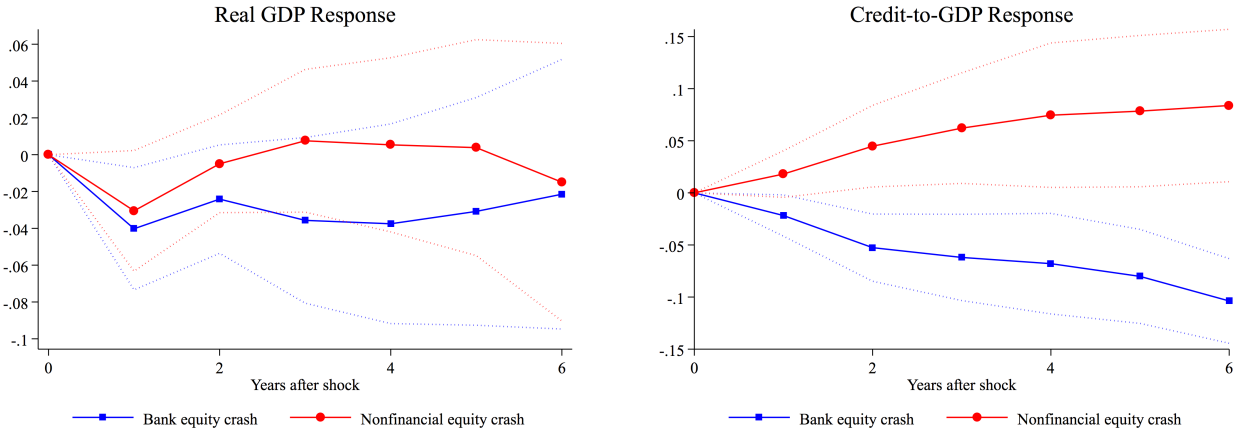
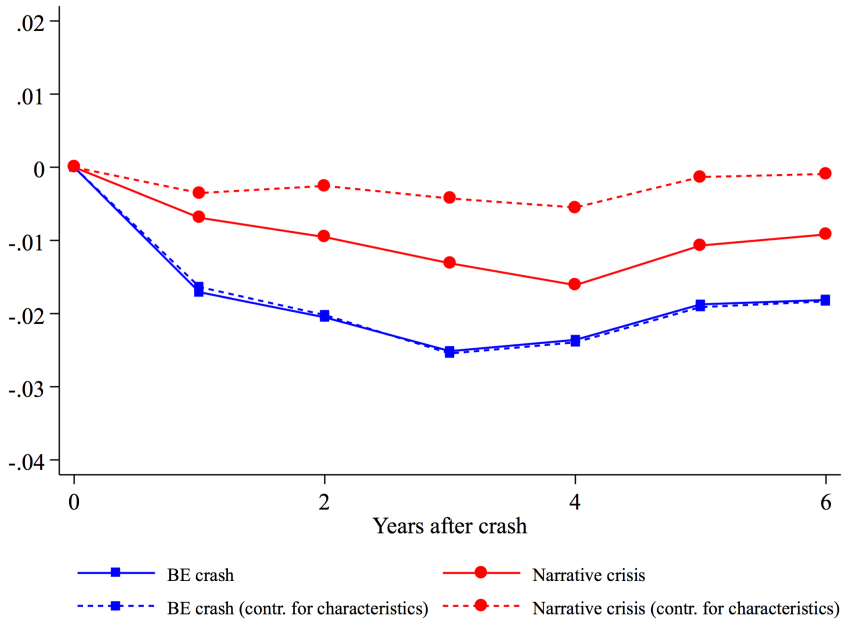


Figure A6: The information content of bank equity versus narrative approaches

This figure presents responses of real GDP (Panel A) and credit-to-GDP (Panel B) to bank equity declines and Narrative Crisis episodes. The responses are estimated jointly to compare the predictive content of each variable. *BE crash* is an indicator that equals one if country-year experiences a 30% drop in the bank equity total returns index. *Narrative crisis* is an indicator that equals one if a country-year is classified as a Narrative Crisis. The responses in the solid lines are estimated controlling for country and year fixed effects, along with contemporaneous and three-year lagged real GDP growth, change in credit-to-GDP, and the nonfinancial crash indicator. The dashed lines represent a separate specification that also controls for characteristics of banking crises obtained from narrative approaches (bank nationalization, significant liquidity support, and government equity injection).

(A) Real GDP



(B) Credit-to-GDP

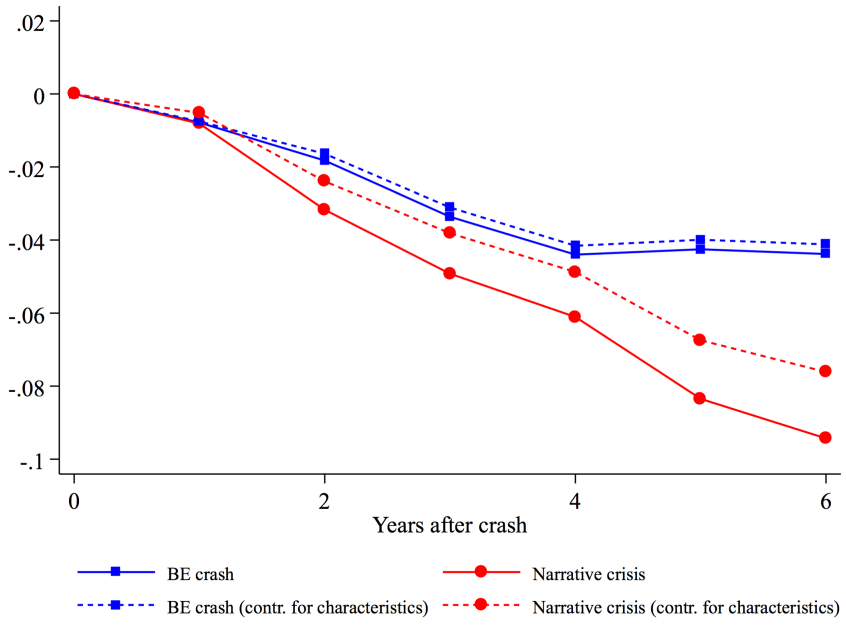
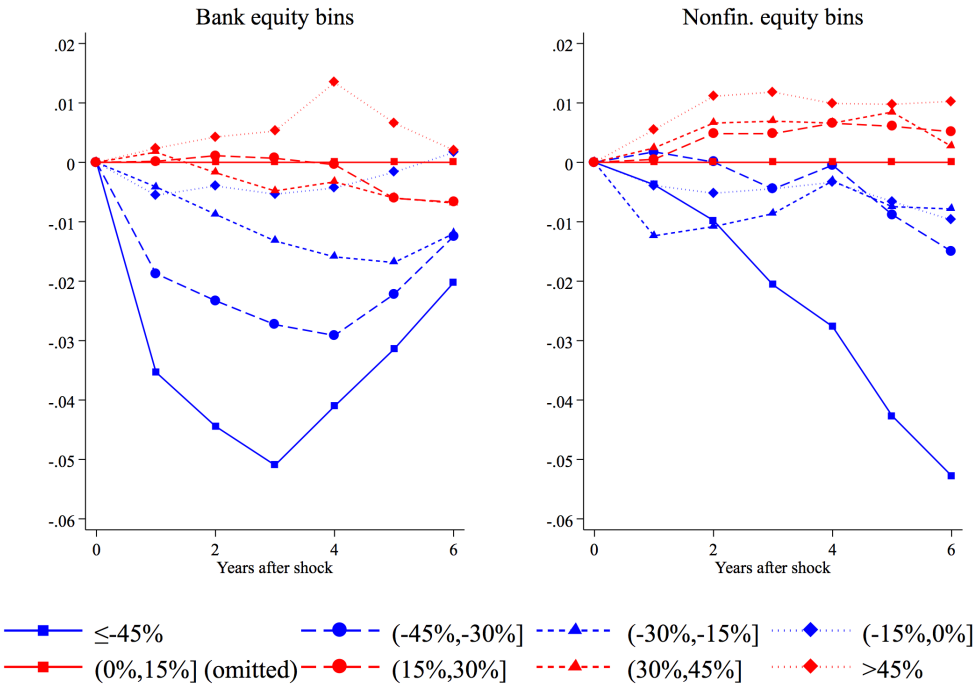


Figure A7: Bank equity crashes outside of panic episodes

This figure shows that bank equity crashes predict real output and credit contraction even excluding panic episodes. We estimate local projection impulse responses to bank equity returns across different bins, as in Figure 2, excluding observations within a ±3-year window of a Panic as defined in Table A2.

(A) Real GDP response outside of panic episodes



(B) Credit-to-GDP response outside of panic episodes

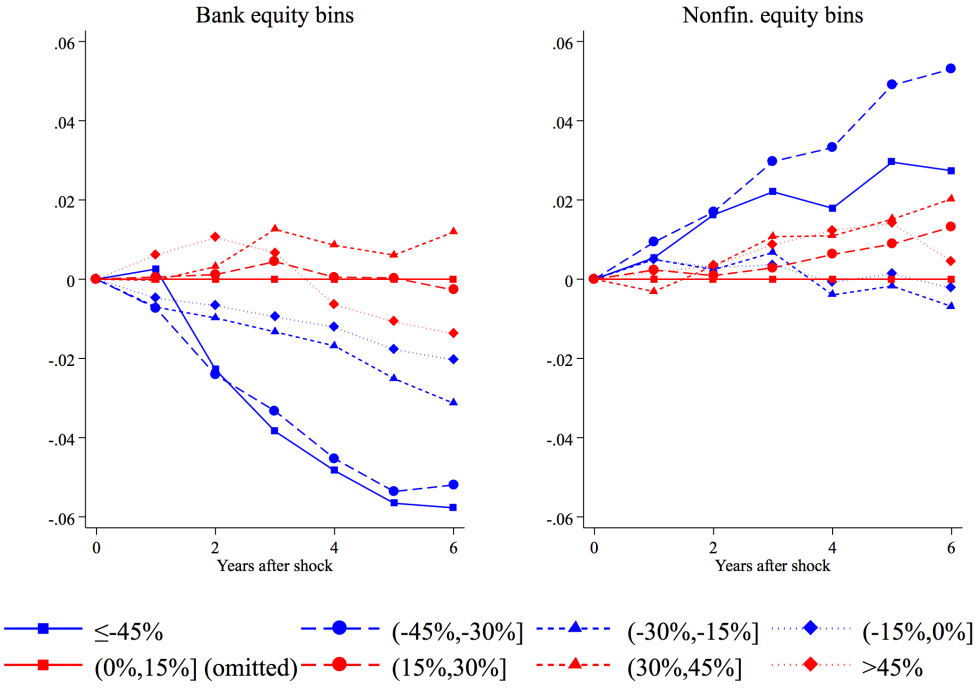


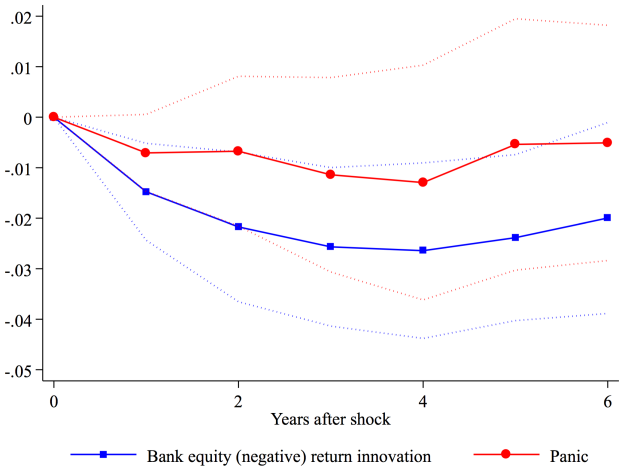
Figure A8: Bank equity continuous returns and panics

This figure presents local projection impulse responses estimated using

$$\Delta_h y_{i,t+h} = \alpha_i + \sum_{j=0}^{4}[\beta_j^h(-r_{i,t-j}^B) + \gamma_j^h Panic_{i,t-j}] + \sum_{j=0}^{4}\Gamma X_{i,t-j} + \epsilon_{i,t+h}, \quad h = 1, 2, \ldots.$$

The blue line plots the response to a negative bank equity return innovation ($\{\beta_0^h\}$) and the red line plots the response to a panic episode ($\{\gamma_0^h\}$). The dashed lines represent 95% confidence intervals based on standard errors double-clustered on country and year.

(A) Real GDP response



(B) Credit-to-GDP response

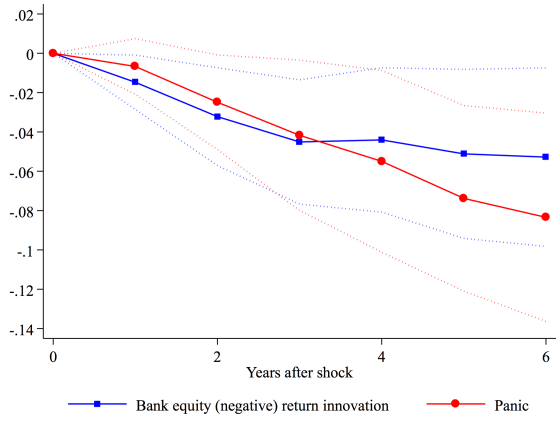


Figure A9: Bank equity declines and the global Great Depression

This figure plots the peak-to-trough decline in real GDP against the peak-to-trough bank equity decline over the period 1929-1933. Note that this figure plots *all* countries in the sample for which data is available, not just those that experienced banking crises.

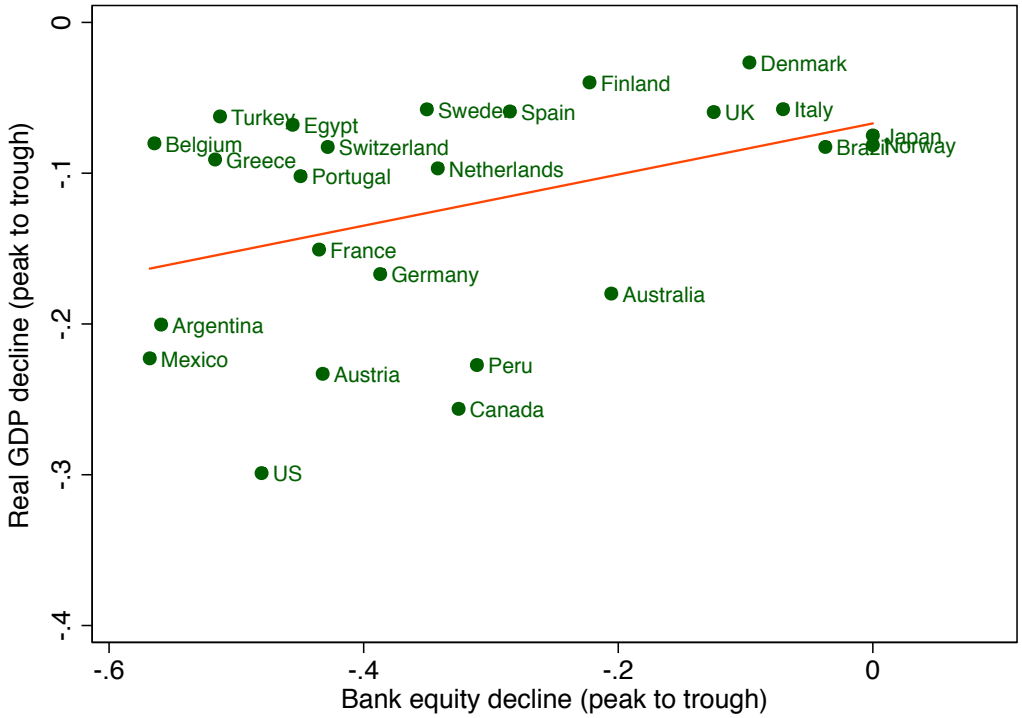
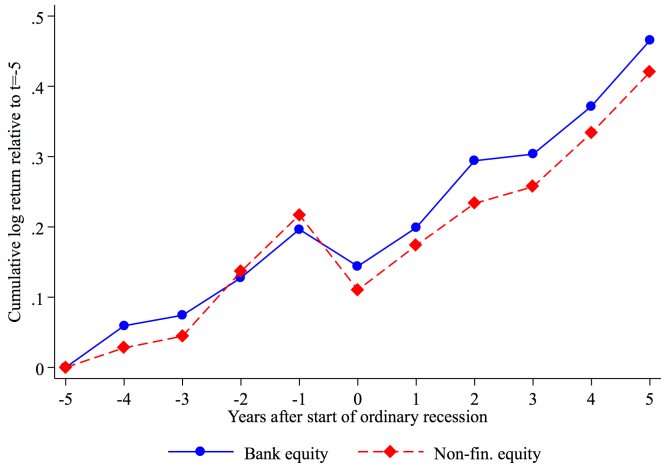


Figure A10: Bank and nonfinancial equity in banking crisis and normal recessions

This figure plots the average dynamics of bank equity and nonfinancial equity around banking crisis recessions and normal (i.e. non-banking crisis) recessions. Banking crisis recessions are defined as recessions that coincide with a Revised Crisis List banking crisis within a year of the peak in GDP. Normal recessions are the remaining recessions in the sample. Time $t = 0$ refers to the GDP peak year.

(A) Normal recessions



(B) Banking crisis recessions

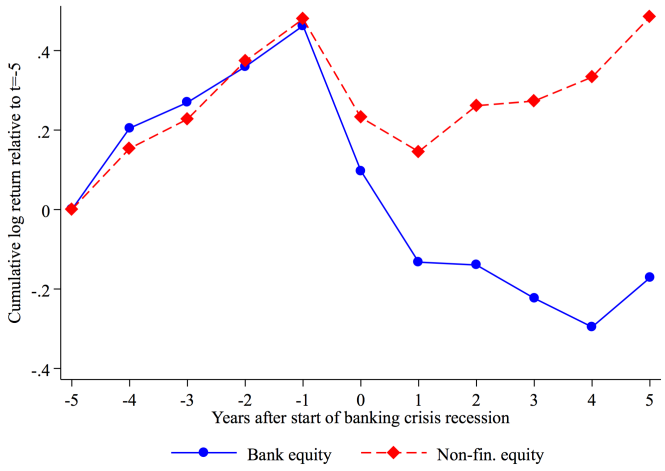


Table A1: Narrative Crises

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Country	Reinhart Rogoff	Schularick Taylor	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt Detrag.	Combined List of Narrative Crises
Argentina	1885						1885
	1890			1890			1890
	1914			1914			1914
	1931			1931			1931
	1934			1934			1934
	1980		1980	1980	1980	1980	1980
	1985		0	0	0	0	1985
	1989		1989	1989	1989	1989	1989
	1995		1995	1995	1995	1995	1995
	2001		2001		2001	2001	2001
Australia	1893	1893		1893			1893
	1931	0		0			1931
	1989	1989	0	1989	1989	0	1989
Austria	1873						1873
	1924						1924
	1929						1929
	1931						1931
	2008		2008				2008
Belgium	1870	1870					1870
	0	1885					1885
	1914	0		1914			1914
	1925	1925		1925			1925
	1931	1931		1931			1931
	1934	1934		1934			1934
	1939	1939		1939			1939
	2008	2008	2008				2008
Brazil	1890			1890			1890
	1897			1897			1897
	1900			1900			1900
	1914			1914			1914
	1923			1923			1923
	1926			0			1926
	1929			0			1929
	1963			1963			1963
	1985		0	0	0	0	1985
	1990		1990	1990	1990	1990	1990
	1994		1994	1994	1994	1994	1994
Canada	1873	0					1873
	1906	0					1906
	1908	1907					1907
	1912	0					1912
	1923	0		1923			1923
	1983	0	0	1983	1982	0	1982
Chile	1890			1889			1889
	1898			1898			1898
	1907			1907			1907
	1914			1914			1914
	1926			1925			1925

Continued on next page

Table A1: Narrative Crises

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Country	Reinhart Rogoff	Schularick Taylor	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt Detrag.	Combined List of Narrative Crises
	1976		1976	1976	1976		1976
	1980		1981	1981	1981	1981	1980
Colombia	1982		1982	1982	1982	1982	1982
	1998		1998	0	0	1999	1998
Czech	1931						1931
	1991		0		1991		1991
	0		1996		0		1996
Denmark	1877	1877					1877
	1885	1885		1885			1885
	1902	0		0			1902
	1907	1908		1907			1907
	1914	0		1914			1914
	1921	1921		1921			1921
	1931	1931		1931			1931
	1987	1987	0	1987	1987	0	1987
	2008	2008	2008				2008
Egypt	1907						1907
	1931						1931
	1980		1980	1981	1980s	0	1980
	1990		0	1991	1991	0	1990
Finland	0	1877					1877
	1900	1900		1900			1900
	1921	1921		1921			1921
	1931	1931		1931			1931
	1939	0		1939			1939
	1991	1991	1991	1991	1991	1991	1991
France	1871						1871
	1882	1882		1882			1882
	1889	1889		1889			1889
	1904	0		0			1904
	1907	0		1907			1907
	1914	0		0			1914
	1930	1930		1930			1930
	1939	0		0			1939
	1994	0	0	1994	1994	0	1994
	2008	2008	2008				2008
Germany	0	1873					1873
	1880	0					1880
	1891	1891		0			1891
	1901	1901		1901			1901
	0	1907		0			1907
	1925	0		0			1925
	1929	1931		1931			1929
	1977	0	0	0	late 1970s		1977
	2008	2008	2008		0		2008
Greece	1931			1931			1931
	1991		0	1991	1991	0	1991
	2008		2008				2008
Hong Kong	1982		0	1982	1982		1982

Continued on next page

Table A1: Narrative Crises

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Country	Reinhart Rogoff	Schularick Taylor	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt Detrag.	Combined List of Narrative Crises
	1983		0	1983	1983		1983
	1998		0		1998		1998
Hungary	1931						1931
	1991		1991		1991	0	1991
	2008		2008				2008
Iceland	1985		0	1985	1985	0	1985
	1993		0	1993	1993	0	1993
	2007		2008				2007
India	1908						1908
	1913						1913
	1921						1921
	1929						1929
	1947						1947
	1993		1993	1993	1993	1991	1991
Indonesia	1992		0	0	0	1992	1992
	1994		0	1994	1994	0	1994
	1997		1997	1997	1997	1997	1997
Ireland	2007		2008				2007
Israel	1977		1977	1977	1977	0	1977
	1983		0	counted above	counted above	1983	1983
Italy	0	1873					1873
	1887	1887					1887
	1891	0		1891			1891
	1893	1893		1893			1893
	1907	1907		1907			1907
	1914	0		1914			1914
	1921	1921		1921			1921
	1930	1930		1930			1930
	1935	1935		1935			1935
	1990	1990	0	1990	1990	1990	1990
	2008	2008	2008				2008
Japan	1872	1871					1871
	1882	0					1882
	0	1890		0			1890
	1901	0		1901			1901
	1907	1907		1907			1907
	1914	0		0			1914
	1917	0		1917			1917
	0	1920		0			1920
	1923	0		0			1923
	1927	1927		1927			1927
	1992			1992	1991	1992	1991
	counted above	1997	1997	counted above	counted above	counted above	1997
Korea	1983		0	0	0	0	1983
	1986		0	0	0	0	1986
	1997		1997	1997	1997	1997	1997
Luxembourg			2008				2008
Malaysia	1985		0	1985	1985	1985	1985
	1997		1997	1997	1997	1997	1997

Continued on next page

Table A1: Narrative Crises

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Country	Reinhart Rogoff	Schularick Taylor	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt Detrag.	Combined List of Narrative Crises
Mexico	1883						1883
	1893						1893
	1908						1908
	1913						1913
	1920						1920
	1929						1929
	1981		1981	1981	1981	0	1981
	1982		counted above	0	counted above	1982	1982
	1992		0	0	0	0	1992
	1994		1994	1995	1994	1994	1994
Netherlands	0	1893		0			1893
	1897	0		1897			1897
	0	1907		0			1907
	1914	0		1914			1914
	1921	1921		1921			1921
	1939	1939		1939			1939
	2008	2008	2008				2008
New Zealand	1890						1890
	1893						1893
	1987		0	1987	1987	0	1987
Norway	1898	1899		0			1898
	1914	0		0			1914
	1921	1922		1921			1921
	1927	0		0			1927
	1931	1931		1931			1931
	1936	0		0			1936
	1987	1988	1991	1987	1987	1987	1987
Peru	1872						1872
	1983		1983	1983	1983	1983	1983
	1999		0		0	0	1999
Philippines	1981		1983	1983	1981	1981	1981
	1997		1997		1998	1998	1997
Portugal	1890	1890		1891			1890
	1920	1920		1920			1920
	1923	1923		1923			1923
	1931	1931		1931			1931
	0	0	0	0	0	1986	1986
	2008	2008	2008				2008
Russia	1875						1875
	1896						1896
	1995		0		1995	0	1995
	1998		1998		1998	0	1998
	2008		2008				2008
Singapore	1982		0	1982	1982		1982
South Africa	1877						1877
	1881						1881
	1890						1890
	1977		0	1977	1977		1977
	0		0	0	0	1985	1985

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Table A1: Narrative Crises

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Country	Reinhart Rogoff	Schularick Taylor	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt Detrag.	Combined List of Narrative Crises
	1989		0	0	1989	0	1989
Spain	0	1883					1883
	0	1890		0			1890
	0	1913		0			1913
	1920	1920		1920			1920
	1924	1924		1924			1924
	1931	1931		1931			1931
	1977	1977	1977	1977	1977		1977
	2008	2008	2008				2008
Sweden	1876	1878					1876
	1897	0		1897			1897
	1907	1907		1907			1907
	1922	1922		0			1922
	1931	1931		1931			1931
	1991	1991	1991	1991	1991	1990	1990
	2008	2008	2008				2008
Switzerland	1870	1870					1870
	1910	1910		0			1910
	1921	0		0			1921
	1931	1931		1931			1931
	1933	0		1933			1933
	0	1991	0	0	0	0	1991
	2008	2008	2008				2008
Taiwan	1923						1923
	1927						1927
	1983			1983	1983	0	1983
	1995			1995	1995	0	1995
	1997			1997	1997	1997	1997
Thailand	1979		0	0	0		1979
	1983		1983	1983	1983	1983	1983
	1996		1997	1997	1997	1997	1996
Turkey	1931						1931
	1982		1982	1982	1982	1982	1982
	1991		0	0	0	1991	1991
	1994		0	1994	1994	1994	1994
	2000		2000		2000	2000	2000
U.K.	1878	0					1878
	1890	1890		1890			1890
	1908	0		0			1908
	1914	0		0			1914
	1974	1974	0	1974	1974		1974
	1984	0	0	0	1980s-90s	0	1984
	1991	1991	0	0	0	0	1991
	1995	0	0	0	0	0	1995
	2007	2007	2007				2007
U.S.	1873	1873					1873
	1884	0		1884			1884
	1890	0		0			1890
	1893	1893		1893			1893

Continued on next page

Table A1: Narrative Crises

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Country	Reinhart Rogoff	Schularick Taylor	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt Detrag.	Combined List of Narrative Crises
	1907	1907		1907			1907
	1914	0		1914			1914
	1929	1929		1930			1929
	1984	1984	1988	1984	1984	1980	1984
	counted above	counted above	counted above	0	counted above	counted above	1990
	2007	2007	2007				2007
Venezuela	1978		0	1978	late 1970s		1978
	1993		1994	1994	1994	1993	1993
	2009		0				2009

Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
Argentina	1885	1	0	0	0	
Argentina	1891	1890	1	1	1	1
Argentina	1914	1	1	1	0	1
Argentina	1930	1931	1	1	0	1
Argentina	1934	1	1	1	1	1
Argentina	1980	1	1		1	1
Argentina	1985	1	0		0	
Argentina	1989	1	1		1	1
Argentina	1995	1	1	1	1	1
Argentina	2000	2001	1	1	1	1
Argentina	2008		0	1	0	
Argentina	2011		0	1	0	
Australia	1893	1	1	1	1	1
Australia	1931	1	1	0	0	
Australia	1952		0	1	0	
Australia	1974		1	1	0	
Australia	1989	1	1	0	1	1
Australia	2008		0	1	0	
Austria	1873	1	1	1	1	1
Austria	1888		0	1	0	
Austria	1920		0	1	0	
Austria	1924	1	1	0	1	1
Austria	1931	1929, 1931	1	1	1	1
Austria	1966		0	1	0	
Austria	1982		0	1	0	
Austria	1995		0	1	0	
Austria	2008	1	1	1	1	1
Austria	2011		0	1	1	1
Belgium	1870	1	1	0	0	
Belgium	1876		1	1	1	1
Belgium	1883	1885	1	1	1	1
Belgium	1891		0	1	0	
Belgium	1914	1	1		0	1
Belgium	1925	1	0	0	0	
Belgium	1929	1931, 1934	1	1	1	1
Belgium	1939	1	1		1	1
Belgium	1974		0	1	0	
Belgium	1980		0	1	0	
Belgium	2002		0	1	0	
Belgium	2008	1	1	1	1	1
Belgium	2011		0	1	1	1
Brazil	1890	1	1	0	1	1
Brazil	1897	1	0	0	0	
Brazil	1900	1	1	0	1	1

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
Brazil	1914	1	1	1	0	1
Brazil	1923	1	0	0	1	1
Brazil	1926	1	0	0	0	
Brazil	1929	1	1	0	0	
Brazil	1953		0	1	0	
Brazil	1957		0	1	0	
Brazil	1962	1963	0		0	
Brazil	1985	1	0		0	
Brazil	1990	1	1		1	1
Brazil	1994	1	1		1	1
Brazil	1998		0	1	0	
Brazil	2008		0	1	0	
Brazil	2012		0	1	0	
Canada	1873	1	1	0	1	1
Canada	1906	1	0	0	0	
Canada	1907	1	1	0	1	1
Canada	1912	1	1	0	0	
Canada	1920	1923	1	1	1	1
Canada	1932		0	1	0	
Canada	1974		0	1	0	
Canada	1982	1	1	0	1	1
Canada	2008		0	1	0	
Chile	1878		1		1	1
Chile	1889	1	0	0	0	
Chile	1898	1	1	0	1	1
Chile	1907	1	1		1	1
Chile	1914	1	1		1	1
Chile	1925	1	1		1	1
Chile	1931		1	1	1	1
Chile	1954		0	1	0	
Chile	1962		0	1	0	
Chile	1970		0	1	0	
Chile	1976	1	1	0	1	1
Chile	1982	1980	1	1	1	1
Chile	1998		0	1	0	
Colombia	1931		1	1	1	1
Colombia	1972		0	1	0	
Colombia	1982	1	1	1	1	1
Colombia	1998	1	1	1	1	1
Colombia	2008		0	1	0	
Czech	1923		1		1	1
Czech	1931	1	0	0	0	
Czech	1991	1	1		1	1
Czech	1995	1996	1	1	1	1
Denmark	1877	1	1	0	1	1

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
Denmark	1885	1	1	0	1	1
Denmark	1902	1	0	0	0	
Denmark	1907	1	1	0	1	1
Denmark	1914	1	1		0	
Denmark	1919	1921	1	1	1	1
Denmark	1931	1	0	0	0	
Denmark	1974		0	1	0	
Denmark	1992	1987	0	1	1	1
Denmark	2008	1	1	1	1	1
Denmark	2011		0	1	1	1
Egypt	1907	1	1	0	1	1
Egypt	1914		1	1	1	1
Egypt	1931	1	1	1	1	1
Egypt	1980	1	0		0	
Egypt	1990	1	0		0	
Finland	1877	1	1		1	1
Finland	1900	1	1		1	1
Finland	1921	1	1	1	1	1
Finland	1931	1	1	0	1	1
Finland	1939	1	0	0	0	
Finland	1974		0	1	0	
Finland	1990	1991	1	1	1	1
Finland	2002		0	1	0	
Finland	2008		0	1	0	
France	1871	1	0		0	
France	1882	1	1	1	1	1
France	1889	1	1	0	1	1
France	1904	1	0	0	0	
France	1907	1	0	0	0	
France	1914	1	1	1	0	1
France	1919		0	1	0	
France	1930	1	1	1	1	1
France	1937		1	1	0	
France	1939	1	0	0	0	
France	1974		0	1	0	
France	1987		0	1	0	
France	1994	1	0	0	1	1
France	2008	1	1	1	1	1
France	2011		0	1	0	
Germany	1874	1873	1	1	1	1
Germany	1880	1	0	0	0	
Germany	1891	1	1	0	1	1
Germany	1901	1	1	0	1	1
Germany	1907	1	1	0	0	
Germany	1914		1		0	

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
Germany	1920		0	1	0	
Germany	1925	1	0	0	1	1
Germany	1930	1929	1	1	1	1
Germany	1962		0	1	0	
Germany	1973		0	1	0	
Germany	1977	1	0	0	0	
Germany	1987		0	1	0	
Germany	2002		0	1	0	
Germany	2008	1	1	1	1	1
Germany	2011		0	1	0	
Greece	1929	1931	0	1	1	1
Greece	1973		0	1	0	
Greece	1980		0	1	0	
Greece	1988		0	1	0	
Greece	1992	1991	0	1	0	1
Greece	2001		0	1	0	
Greece	2008	1	1	1	1	1
Greece	2010		1	1	1	1
Hong Kong	1874		0	1	0	
Hong Kong	1892		1	1	1	1
Hong Kong	1950		0	1	0	
Hong Kong	1965		1	0	1	
Hong Kong	1974		0	1	0	
Hong Kong	1982	1982, 1983	1	1	1	1
Hong Kong	1988		0	1	0	
Hong Kong	1998	1	1	1	0	1
Hong Kong	2011		0	1	0	
Hungary	1873		1	1	1	1
Hungary	1883		0	1	0	
Hungary	1924		0	1	0	
Hungary	1931	1	1		1	1
Hungary	1991	1	0		1	1
Hungary	1995		1	1	1	1
Hungary	2008	1	0	1	1	1
Hungary	2011		0	1	0	
Iceland	1920		1	1	1	1
Iceland	1930		1		1	1
Iceland	1985	1	0		1	1
Iceland	1993	1	0		1	1
Iceland	2008	2007	1	1	1	1
India	1908	1	0	0	0	
India	1913	1	1	0	1	1
India	1920	1921	1	1	1	1
India	1929	1	0	0	0	
India	1947	1	0		0	

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
India	1993	1991	1	1	1	1
India	1998		0	1	0	
India	2011		0	1	0	
Indonesia	1990	1992, 1994	1	1	1	1
Indonesia	1998	1997	1	1	1	1
Ireland	1974		0	1	0	
Ireland	1990		0	1	0	
Ireland	2007	1	1	1	1	1
Ireland	2010		1	1	1	1
Ireland	2016		0	1	0	
Israel	1977	1	0	0	0	
Israel	1983	1	0	1	1	1
Israel	1988		0	1	0	
Israel	2002		0	1	0	
Israel	2008		0	1	0	
Israel	2011		0	1	0	
Italy	1873	1	1	0	1	1
Italy	1889	1887	1	1	1	1
Italy	1891	1891, 1893	1	1	1	1
Italy	1907	1	1	1	1	1
Italy	1914	1	1	1	1	1
Italy	1921	1	1	1	1	1
Italy	1930	1	1	0	1	1
Italy	1935	1	0		0	
Italy	1962		0	1	0	
Italy	1974		0	1	0	
Italy	1982		0	1	0	
Italy	1992	1990	0	1	1	1
Italy	2001		0	1	0	
Italy	2008	1	1	1	1	1
Italy	2011		0	1	1	1
Italy	2016		0	1	0	
Japan	1871	1	1		0	
Japan	1882	1	1		1	1
Japan	1890	1	1		1	1
Japan	1901	1	1	0	1	1
Japan	1907	1	1	1	1	1
Japan	1914	1	0	0	0	
Japan	1917	1	0	0	0	
Japan	1920	1	1	1	1	1
Japan	1922		1	1	1	1
Japan	1923	1	1	1	1	1
Japan	1927	1	1	0	1	1
Japan	1953		0	1	0	
Japan	1974		0	1	0	

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
Japan	1990	1991	0	1	1	1
Japan	1997	1	1	1	1	1
Japan	2001		0	1	1	1
Japan	2008		0	1	0	
Korea	1976		0	1	0	
Korea	1984	1983	0	1	0	1
Korea	1986	1	0	0	0	
Korea	1990		0	1	0	
Korea	1997	1	1	1	1	1
Korea	2008		0	1	0	
Luxembourg	1879		0	1	0	
Luxembourg	1924		0	1	0	
Luxembourg	1930		0	1	0	
Luxembourg	2008	1	1	1	1	1
Luxembourg	2012		0	1	0	
Malaysia	1973		0	1	0	
Malaysia	1985	1	1	1	1	1
Malaysia	1997	1	1	1	1	1
Malaysia	2008		0	1	0	
Mexico	1883	1	1		1	1
Mexico	1893	1	0	1	1	1
Mexico	1908	1	0	0	1	1
Mexico	1913	1	1		1	1
Mexico	1921	1920	1		1	1
Mexico	1924		0	1	0	
Mexico	1928	1929	1	1	1	1
Mexico	1974		0	1	0	
Mexico	1981	1981, 1982	1		1	1
Mexico	1992	1	0	0	0	
Mexico	1994	1	1	1	1	1
Mexico	1998		0	1	0	
Netherlands	1893	1	0	0	0	
Netherlands	1897	1	0	0	0	
Netherlands	1907	1	1	0	1	1
Netherlands	1914	1	1		1	1
Netherlands	1921	1	1	0	1	1
Netherlands	1931		0	1	1	1
Netherlands	1939	1	0		0	
Netherlands	1957		0	1	0	
Netherlands	1965		0	1	0	
Netherlands	1987		0	1	0	
Netherlands	2002		0	1	0	
Netherlands	2008	1	1	1	1	1
Netherlands	2011		0	1	0	
New Zealand	1888	1890	1	1	1	1

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
New Zealand	1894	1893	1	1	1	1
New Zealand	1931		0	1	0	
New Zealand	1960		0	1	0	
New Zealand	1984		0	1	0	
New Zealand	1987	1	1	1	1	1
New Zealand	1998		0	1	0	
New Zealand	2008		0	1	0	
Norway	1898	1	1		1	1
Norway	1914	1	1		0	
Norway	1919	1921	1	1	1	1
Norway	1927	1	0	0	0	
Norway	1931	1	1	0	1	1
Norway	1936	1	0	0	0	
Norway	1951		0	1	0	
Norway	1964		0	1	0	
Norway	1971		0	1	0	
Norway	1987	1	1	1	1	1
Norway	2008		1	1	0	
Peru	1876	1872	1	1	1	1
Peru	1914		1	1	1	1
Peru	1931		1	1	1	1
Peru	1981	1983	1	1	1	1
Peru	1987		0	1	0	
Peru	1998	1999	1	1	1	1
Philippines	1971		1	1	0	
Philippines	1981	1	1	1	1	1
Philippines	1997	1	1	1	1	1
Philippines	2008		0	1	0	
Portugal	1876		1		1	1
Portugal	1890	1	1		1	1
Portugal	1921	1920	1	1	1	1
Portugal	1923	1	1	1	1	1
Portugal	1931	1	0	1	1	1
Portugal	1956		0	1	0	
Portugal	1986	1	0		0	
Portugal	2002		0	1	0	
Portugal	2008	1	1	1	1	1
Portugal	2011		0	1	1	1
Portugal	2014		0	1	0	
Russia	1875	1	1	0	1	1
Russia	1900	1896	1	1	1	1
Russia	1995	1	1		1	1
Russia	1998	1	1	1	1	1
Russia	2008	1	1	1	1	1
Singapore	1973		0	1	0	

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
Singapore	1982	1	0	0	0	
South Africa	1877	1	0	0	0	
South Africa	1881	1	1	0	1	1
South Africa	1890	1	1	0	1	1
South Africa	1920		0	1	0	
South Africa	1969		0	1	0	
South Africa	1973		0	1	0	
South Africa	1977	1	0	0	0	
South Africa	1984	1985	1	1	1	1
South Africa	1989	1	0	0	0	
Spain	1882	1883	1	1	1	1
Spain	1890	1	1	0	1	1
Spain	1913	1	1	0	0	
Spain	1920	1	1	0	1	1
Spain	1924	1	1	0	1	1
Spain	1931	1	0	1	1	1
Spain	1958		0	1	0	
Spain	1971		0	1	0	
Spain	1975	1977	1	1	1	1
Spain	1991		0	1	0	
Spain	2002		0	1	0	
Spain	2008	1	1	1	1	1
Spain	2010		1	1	1	1
Sweden	1878	1876	1		1	1
Sweden	1897	1	0	0	0	
Sweden	1907	1	1	0	1	1
Sweden	1919	1922	1	1	1	1
Sweden	1932	1931	1	1	1	1
Sweden	1991	1990	1	1	1	1
Sweden	2002		0	1	0	
Sweden	2008	1	1	1	1	1
Switzerland	1870	1	1	0	1	1
Switzerland	1910	1	1	0	0	
Switzerland	1914		1		1	1
Switzerland	1919	1921	0	1	1	1
Switzerland	1931	1931, 1933	1	1	1	1
Switzerland	1963		0	1	0	
Switzerland	1974		0	1	0	
Switzerland	1987		0	1	0	
Switzerland	1990	1991	1	1	1	1
Switzerland	2008	1	1	1	1	1
Taiwan	1923	1	1		1	1
Taiwan	1927	1	1		1	1
Taiwan	1983	1	1		1	1
Taiwan	1990		0	1	0	

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
Taiwan	1995	1	1	1	1	1
Taiwan	1998	1997	1	1	1	1
Taiwan	2008		0	1	0	
Thailand	1979	1	0	1	1	1
Thailand	1983	1	1	0	1	1
Thailand	1997	1996	1	1	1	1
Thailand	2008		0	1	0	
Turkey	1875		1	1	0	
Turkey	1883		0	1	0	
Turkey	1914		1	1	1	1
Turkey	1930	1931	1	1	1	1
Turkey	1974		0	1	0	
Turkey	1980	1982	1	1	1	1
Turkey	1988		0	1	0	
Turkey	1991	1	1	1	0	1
Turkey	1994	1	1	0	1	1
Turkey	1998		0	1	0	
Turkey	2001	2000	1	1	1	1
Turkey	2008		0	1	0	
Turkey	2011		0	1	0	
U.K.	1878	1	1	0	1	1
U.K.	1890	1	1	0	0	1
U.K.	1908	1	0	0	0	
U.K.	1914	1	1	1	0	1
U.K.	1951		0	1	0	
U.K.	1973	1974	1	1	1	1
U.K.	1984	1	0	0	0	
U.K.	1991	1	1	0	1	1
U.K.	1995	1	0	0	0	
U.K.	2008	2007	1	1	1	1
U.K.	2011		0	1	0	
U.S.	1873	1	1	0	1	1
U.S.	1884	1	1	0	1	1
U.S.	1890	1	1	0	1	1
U.S.	1893	1	1	0	1	1
U.S.	1907	1	1	1	1	1
U.S.	1914	1	0	0	0	
U.S.	1930	1929	1	1	1	1
U.S.	1937		0	1	0	
U.S.	1974		0	1	0	
U.S.	1984	1	1	0	1	1
U.S.	1990	1	0	1	1	1
U.S.	2007	1	1	1	1	1
Venezuela	1960		0	1	0	
Venezuela	1981	1978	1	1	1	1

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Table A2: Master List of Episodes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Year by bank eq. decline	Narrative Crisis (with narrative start year, if different)	Panic	Bank eq. 30% cumulative decline	Narrative evidence of widespread bank failures	Revised Crisis List
Venezuela	1988		0	1	0	
Venezuela	1992	1993	1	1	1	1
Venezuela	1998		0	1	0	
Venezuela	2008	2009	1	1	1	1
Venezuela	2014		0	1	0	
Total count	409	239	207	270	208	218

Table A3: Bank equity captures the symptoms and severity of banking crises

This table shows that bank equity peak-to-trough declines during Narrative Crises are correlated with characteristics of banking crises and their economic severity. The table reports estimates from Equation A1, which regresses various dependent variables (in the various columns) on bank equity peak-to-trough returns. Each observation is an individual Narrative Crisis episode. The sample size in different columns varies due to data availability of the dependent variable. t-statistics in brackets are computed using robust standard errors. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Severity of banking crises – Real GDP

	Real GDP (peak-to-trough decline)	Real GDP growth (%.-pt. decline, peak-to-trough)	Real GDP growth (max deviation from trend)
	(1)	(2)	(3)
Bank equity decline	0.140***	0.131***	0.0933***
	[5.301]	[6.327]	[4.825]
Post-1945 dummy	✓	✓	✓
Adj. R^2 (within)	0.170	0.185	0.133
N	179	179	179

Panel B: Severity of banking crises – Other macroeconomic measures

	Real cons. per capita	Invest. to GDP	Broad money	(minus) Govt debt to GDP	Total loans	Mort. loans	House prices
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bank equity decline	0.0996**	0.0514**	0.330***	0.228**	0.199***	0.289***	0.151*
	[2.224]	[2.048]	[3.924]	[2.348]	[2.916]	[3.785]	[1.744]
Post-1945 dummy	✓	✓	✓	✓	✓	✓	✓
R^2 (within)	0.210	0.0493	0.176	0.0674	0.149	0.157	0.0463
N	102	98	101	129	94	95	80

Panel C: Characteristics of banking crises

	Decline in deposits (pre-war only)	Significant bank closures	Failed banks (% of total bank assets)	Largest banks failing	NPL at peak
	(1)	(2)	(3)	(4)	(5)
Bank equity decline	0.291**	-0.213	-0.389**	-0.477*	-0.180**
	[2.649]	[-1.525]	[-2.581]	[-1.806]	[-2.049]
Post-1945 dummy	✓	✓	✓	✓	✓
Adj. R^2 (within)	0.103	0.0156	0.0556	0.0232	0.0466
N	51	140	60	114	63

	Significant liability guarantees	Significant liquidity support	Banks nationalized	Govt equity injections
	(6)	(7)	(8)	(9)
Bank equity decline	-0.337	-0.829***	-0.544*	-1.450***
	[-1.325]	[-3.457]	[-1.842]	[-5.325]
Post-1945 dummy	✓	✓	✓	✓
Adj. R^2 (within)	0.00658	0.0916	0.0329	0.238
N	121	127	96	81

Table A4: Alternative measures of bank equity declines

This table is similar to Table A3 but uses alternate measures of bank equity declines as the independent variable. In Panel A, the independent variable is the *abnormal bank equity decline*, which is defined as the peak-to-trough decline of the bank equity total return minus nonfinancial equity total return. In Panel B, the independent variable is *bank market capitalization decline*, defined as the peak-to-trough decline in an index defined by annual returns of (1+bank equity price returns)*(1+bank equity new issuance). Panel C has two independent variables: *bank equity decline* and *bank equity recovery* (positive returns in the bank equity total returns index subsequent to the trough within three years after a banking crisis).

Panel A: Abnormal bank equity decline (i.e. bank equity minus nonfinancial equity returns)

	Real GDP (peak-to-trough decline)	Real GDP growth (%.-pt. decline, peak-to-trough)	Real GDP growth (max deviation from trend)
	(1)	(2)	(3)
Abnormal bank decline	0.0592***	0.0495***	0.0405***
	[3.326]	[3.529]	[3.375]
Post-1945 dummy	✓	✓	✓
Adj. R^2 (within)	0.0748	0.0606	0.0576
N	170	170	170

Panel B: Bank market capitalization decline

	Real GDP (peak-to-trough decline)	Real GDP growth (%.-pt. decline, peak-to-trough)	Real GDP growth (max deviation from trend)
	(1)	(2)	(3)
Bank market cap decline	0.113***	0.0878***	0.0807***
	[3.849]	[5.067]	[5.326]
Post-1945 dummy	✓	✓	✓
Adj. R^2 (within)	0.235	0.205	0.224
N	75	75	75

Panel C: Bank equity recoveries

	Real GDP (peak-to-trough decline)	Real GDP growth (%.-pt. decline, peak-to-trough)	Real GDP growth (max deviation from trend)
	(1)	(2)	(3)
Bank equity decline	0.143***	0.125***	0.0877***
	[4.282]	[5.399]	[4.129]
Bank equity recovery	0.00665	-0.0124	-0.0129
	[0.233]	[-0.572]	[-0.611]
Post-1945 dummy	✓	✓	✓
Adj. R^2 (within)	0.165	0.182	0.130
N	179	179	179

Table A5: Bank equity crashes and subsequent GDP and credit growth: subsample analysis

A bank (nonfinancial) equity crash is defined as an annual less than -30% return in the bank (nonfinancial) equity total return index. Controls refers to contemporaneous real GDP growth and credit-to-GDP change, as well as three lags in bank equity crash, nonfinancial equity crash, credit-to-GDP change, and real GDP growth. t-statistics in brackets are computed from standard errors double-clustered on country and year. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Real GDP growth from year t to $t+3$

	Pre-1939		1946-1970		1971-2016	
	(1)	(2)	(3)	(4)	(5)	(6)
Bank equity crash	-0.018	-0.019	-0.027***	-0.043***	-0.042***	-0.029***
	[-0.91]	[-0.81]	[-4.08]	[-3.26]	[-5.17]	[-5.02]
Nonfinancial equity crash	-0.12**	-0.076**	-0.011***	0.0035	-0.017*	-0.021*
	[-2.46]	[-2.21]	[-22.6]	[0.26]	[-1.84]	[-1.78]
Country fixed effects	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓
Year fixed effects		✓		✓		✓
Adj. R^2 (within)	0.049	0.066	0.0068	0.097	0.062	0.12
N	545	545	523	523	1478	1478

Panel B: Credit-to-GDP change from year t to $t+3$

	Pre-1939		1946-1970		1971-2016	
	(1)	(2)	(3)	(4)	(5)	(6)
Bank equity crash	-0.036	-0.0063	-0.029***	-0.028***	-0.096***	-0.054***
	[-1.45]	[-0.37]	[-3.27]	[-2.86]	[-5.23]	[-3.65]
Nonfinancial equity crash	-0.0052	-0.0042	0.016**	0.022**	0.0086	-0.011
	[-0.25]	[-0.24]	[2.57]	[2.08]	[0.71]	[-0.65]
Country fixed effects	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓
Year fixed effects		✓		✓		✓
Adj. R^2 (within)	0.0043	0.067	0.0078	0.081	0.038	0.17
N	544	544	606	606	1384	1384

Table A6: The information content of bank equity versus narrative approaches

This table compares the predictive effect of bank equity crashes and narrative crises for GDP growth (Panel A) and the credit-to-GDP change (Panel B). *Narrative Crisis* is an indicator that equals one if a country-year is a Narrative Crisis. All columns control for country fixed effects, and three lags of bank equity crash indicator, nonfinancial equity crash indicator, *Narrative Crisis* indicator, GDP growth, and credit-to-GDP change. Columns 2 and 4 include year fixed effects. Columns 3 and 4 control for specific characteristics of banking crises obtained from narrative approaches (bank nationalization, significant liquidity support, and government equity injection). t-statistics in brackets are computed from standard errors double-clustered on country and year. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Real GDP growth

	(1)	(2)	(3)	(4)
Bank equity crash	-0.027***	-0.025***	-0.027***	-0.025***
	[-4.32]	[-4.47]	[-3.74]	[-4.36]
Nonfinancial equity crash	-0.029***	-0.023**	-0.026***	-0.023**
	[-2.98]	[-2.40]	[-2.73]	[-2.31]
Narrative crisis	-0.021**	-0.013	-0.0071	-0.0043
	[-2.22]	[-1.38]	[-0.58]	[-0.40]
Country fixed effects	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Year fixed effects		✓		✓
Characteristics controls			✓	✓
Adj. R^2 (within)	0.11	0.071	0.12	0.076
N	2548	2548	2548	2548

Panel B: Credit-to-GDP change

	(1)	(2)	(3)	(4)
Bank equity crash	-0.039***	-0.034***	-0.036***	-0.031***
	[-3.53]	[-2.89]	[-3.23]	[-2.76]
Nonfinancial equity crash	0.0030	-0.0038	0.0055	-0.00092
	[0.23]	[-0.30]	[0.47]	[-0.078]
Narrative crisis	-0.049***	-0.049**	-0.039**	-0.038**
	[-2.74]	[-2.66]	[-2.18]	[-2.03]
Country fixed effects	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Year fixed effects		✓		✓
Characteristics controls			✓	✓
Adj. R^2 (within)	0.16	0.14	0.16	0.15
N	2536	2536	2536	2536

Table A7: Impact of bank equity crashes outside of narrative crises

This table shows that bank equity crashes predict output gaps and credit contraction even excluding narrative-based banking crisis episodes. *Narrative Crises* is an indicator for a three-year window around a crisis on the list of Narrative Crises. Controls include country and year fixed effects, three lags in the bank equity crash variables, three lags in the nonfinancial equity crash, as well as contemporaneous and lagged real GDP growth and credit-to-GDP change. t-statistics in brackets are computed from standard errors double-clustered on country and year. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Real GDP growth

	Real GDP growth$_{t,t+1}$		Real GDP growth$_{t,t+3}$	
	(1)	(2)	(3)	(4)
Bank equity crash	-0.018***	-0.015***	-0.025***	-0.020**
	[-4.53]	[-3.52]	[-5.26]	[-2.37]
Narrative crisis	-0.0011	-0.00051	-0.018**	-0.017**
	[-0.38]	[-0.18]	[-2.57]	[-2.27]
Bank eq. crash × Narrative crisis		-0.0054		-0.0100
		[-0.93]		[-0.73]
Non-financial equity crash	-0.010**	-0.010**	-0.023**	-0.023**
	[-2.27]	[-2.27]	[-2.35]	[-2.36]
Country fixed effects	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
Adj. R^2 (within)	0.090	0.091	0.090	0.090
N	2548	2548	2548	2548

Panel B: Credit-to-GDP change

	Credit/GDP change$_{t,t+1}$		Credit/GDP change$_{t,t+3}$	
	(1)	(2)	(3)	(4)
Bank equity crash	-0.0086	0.0000013	-0.039***	-0.013
	[-1.37]	[0.00020]	[-3.10]	[-1.03]
Narrative crisis	0.015**	0.017**	0.037***	0.042***
	[2.32]	[2.46]	[2.71]	[3.00]
Bank eq. crash × Narrative crisis		-0.016*		-0.048***
		[-1.74]		[-3.20]
Non-financial equity crash	0.0030	0.0030	-0.0028	-0.0028
	[0.65]	[0.66]	[-0.22]	[-0.23]
Country fixed effects	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
Adj. R^2 (within)	0.22	0.22	0.16	0.16
N	2535	2535	2536	2536

Table A8: Bank equity continuous returns and panics

This table is similar to Table 4, but replaces the bank and nonfinancial equity crash variables with the negative continuous return. t-statistics in brackets are computed from standard errors double-clustered on country and year. *,**,*** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Real GDP growth

	Real GDP growth$_{t,t+1}$		Real GDP growth$_{t,t+3}$	
	(1)	(2)	(3)	(4)
Bank equity (negative) return	-0.0198***	-0.0148***	-0.0329***	-0.0257***
	[-3.69]	[-3.02]	[-3.11]	[-3.20]
Nonfinancial equity (negative) return	-0.0207***	-0.0173***	-0.0145	-0.0256***
	[-3.21]	[-3.71]	[-1.36]	[-3.70]
Panic	-0.0290***	-0.00707*	-0.0422***	-0.0114
	[-6.92]	[-1.82]	[-3.79]	[-1.16]
Country fixed effects	✓	✓	✓	✓
Controls		✓		✓
Year fixed effects		✓		✓
Adj. R^2 (within)	0.143	0.111	0.0540	0.0857
N	2548	2548	2548	2548

Panel B: Credit-to-GDP change

	Credit/GDP change$_{t,t+1}$		Credit/GDP change$_{t,t+3}$	
	(1)	(2)	(3)	(4)
Bank equity (negative) return	-0.0251**	-0.0147**	-0.0664***	-0.0451***
	[-2.30]	[-2.10]	[-3.84]	[-2.80]
Nonfinancial equity (negative) return	0.0169**	0.00569	0.0232*	0.00383
	[2.58]	[0.83]	[1.81]	[0.33]
Panic	-0.00123	-0.00670	-0.0441**	-0.0417**
	[-0.16]	[-0.93]	[-2.37]	[-2.14]
Country fixed effects	✓	✓	✓	✓
Controls		✓		✓
Year fixed effects		✓		✓
Adj. R^2 (within)	0.0117	0.213	0.0325	0.135
N	2535	2535	2536	2536

Table A9: Changes to start years of banking crises based on bank equity crashes

This table lists other modifications made in constructing the Revised Crisis List. Panel A lists changes in start dates of banking crises that were made by examining the year in which bank equity returns index declined -30% or more. Panel B lists episodes from the Narrative Crises list which were deemed to be part of the same episode and thus combined.

Panel A: Changes in starting dates of banking crises

Country	Change in starting date	Country	Change in starting date
Argentina	1890 → 1891	Mexico	1920 → 1921
	1931 → 1930		1929 → 1928
	2001 → 2000	New Zealand	1890 → 1888
Austria	1929 → 1931		1893 → 1894
Belgium	1885 → 1883	Norway	1921 → 1919
	1931 → 1929	Peru	1872 → 1876
Brazil	1963 → 1962		1983 → 1981
Canada	1923 → 1920		1999 → 1998
	1982 → 1983	Portugal	1920 → 1921
Chile	1980 → 1982	Russia	1896 → 1900
Czech	1996 → 1995	South Africa	1985 → 1984
Denmark	1921 → 1919	Spain	1977 → 1975
	1987 → 1992		1883 → 1882
Finland	1991 → 1990	Sweden	1876 → 1878
Germany	1873 → 1874		1922 → 1919
	1929 → 1930		1931 → 1932
Greece	1931 → 1929		1990 → 1991
	1991 → 1992	Switzerland	1921 → 1919
Iceland	2007 → 2008		1991 → 1990
India	1921 → 1920	Taiwan	1997 → 1998
	1991 → 1993	Thailand	1996 → 1997
Indonesia	1992 → 1990	Turkey	1931 → 1930
	1997 → 1998		1982 → 1980
Italy	1887 → 1889		2000 → 2001
	1990 → 1992	U.K.	1974 → 1973
Japan	1991 → 1990		2007 → 2008
Korea	1983 → 1984	U.S.	1929 → 1930
		Venezuela	1978 → 1981
			1993 → 1992
			2009 → 2008

Panel B: Combined episodes for the Revised Crisis List

Country	Combined Events
Austria	1929 and 1931
Belgium	1931 and 1934
Hong Kong	1982 and 1983
Indonesia	1992 and 1994
Italy	1891 and 1893
Mexico	1981 and 1982
Switzerland	1931 and 1933

Table A10: Additional episodes of minor bank distress from narrative accounts

This table lists additional episodes of minor bank distress that are not classified as banking crises on the Revised Crisis List (Table 5, Panel C) or as non-panic bank distress episodes in Table A2 (because the bank equity declines are less than -30% in magnitude). These episodes are listed purely for historical interest and are not analyzed in this paper. These episodes are generally instances of a single idiosyncratic bank failure or failures of many small banks that collectively do not rise to the level of a crisis.

Country	Starting year of bank distress
Argentina	1985
Australia	1931, 1974
Belgium	1900, 1920, 1925
Brazil	1929, 1985
Canada	1887, 1891, 1901, 1905, 1912
Czech	1884, 1931, 1936
Denmark	1914, 1931, 1984
France	1937, 1991
Germany	1907, 1914, 1974, 2002
Hong Kong	1914, 1965
India	1914, 1938
Ireland	1885
Italy	1926, 1982, 1997
Netherlands	1939, 1981
Norway	1886, 1914, 1926
South Africa	1977, 1991
Spain	1913, 1914, 1991
Switzerland	1910
Turkey	1998
U.K.	1911, 1984, 1995
U.S.	1998

Data Appendix Tables and Figures

Table B1: Bank equity index coverage and sources

This figure provides an overview of the coverage and sources for the bank equity index total return variable. Cells with numbers indicate the number of underlying banks used to construct new bank equity return indexes. Shaded areas refer to pre-made indexes.

	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
Argentina	2	3	4	Nakamura-Zaragoza index									Datastream index		
Australia	11	S&P/ASX 200 Banking Index from GFD													
Austria	5	6	4	5	4	Austria National Bank Banks Index from GFD				2	Austria Bank and Insurance Stocks" index from GFD		Baron-Xiong bank index		
Belgium	6	7	4	6	7	3	Two bank price indexes from GFD							Baron-Xiong bank index	
Brazil	2	2	2	1	1	1	3	1	1	1			Datastream index		
Canada	4	3	6	5	Canada S&P/TSX Banks index from GFD										
Chile			1	Chile BEC Finance price index from GFD											
Colombia	Colombia IBOMED Financial Sector price index from GFD														
Czech	Czech Bank index from GFD												Datastream index		
Denmark	6	6	7	7	Copenhagen SE Banks index from GFD										
Egypt	3	3	2	6	5	4	4	1	1				Datastream index		
Finland					11	14	8	6	4	Finland Unitas Banks index from GFD			Datastream index		
France	14	17	13	14	13	16	14	France INSEE Credit Banks index from GFD					Paris CAC financials index from GFD		
Germany	6	8	8	10	10	10	CDAX Banks Price index from GFD								
Greece	1	1	1	2	2	4	4	Greece National Bank Finance index from GFD							
Hong Kong	1	1	1	1	1	1	1	1	1	1	Datastream index				
Hungary	Hungary Korosy Bank index from GFD					2							Datastream index		
Iceland														Datastream index	
India	4	3	3	3	3	2							Datastream index		
Indonesia													Datastream index		
Ireland	9	9	9	8	8	7	6		2	3	Datastream index				
Israel										Israel Finance and Insurance Composite index	Datastream index				
Italy	7	9	11	7	5	6	6		2	6	Datastream index				

Table B1: Bank equity index coverage and sources (cont.)

	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
Japan				7	4	3	6	Oriental Economist Bank & Trust index from GFD			Japan TOPIX Banks index from GFD				
Korea											Korea SE Banks/Finance index from GFD				
Luxembourg	1	1	1	1	1	1	Luxembourg SE Banks index from GFD						Datastream index		
Malaysia											Malaysia KLSE Financial Index from GFD				
Mexico		2	2	4	4	3	Mexico Nacional Financiera Bank index from GFD						Datastream index		
Netherlands	2	4	4	5	5	5	Netherlands ANP-CBS Banks & Insurance index from GFD					Netherlands CBS Banks index from GFD			
New Zeal.	4	3	3	3	2	2	2	2	1	1		4	Datastream index		
Norway					Oslo SE Banks and Insurance Index from GFD								Baron-Xiong bank index		
Peru	2				1	Lima SE Banks index from GFD							Datastream index		
Philippines									Manila Banks index from GFD				Datastream index		
Portugal						3	4	Portugal Banks/Financials index from GFD					Datastream index		
Russia	3	3	3	3	5								Datastream index		
Singapore										4	Singapore SE Finance GFD index			Datastream index	
S. Africa	2	1	3	4	4	2	1	1	1	Johannesburg SE Financial index from GFD			Datastream index		
Spain	1	2	2	1	4	6	6	Madrid SE Banking and Finance from GFD						Baron-Xiong bank index	
Sweden			3	Stockholm SX Banks index from GFD											Datast.
Switzerland	12	16	18	13	12	12	12	SWX ICB Banks index from GFD							
Taiwan												Datastream index			
Thailand											Thailand SE Banks index		Datastream index		
Turkey	4	3	3	2	2	2	2			1	1	Datastream index			
UK	70	70	Various bank price indexes from GFD												
US	4	4	4	4	Various bank price indexes from GFD										
Venezuela								Caracas SE Financial index from GFD							

Table B2: Data sources: Annual equity variables

	Yearly bank stock prices	Yearly bank stock dividends	Yearly nonfinancial stock prices	Yearly nonfinancial stock dividends
Notes:	See document linked in Appendix text for individual bank stocks used and their sources. "Baron-Xiong" refers to indexes constructed from individual stocks in Baron and Xiong (2017). Datastream refers to the pre-constructed "DS BANKS" stock index from Datastream. The Datastream index codes used are: BANKSXX (for banks), INDUSXX (for nonfinancials), and TOTMKXX (for broad market), with XX being the two-character country code for each country.		For nonfinancial stocks only, price returns are occassionally used in place of total returns, when dividend returns are not available. Also for nonfinancial stocks only, broad market returns are occassionally used when nonfinancial returns are not available (noted in specific cases below).	
Argentina	Individual bank stocks from various sources (1870-1900, 1935-1938), Nakamura-Zarazaga index (1900-1935), Datastream (1992-2016)	Individual bank stocks from various sources (1870-1938), Datastream (1992-2016)	IMM (1882-1935), Broad market index (Buenos Aires SE General Index (_IBGD) from GFD, 1967-1993), Datastream (1994-2016)	IMM (1882-1935), Broad market index (Datastream: TOTMKAR, 1987-1993), Datastream (1994-2016, INDUSAR)
Australia	Individual bank stocks from various sources (1870-1874), "S&P/ASX 200 Banking Index" (_AXBAJD) from GFD (1875-2016)	Individual bank stocks from various sources (1870-1923), Baron-Xiong (1924-2016)	IMM (1870-1882), “Sydney SE Industrial and Commercial” (AUINCM) price index from GFD (1883-1980), “Australia ASX All-Industrials” (_AAIID) price index from GFD (1981-2002), Datastream (2003-2016)	IMM (1870-1882), Broad market index (Australia ASX Dividend Yield (SYAUSYM) from GFD, 1883-2002), Datastream (2003-2016)
Austria	Individual bank stocks from various sources (1870-1921, 1929-1968, 1981-1985),"Austria National Bank Banks Index" (ATBBANKM) from GFD (1922-1928), "Austria 6 Bank and Insurance Stocks" (ATWBANKM) index from GFD (1969-1980), Baron-Xiong (using Compustat Global) (1986-2016)	Individual bank stocks from various sources (1870-1985), Baron-Xiong (using Compustat Global) (1986-2016)	“Austria National Bank Industrials Index” (ATINDUM) price index from GFD (1921-1934), “Vienna Miscellaneous Stocks” (ATMISCM) price index from GFD (1948-1966), “Austria 36 Industrials” (ATAUT36W) price index from GFD (1967-1980), Datastream (1981-2016)	Broad market index (Vienna SE Dividend Yield (SYAUTYM) from GFD, 1925-38, 1969-80)
Belgium	Individual bank stocks from various sources (1870-1933), “Belgium INS Finance and Insurance” (BEFININM) index from GFD (1934-1989), “Brussels Bank Index” (_BXSSBKD) index from GFD (1989-2005), and price index constructed from Compustat global (2005-2012) and Datastream (2013-2016).	Individual bank stocks from various sources (1872-1933), Baron-Xiong (1934-2016)	Broad market index (JST 1870-1955), “Belgium INS Industrials Index” (BEINDUSM) price index from GFD (1956-1972), Datastream (1973-2016)	Broad market index (Annaert et al., 1871-1972), Datastream (1973-2016)
Brazil	Individual bank stocks from various sources (1870-1964), Datastream (1994-2016)	Individual bank stocks from various sources (1870-1959), Datastream (1994-2016)	IMM (1873-1926), newspapers (1927-42), Broad market index (Brazil Bolsa de Valores de Sao Paulo (_BVSPD) from GFD, total returns, 1955-2016)	IMM (1873-1926), newspapers (1927-42)
Canada	Individual bank stocks from various sources (1870-1914), "Canada S&P/TSX Banks" index from GFD (1915-2016)	Individual bank stocks from various sources (1870-1923), Baron-Xiong (1923-2016)	IMM (1870-1914), “Canada Investor's Index Industrials” (CAIINDUM) price index from GFD (1915-1977), “Toronto SE-300 Industrial Products” (_TIPD) price index from GFD (1978-2004), Datastream (2005-2016)	IMM (1870-1929), Broad market index (S&P/TSX-300 Dividend Yield (SYCANYTM) from GFD, 1930-2004), Datastream (2005-2016)
Chile	Individual bank stocks from various sources (1891-1901), "Chile BEC Finance Index" (_FINANCD) price index from GFD (1927-2016)	Individual bank stocks from various sources (1891-1901, 1928-1980), Datastream (1989-2016)	IMM (1870-1928), “Chile BEC Industrials Index” (_INDUSTD) price index from GFD (1927-2009), Datastream (2010-2016)	IMM (1870-1928), Broad market index (Datastream: TOTMKCL, 1983-2009) Datastream (2010-2016, INDUSCL)
Colombia	"Colombia IBOMED Financial Sector" (_IBMFDC) price index from GFD (1923-2016)	Individual bank stocks from various sources (1928-1980), Datastream (1992-2016)	“Bogota SE Industrials (old)” (COBINDUM) price index from GFD (1928-1942), “Bogota SE Industrials Index” (COBOINDD) price index from GFD (1956-1964), “Colombia IBOMED Industrials” (_IBMID) price index from GFD (1968-2000), Datastream (2001-2016)	Datastream (2001-2016)
Czech	“Czechoslovakia Banks Index” (CZBANKSM) price index from GFD (1919-1938), Datastream (1994-2016)	Individual bank stocks from various sources (1919-1937), Datastream (1994-2016)	Czechoslovakia Industrials and Transports (CZINDTRM) from GFD (1919-1937), Datastream (1993-2016)	Datastream (1993-2016)

Table B2: Data sources: Annual equity variables (cont.)

	Yearly bank stock prices	Yearly bank stock dividends	Yearly nonfinancial stock prices	Yearly nonfinancial stock dividends
Denmark	Individual bank stocks from various sources (1870-1920), "Copenhagen SE Banks" (_CX4010D) index from GFD (1921-2011), Datastream (2012-2016)	Individual bank stocks from various sources (1870-1951), Baron-Xiong (1952-2016)	Individual nonfinancial stocks from various sources (1875-1915), Denmark Other Shares (DKOTHERM) (1915-1920), Copenhagen SE Industrials Index (_CX20PID) from GFD, 1921-2012, Datastream (2013-2016, INDUSDK)	Individual nonfinancial stocks from various sources (1876-1936), Datastream (1969-2016, INDUSDK)
Egypt	Individual bank stocks from various sources (1870-1959), Datastream (1996-2016)	Individual bank stocks from various sources (1870-1959), Datastream (1996-2016)	IMM (1906-29), Broad market index (Egyptian Stock Exchange Index (EGCAIROM) from GFD, 1949-62), Datastream (1996-2016)	IMM (1906-29), Datastream (1996-2016)
Finland	Individual bank stocks from various sources (1911-1958), "Finland Unitas Banks" (FIUBANKM) index from GFD (1959-1987), Datastream (1988-2016)	Individual bank stocks from various sources (1911-1987), Datastream (1988-2016)	Broad market index (Nyberg-Vaihekoski, 1913-32), "Finland Unitas Industrials Index" (FIUINDUD) price index from GFD (1933-1991), Datastream (1992-2016)	Broad market index (Nyberg-Vaihekoski, 1913-1970, and Datastream: TOTMKFN, 1972-1991), Datastream (1992-2016, INDUSFN)
France	Individual bank stocks from various sources (1870-1923), "France INSEE Credit Banks" (FRBANKCM) price index from GFD (1924-1990), "Euronext Paris CAC Financials 8000" (_FRFIND) price index from GFD (1991-2016)	Individual bank stocks from various sources (1870-1938), Baron-Xiong (1939-1993), Datastream (1994-2016)	Individual nonfinancial stocks from various sources (1870-1920), Euronext Paris CAC Construction and Materials (_FRCMD) from GFD (1921-2016)	Individual nonfinancial stocks from various sources (1870-1899), Broad market index (France Dividend Yield (SYFRAYM) from GFD, 1900-2016)
Germany	Individual bank stocks from various sources (1871-1902, 1915-1929), "Germany Conrad German Banks" (DECBGERM) index from GFD (1903-1914), "CDAX Banks Price" (_CXKBXD) index from GFD (1930-2016)	Individual bank stocks from various sources (1871-1929), Baron-Xiong (1930-2016)	Individual nonfinancial stocks from various sources (1870-1902), "Germany Conrad Metalworking and Machinery" (DECMACHM) index from GFD (1903-1914), "Germany Bundesamt Heavy Industry" (DEBHEAVM) index from GFD (1914-1950), "Germany CDAX Industrials" (_CXKNXD) index from GFD (1950-2016)	Individual nonfinancial stocks from various sources (1871-1929), Broad market index (Germany Dividend Yield (SYDEUYM) from GFD, 1900-2009), Datastream (2009-2016, INDUSDE)
Greece	Individual bank stocks from various sources (1870-1933), "Greece National Bank Finance" (GRFINANM) index from GFD (1952-1996), Datastream (1997-2016)	Individual bank stocks from various sources (1870-1933), Datastream (1990-2016)	Broad market index (Greece Stock Market Index (GRATHENM) from GFD, 1929-1940), "Athens SE Industrials Index" (_ATIDD) price index from GFD (1953-2005), Datastream (2006-2016)	Athens SE Dividend Yield (SYGRCYM) from GFD (1977-2005), Datastream (2006-2016)
Hong Kong	Individual bank stocks from various sources (1870-1972), Datastream (1973-2016)	Individual bank stocks from various sources (1870-1972), Datastream (1973-2016)	Broad market index (Hong Kong Hang Seng Composite Index (_HSID) from GFD, 1965-1972), Datastream (1973-2016)	Broad market index (Datastream: TOTMKHK, 1970-1972), Datastream (1973-2016)
Hungary	"Hungary Korosy Bank Stock" (HUKOBNKA) index from GFD (1874-1899), Individual bank stocks from various sources (1870-1874, 1923-1930), Datastream (1994-2016)	Individual bank stocks from various sources (1870-1890, 1923-1930), Datastream (1994-2016)	"Hungary Korosy Industrials Stock Index" (HUKOINDA) price index from GFD (1873-1898), "Hungary Stock Market Index" (HUBUDAM) price index from GFD (1921-1944), Broad market index (1992-1996), Datastream (1997-2016)	Broad market index (Datastream: TOTMKHU, 1992-1996), Datastream (1997-2016)
Iceland	Datastream (1999-2016)	Datastream (1999-2016)	Datastream (1993-2016)	Datastream (1993-2016)
India	Individual bank stocks from various sources (1870-1929), Datastream (1990-2016)	Individual bank stocks from various sources (1870-1929), Datastream (1990-2016)	IMM (1870-1928), Broad market index (Bombay SE Sensitive Index (_BSESND) from GFD, 1929-1989), Datastream (1990-2016)	IMM (1870-1928), Datastream (1990-2016)
Indonesia	Datastream (1990-2016)	Datastream (1990-2016)	Broad market index (Jakarta SE Composite Index (_JKSED) from GFD, 1978-1992), Datastream (1993-2016)	Broad market index (Datastream: TOTMKID, 1990-1992), Datastream (1993-2016)

Table B2: Data sources: Annual equity variables (cont.)

	Yearly bank stock prices	Yearly bank stock dividends	Yearly nonfinancial stock prices	Yearly nonfinancial stock dividends
Ireland	Individual bank stocks from various sources (1870-1936, 1953-1972), Datastream (1973-2016)	Individual bank stocks from various sources (1870-1936, 1953-1972), Datastream (1973-2016)	IMM (1870-1929), Broad market index (Ireland ISEQ Overall Price Index (_ISEQD) from GFD, 1934-72), Datastream (1973-2016)	IMM (1870-1929), Datastream (1973-2016)
Israel	"Israel Finance and Insurance Composite" (ILXFINSM) index from GFD (1966-1983), Datastream (1984-2016)	Individual bank stocks from various sources (1966-1994), Datastream (1995-2016)	"Tel Aviv SE Industrial and Manufacturing" (ILTLVND) from GFD (1966-1993), Datastream (1993-2016)	Datastream (1993-2016)
Italy	Individual bank stocks from various sources (1870-1972), Datastream (1973-2016)	Individual bank stocks from various sources (1870-1972), Datastream (1973-2016)	Individual bank stocks from L'Economista (1884-1894) and Corriere newspaper (1884-1894), Broad market index (Banca Commerciale Italiana Index (_BCIID) from GFD , 1905-1961), "Milan SE Industrials" (ITMILAND) price index from GFD (1962-1985), "Milan SE Historical Industrials" (_MHIDD) price index from GFD (1986-2009), Datastream (2010-2016)	Broad market index (Italy Dividend Yield (SYITAYM) from GFD, 1925-2009), Datastream (2010-2016)
Japan	Individual bank stocks from various sources (1897-1932), "Japan Oriental Economist Bank and Trust" (JPOBANKM) index from GFD (1933-1944), "Japan TOPIX Finance and Insurance" (JPFININM) index from GFD (1946-1985), "Japan TOPIX Banks" (_IBNKS_D) index from GFD (1986-2016)	Individual bank stocks from various sources (1901-1957), Baron-Xiong (1958-2016)	Broad market index (JST, 1879-1914, and Nikkei 225 Stock Average (_N225D) from GFD, 1915-1944), "Japan TOPIX Machinery" (_IMCHN_D) price index from GFD (1947-2016)	Broad market index (Tokyo SE Dividend Yield (SYJPNYM) from GFD, 1886-1944, 1947-2016)
Korea	"Korea SE Financial Institutions" (_KS49D) index from GFD (1975-1978), "Korea SE Banks" (_KS49D) index from GFD (1979-2016)	Individual bank stocks from various sources (1978-1986), Datastream (1987-2016)	Broad market index (Korea KOPSI SE Stock Price Index (_KS11D) from GFD, 1962-1987), Datastream (1988-2016)	Broad market index (Korea SE Dividend Yield (SYKORYM) from GFD, 1962-1987), Datastream (1988-2016)
Luxembourg	Individual bank stocks from various sources (1871-1929), "Luxembourg SE Banks and Finance" (LUBANKM) index from GFD (1930-1967), Datastream (1992-2016)	Individual bank stocks from various sources (1871-1929, 1947-1968), Datastream (1992-2016)	"Luxembourg SE Miscellaneous" (LUMISCM) price index from GFD (1930-1967), Broad market index (Luxembourg SE LUXX Index (_LUXXD) from GFD, 1968-1991), Datastream (1992-2016)	Broad market index (Datastream: TOTMKLX, 1982-1991), Datastream (1992-2016)
Malaysia	"Malaysia KLSE Financial Index" (_KLFID) from GFD (1969-2016)	Datastream (1985-2016)	"Malaysia KLSE Industrials" (_KLIND) price index from GFD (1969-2016)	Broad market index (Datastream: TOTMKMY, 1973-2016)
Mexico	Individual bank stocks from various sources (1884-1913, 1919-1933), "Mexico Nacional Financiera Bank" (MXBANKSM) index from GFD (1937-1976), Datastream (1988-2016)	Individual bank stocks from various sources (1884-1913, 1919-1976), Datastream (1988-2016)	IMM (1908-1929), "Banco de Mexico Industrials Index" (MXXINDUM) price index from GFD (1930-1944), "Mexico Nacional Financiera Industrials Index" (MXINDUSM) price index from GFD (1945-1976), Broad market index (Mexico SE Indice de Precios y Cotizaciones (_MXXD) from GFD, 1977-1988), Datastream (1989-2016)	IMM (1908-1929), Datastream (1989-2016)
Netherlands	Individual bank stocks from various sources (1873-1929), "Netherlands ANP-CBS Banks and Insurance" (NLDBKINM) index from GFD (1928-1971), "Netherlands CBS Banks" (NLBNKPRD) index from GFD (1972-2003), Baron-Xiong (2003-2016)	Individual bank stocks from various sources (1873-1927), Baron-Xiong (1928-2016)	Broad market index (JST, 1891-1919, and Netherlands All-Share Price Index (_AAXD) from GFD, 1891-1962), "Netherlands CBS Industrials Index" (NLINDD) price index from GFD (1963-1989), Datastream (1990-2016)	Broad market index (imputed from total returns from GFD: _AAXRD, 1951-1968, and Netherlands SE Dividend Yield (SYNLDYAM) from GFD, 1950-1989), Datastream (1990-2016)
New Zealand	Individual bank stocks from various sources (1870-1965, 1980-1992), Datastream (1998-2016)	Individual bank stocks from various sources (1870-1929, 1980-1992), Datastream (1998-2016)	IMM (1881-1913), Broad market index (New Zealand SE 40 Share Index (_NZ40D) from GFD, 1927-2016)	IMM (1881-1913), Broad market index (Datastream: TOTMKNZ, 1984-2016)

Table B2: Data sources: Annual equity variables (cont.)

	Yearly bank stock prices	Yearly bank stock dividends	Yearly nonfinancial stock prices	Yearly nonfinancial stock dividends
Norway	"Oslo SE Finance (Banks and Insurance) TR Index" (_FINXD) from GFD (1915-1986), Baron-Xiong (1987-2016). Note these are all total returns.	Norges Bank index (implied from differencing total returns and price returns, 1920-1935), Datastream (1986-2016)	"Oslo SE Industrials TR Index" (_NOSID) Total Return price index from GFD (1914-1981), Datastream (1982-2016)	Datastream (1982-2016)
Peru	Individual bank stocks from various sources (1870-1881, 1912-1926), "Lima SE Banks" (_LMBFIND) index from GFD (1927-1993), Datastream (1994-2016)	Individual bank stocks from various sources (1870-1881, 1912-1958), Datastream (1994-2016)	"Lima SE Industrials" (_LMINDD) price index from GFD (1938-2016)	Broad market index (1993 - 2016)
Philippines	"Manila SE Finance Index" (_PSFID) from GFD (1952-1981), Datastream (1989-2016)	Datastream (1989-2016)	"Philippine SE Industrial Index" (_PSIND) price index from GFD (1953-2012), Datastream (2013-2016)	Broad market index (Datastream: TOTMKPL, 1982-2012), Datastream (2013-2016, INDUSPL)
Portugal	Individual bank stocks from various sources (1921-1938), "Portugal Banks" (PTBANKSM) index from GFD (1939-1959) "Portugal Credit and Insurance" (PTCREDIM) index from GFD (1960-1987), Datastream (1988-2016)	Individual bank stocks from various sources (1921-1931), Datastream (1988-2016)	Broad market index (Oporto PSI-20 Index (_PSI20D) from GFD, 1930-1953, 1983-1989), "Portugal Industrials" (PTINDUSM) price index from GFD (1954-1982), Datastream (1990-2016)	GFD (1954-1982), Datastream (1990-2016)
Russia	Individual bank stocks from various sources (1870-1917), Russia AK&M Bank Index (RUAKMBD) from GFD (1993-1997), Datastream (1997-2016)	Individual bank stocks from various sources (1870-1917), Datastream (1997-2016)	"Russia St. Petersburg Yale Stock Index" (RUSPSEYM) price index from GFD (1871-1914), Russia AK&M Industrials Index (_AKMED) from GFD (1993-2013), Datastream (2013-2016)	Datastream (1995-2016)
Singapore	Individual bank stocks from various sources (1966-1969), "Singapore SES Finance" (_FIAND) Index from GFD (1970-1999), Datastream (2000-2016)	Individual bank stocks from various sources (1966-1986), Datastream (1986-2016)	"Singapore Straits-Times Industrials Index" (SGSS1D) price index from GFD (1965-1998), Datastream (1999-2016)	Broad market index (Singapore SE Dividend Yield (SYSGPYM) from GFD, 1972-1998), Datastream (1999-2016)
South Africa	Individual bank stocks from various sources (1870-1959), "Johannesburg SE Financial" (_JFIND) index from GFD (1960-1985), Datastream (1986-2016)	Individual bank stocks from various sources (1870-1985), Datastream (1986-2016)	IMM (1888-1911), "Johannesburg SE Industrials" (_JIAID) price index from GFD (1912-2002), Datastream (2003-2016)	IMM (1888-1929), Broad market index (Johannesburg SE Dividend Yield (SYZAFYM) from GFD, 1954-2016).
Spain	Individual bank stocks from various sources (1873-1935), "Madrid SE Banking and Finance" (_IBAN_MD) from GFD (1940-2000), Baron-Xiong (2001-2016)	Individual bank stocks from various sources (1873-1935, 1946-1965), Baron-Xiong (1966-2016)	Broad market index (JST, 1870-1920, and Spain Pre-War Stock Index (ESZINDXM) from GFD, 1921-1936, and Madrid SE Index (ESMADM) from GFD, 2012-2016), "Madrid SE Metals" (_IMET_MD) price index from GFD (1941-2001)	Broad market index (Madrid SE Dividend Yield (SYESPYM) from GFD, 1900-1930, 1941-2016)
Sweden	Individual bank stocks from various sources (1890-1901), "Stockholm SX Banks Price" (_SX4010D) index from GFD (1906-2011), Datastream (2012-2016)	Individual bank stocks from various sources (1890-1901), Baron-Xiong (1926-2016)	Broad market index (JST, 1870-1906), "Stockholm SX Industrials Price Index" (_SX20PID) price index from GFD (1907-2011), Datastream (2012-2016)	Broad market index (Stockholm SE Dividend Yield (SYSWEYM) from GFD, 1870-2011), Datastream (2012-2016)
Switzerland	Individual bank stocks from various sources (1870-1929), "SWX ICB Banks Price Index (w/ GFD extension)" (_C8300PD) index from GFD (1930-2016)	Individual bank stocks from various sources (1870-1929), Baron-Xiong (1930-2016)	Broad market index (JST, 1900-1924, and Switzerland Price Index (_SPIXD) from GFD, 2006-2016), "Switzerland SPI Industrials Index" (_SINXD) price index from GFD (1924-2005)	Broad market index (Switzerland Dividend Yield (SYCHEYM) from GFD, 1918-1939, 1966-2016)
Taiwan	Datastream (1987-2016)	Datastream (1987-2016)	Broad market index (Taiwan SE Capitalization Weighted Index (_TWIID) from GFD, 1968-1987), Datastream (1988-2016)	Datastream (1988-2016)
Thailand	"Thailand SET Banks" (_SETBD) index from GFD (1975-1986), Datastream (1987-2016)	Individual bank stocks from various sources (1975-1986), Datastream (1987-2016)	Thailand SET Commerce Index (_SETCD) from GFD (1976-2016)	Broad market index (Datastream: TOTMKTH, 1976-2016)
Turkey	Individual bank stocks from various sources (1870-1939, 1965-1985), Datastream (1986-2016)	Individual bank stocks from various sources (1870-1931), Datastream (1986-2016)	Broad market index (Istanbul SE IMKB-100 Price Index (_XU100D) from GFD, 1986-2016)	Broad market index (Datastream: TOTMKTK, 1986-2016)

Table B3: Data sources: Monthly variables

	Monthly bank stock returns	Monthly nonfin stock returns	Monthly bank credit spreads	Monthly corp credit spreads
Notes:	Note that Datastream is given priority for the monthly data over other GFD, given that Datastream is a total returns index, whereas the GFD indexes are price indexes. In general, a total returns monthly index is given priority over a price return index, whenever possible.			
Argentina	Nakamura-Zarazaga index (1900-1935, quarterly), Datastream (1993-2016)	Nakamura-Zarazaga index (1900-1935, quarterly), Datastream (1993-2016)	Argentina BAIBAR Overnight Interbank (IMARGD) from GFD (1990-2016), relative to Argentina Reserve Bank Discount Rate (IDARGD) from GFD (1990-2002) and Argentina 3-month BCRA Treasury Auction Yield (ITARG3D) from GFD (2002-2016)	
Australia	"S&P/ASX 200 Banking Index" (_AXBAJD) from GFD (1875-2016)	"Sydney SE Industrial and Commercial" (AUINCM) price index from GFD (1883-1980), "Australia ASX All-Industrials" (_AAIID) price index from GFD (1981-2002), Datastream (2003-2016)	Australia 3-month Interbank Rate (IBAUS3D) from GFD (1987-2016), relative to Australia 3-month Treasury Bill Yield (ITAUS3D) from GFD	Australia Corporate Bond Yield (INAUSW) from GFD (1983-2016), relative to Australia 10-year Government Bond Yield (IGAUS10D) from GFD
Austria	"Austria National Bank Banks Index" (ATBBANKM) from GFD (1922-1933), "Austria 6 Bank and Insurance Stocks" (ATWBANKM) index from GFD (1969-1980), Datastream (1986-2016)	"Austria National Bank Industrials Index" (ATINDUM) price index from GFD (1921-1934), Datastream (1973-2016)	Austria 3-month VIBOR (IBAUT3D) from GFD (1990-2001), relative to Austria 3-month (ITAUT3M, 1960-1980) and 1-year (IGAUT1D, 1980-2001) Treasury Bill Rate from GFD. EURIBOR (IBEUR3D) relative to German T-Bill (IBEUR3D minus ITDEU3D), from GFD (2002-2016)	
Belgium	Monthly bank stock index data provided by Frans Buelens (1867-1873, 1922-1936), "Belgium INS Finance and Insurance" (BEFININM) index from GFD (1934-1973), Datastream (1973-2016)	Monthly nonfin stock index data provided by Frans Buelens (1867-1873, 1922-1936), Datastream (1973-2016)		Belgium Non-Financial Company Bond Yields (INBELW) from GFD (1960-2016), relative to Belgium 10-year Government Bond Yield (IGBEL10D) from GFD
Brazil	Datastream (1994-2016)	Datastream (1994-2016)	BRAZILIAN INTERBANK RATE (BRIBCDI) from Datastream (2004-2016), relative to Brazil 3-month Treasury Bill Yield (ITBRA3D) from GFD	
Canada	"Canada S&P/TSX Banks" index from GFD (1915-1972), Datastream (1973-2016)	"Canada Investor's Index Industrials" (CAIINDUM) price index from GFD (1915-1935), Datastream (1973-2016)	Canada 3-month Interbank Rate (IBCAN3D) from GFD (1990-2016), relative to Canada 3-month Treasury Bill Yield (ITCAN3D) from GFD	Canada Long-term Corporate Bond Yields (INCANLTW) from GFD (1948-2016), relative to Canada 10-year Government Bond Yield (IGCAN10D) from GFD.
Chile	"Chile BEC Finance Index" (_FINANCD) price index from GFD (1927-1989), Datastream (1989-2016)	"Chile BEC Industrials Index" (_INDUSTD) price index from GFD (1927-1989), Datastream (1989-2016)	Chile Interbank Rate (IBCHLD) from GFD (1986-2016), relative to Chile Time Deposit Rate (ICCHLTD, 1976-1996) and Chile 3-month Nominal T-bill Auction Yield (ITCHL3D, 1997-2012) from GFD	
Colombia	Bogota SE Banks Index (COBBANKM) from GFD (1937-1971), "Colombia IBOMED Financial Sector" (_IBMFDC) price index from GFD (1923-1993), Datastream (1993-2016)	"Bogota SE Industrials (old)" (COBINDUM) price index from GFD (1928-1942), "Colombia IBOMED Industrials" (_IBMID) price index from GFD (1968-1998), Datastream (1998-2016)	Colombia TBS Interbank Rate (IBCOLD) from GFD (1998-2016), relative to Colombia 3-month Treasury Bill Yield (ITCOL3W, 1998-2016) from GFD	
Czech	"Czechoslovakia Banks Index" (CZBANKSM) price index from GFD (1919-1938), Datastream (1994-2016)	Czechoslovakia Industrials and Transports (CZINDTRM) from GFD (1919-1937), Datastream (1993-2016)	Czech Republic 3-month PRIBOR (IBCZE3D) from GFD (1992-2016), relative to Czech Republic 3-month Treasury Bill Yield (ITCZE3D) from GFD	

Table B3: Data sources: Monthly variables (cont.)

	Monthly bank stock returns	Monthly nonfin stock returns	Monthly bank credit spreads	Monthly corp credit spreads
Denmark	same as yearly	same as yearly	Denmark 3-month Interbank Rate (IBDNKDD) index (1998-2014) relative to Denmark 3-month Treasury Bill Yield (ITDNK3D) from GFD	Denmark Corporate Bond Yield (INDNKEW) from GFD (1939-2011), relative to Denmark 10-year Government Bond Yield (IGDNK10D)
Egypt	Datastream (1996-2016)	Datastream (1996-2016)	Egypt Interbank Lending Rate (IBEGYD) from GFD (2001-2016), relative to Egypt 3-month Treasury Bill Yields (ITEGY3D) from GFD	
Finland	OMX Helsinki Banks Price Index (_HX4010D) from GFD (1934-2008), Datastream (2009-2016)	"Finland Unitas Industrials Index" (FIUINDUD) price index from GFD (1933-1991), Datastream (1988-2016)	EURIBOR (IBEUR3D) relative to German T-Bill (IBEUR3D minus ITDEU3D), from GFD (2002-2016)	
France	same as yearly	same as yearly	France 3-month Interbank Rate (IBFRA3D) from GFD (1969-2001) relative to Deposit Rate (IDFRAD) from GFD. EURIBOR (IBEUR3D) relative to German T-Bill (IBEUR3D minus ITDEU3D), from GFD (2002-2016)	
Germany	same as yearly	same as yearly	Germany 3-month Interbank Rate (IBDEU3D) from GFD (1959-2001), and EURIBOR (IBEUR3D) from GFD (2002-2016), relative to German T-Bill (ITDEU3D)	Corporate bond index from "Statistisches Jahrbuch für das Deutsche Reich" (1929-1934), Germany Corporate Bond Yield (INDEUD) from GFD (1958-2016), all relative to German 10-year Government Bond (IGDEU10D)
Greece	"FTSE/Athex Banks Index" (_FTATBNK) index from GFD (1978-1990), Datastream (1990-2016)	"FTSE/Athex Industrial Goods and Services" (_FTATIND) index from GFD (1952-1988), Datastream (1988-2016)		
Hong Kong	Datastream (1973-2016)	Datastream (1973-2016)	Hong Kong 1-month HIBOR (IBHKG1D) from GFD (1982-2016), relative to Hong Kong 3-month Time Deposits (ICHKGTM, 1971-1991) and Hong Kong 3-month Treasury Bill Yield (ITHKG3D, 1991-2016) from GFD	
Hungary	Datastream (1994-2016)	Datastream (1997-2016)	Hungary 3-month BUBOR (IBHUN3D) from GFD (1991-2016), relative to Hungary 3-month Treasury Bill Yield (ITHUN3D) from GFD	
Iceland	Datastream (1999-2016)	Datastream (1993-2016)	Iceland 3-month REIBOR (IBISL3D) from GFD (1970-2016), relative to Iceland 3-month Treasury Bill Yield (ITISL3D) from GFD	
India	Datastream (1990-2016)	Datastream (1990-2016)	India 3-month MIBOR (IBIND3D) from GFD (1998-2016), relative to India 3-month Treasury Bill Yield (ITIND3D) from GFD	
Indonesia	Datastream (1990-2016)	Datastream (1993-2016)	Indonesia Overnight Interbank Rate (IMIDND) from GFD (1985-2016), relative to Indonesia Treasury Bill Yield (ITIDN3M, 2000-2008) and Indonesia 6-month Treasury Bond Yield (ITIDN6D, 2009-2016) from GFD	

Table B3: Data sources: Monthly variables (cont.)

	Monthly bank stock returns	Monthly nonfin stock returns	Monthly bank credit spreads	Monthly corp credit spreads
Ireland	Datastream (1973-2016)	Datastream (1973-2016)	Ireland 3-month Interbank Rate (IBIRL3D) from GFD (1978-2001), relative to Ireland 3-month Treasury Bill Yield (ITIRL3M) from GFD. EURIBOR (IBEUR3D) relative to German T-Bill (IBEUR3D minus ITDEU3D), from GFD (2002-2016)	
Israel	"Tel Aviv SE Commercial Banks" (ILTLVBD) from GFD, (1973-1993), Datastream (1993-2016)	"Tel Aviv SE Industrial and Manufacturing" (ILTLVND) from GFD (1966-1993), Datastream (1993-2016)	Israel 3-month TELBOR (IBISR3D) from GFD (1969-2016), relative to Israel 3-month Treasury Bill Yield (ITISR3D) from GFD	
Italy	Individual bank stocks from L'Economista (1884-1894) and Corriere newspaper (1884-1894, 1904-1934). Datastream (1973-2016)	Individual nonfinancial stocks from L'Economista (1884-1894) and Corriere newspaper (1884-1894, 1904-1934). Datastream (1973-2016)	Italy RIBOR 3 months (IBITA3D) from GFD (1971-2001), relative to Italy 3-month Treasury Bill Yield (ITITA3D) from GFD. EURIBOR (IBEUR3D) relative to German T-Bill (IBEUR3D minus ITDEU3D), from GFD (2002-2016)	
Japan	Individual bank stocks from various sources (1897-1931). Datastream (1973-2016)	Individual nonfinancial stocks from various sources (1897-1931). Datastream (1973-2016)	Japan 3-month TIBOR (IBJPN3D) from GFD (1979-2016), relative to Japan 3-month Treasury Bill Yield (ITJPN3D) from GFD	Japan Corporate Bond Yield (INJPNW) from GFD (1933-2016), relative to Japan 10-year Government Bond Yield (IGJPN10D) from GFD
Korea	"Korea SE Banks" (_KS51D) from GFD (1979-1987), Datastream (1987-2016)	"Korea SE Manufacturing" (_KS55D) from GFD (1980-1987), Datastream (1987-2016)		
Luxembourg	Datastream (1992-2016)	Datastream (1992-2016)	Luxembourg Interbank Offer Rate (IBLUXM) from GFD (1990-2001), relative to Luxembourg 3-month Time Deposit Rate (ICLUXTM) from GFD. EURIBOR (IBEUR3D) relative to German T-Bill (IBEUR3D minus ITDEU3D), from GFD (2002-2016)	Luxembourg Industrial Bonds (LUBINDM) from GFD (1963-2016), relative to Luxembourg Government Bonds (IGLUX10D) from GFD
Malaysia	"Malaysia KLSE Financial Index" (_KLFID) from GFD (1969-1986), Datastream (1986-2016)	“Malaysia KLSE Industrials” (_KLIND) price index from GFD (1969-1986), Datastream (1986-2016)	Malaysia 3-month KLIBOR (IBMYS3D) from GFD (1994-2016), relative to Malaysia 3-month T-bill Discount Rate (ITMYS3D) from GFD	
Mexico	Datastream (1989-2016)	Datastream (1989-2016)		
Netherlands	Individual bank stocks from various sources (1890-1934). "Netherlands ANP-CBS Banks and Insurance" (NLDBKINM) index from GFD (1928-1971), Datastream (1973-2016)	Individual nonfinancial stocks from various sources (1890-1934). "Netherlands ANP-CBS Consumer Goods" (NLDCONSM) from GFD (1931-1973), Datastream (1973-2016)		
New Zealand	Datastream (2010-2016)	Datastream (1994-2016)	New Zealand 6-month Interbank Rate (IBNZL6D) from GFD (1990-2013) and NZ INTERBANK RATE - 3 MONTH (NZINTER3) from Datastream (2013-2016), relative to New Zealand 3-month Treasury Bill Yield (ITNZL3D) from GFD	
Norway	“Oslo SE Finance (Banks and Insurance) TR Index” (_FINXD) from GFD (1915-1990), Datastream (1990-2016)	“Oslo SE Industrials TR Index” (_NOSID) Total Return price index from GFD (1914-1980), Datastream (1980-2016)	Norway 3-month OIBOR (IBNOR3D) from GFD (1978-2016), relative to Norway 3-month Treasury Bill Yield (ITNOR3D) from GFD	Norway 10-year Industrial Bond Yield (INNOR10D) from GFD (1921-2003), relative to Norway Government Bonds (IGNOR10D) from GFD
Peru	"Lima SE Banks" (_LMBFIND) index from GFD (1927-1993), Datastream (1994-2016)	“Lima SE Industrials” (_LMINDD) price index from GFD (1938-1991), Datastream (1991-2016)		

Table B3: Data sources: Monthly variables (cont.)

	Monthly bank stock returns	Monthly nonfin stock returns	Monthly bank credit spreads	Monthly corp credit spreads
Philippines	"Philippines Banks" (PHBANKM) from GFD (1952-1981), "Philippines Finance" (PHFINM) from GFD (1981-1989), Datastream (1989-2016)	"Philippine SE Industrial Index" (_PSIND) price index from GFD (1953-1990), Datastream (1990-2016)	Philippines Interbank Overnight Rate (IMPHLD) from GFD (1982-2016), relative to Philippines 3-month Treasury Bill Yield (ITPHL3D) from GFD	
Portugal	Datastream (1990-2016)	Datastream (1990-2016)	Portugal Overnight Interbank Rate (IMPRTD, 1975-1983) and 3-month LISBOR (IBPRT3D, 1983-2001) from GFD, relative to Portugal 3-month Treasury Bill Yield (ITPRT3M, 1985-1988) and 6-month Treasury Bill Yield (ITPRT6D, 1989-2001) from GFD. EURIBOR (IBEUR3D) relative to German T-Bill (IBEUR3D minus ITDEU3D), from GFD (2002-2016)	
Russia	Russia AK&M Bank Index (RUAKMBD) from GFD (1993-1997), Datastream (1997-2016)	Russia AK&M Industrials Index (_AKMED) from GFD (1993-2013), Datastream (2013-2016)	Russia MIACR Overnight Interbank Rate (IMRUSD) from GFD (1992-2016), relative to Russia 3-month Treasury Bill Yield (ITRUS3D) from GFD	Russia Corporate Bonds Average Yield (INRUSXD) from GFD (2003-2016), relative to Russia 10-year Bond Yield (IGRUS10D) from GFD
Singapore	Datastream (1973-2016)	Datastream (1973-2016)	Singapore 3-month SIBOR (IBSGP3D) from GFD (1973-2016), relative to Singapore 3-month Treasury Yield (ITSGP3D) from GFD	
South Africa	"FTSE/JSE Africa Banks" (_JBANKD) index from GFD (1979-1985), Datastream (1986-2016)	"Johannesburg SE Industrials" (_JIAID) price index from GFD (1912-1973), Datastream (1973-2016)	South Africa 3-month JABIR (IBZAF3D) from GFD (1997-2016), relative to South Africa 3-month Treasury Bill Yield (ITZAF3D) from GFD	South Africa Eskom Corporate Bond Yield (INZAFD) from GFD (1953-2016), relative to South Africa 10-Year Bond Yield (IGZAF10D) from GFD
Spain	Individual bank stocks from various sources (1917-1934, 1974-1980). "Madrid SE Banking and Finance" (_IBAN_MD) from GFD (1940-1987), Datastream (1987-2016)	Individual nonfinancial stocks from various sources (1917-1934, 1974-1980). "Madrid SE Metals" (_IMET_MD) price index from GFD (1941-1987), Datastream (1987-2016)	Spain 3-month MIBOR (IBESP3D) from GFD (1973-2001), relative to Spain 3-month T-Bill Yield (ITESP3D) from GFD. EURIBOR (IBEUR3D) relative to German T-Bill (IBEUR3D minus ITDEU3D), from GFD (2002-2016)	
Sweden	"Stockholm SX Banks Price" (_SX4010D) index from GFD (1906-1982), Datastream (1982-2016)	"Stockholm SX Industrials Price Index" (_SX20PID) price index from GFD (1907-1982), Datastream (1982-2016)	Sweden 3-month Interbank Rate (IBSWE3D) from GFD (1980-2016), relative to Sweden 3-month Treasury Bill Yield (ITSWE3D) from GFD	
Switzerland	Individual bank stocks from various sources (1867-1873, 1907-1934). Datastream (1973-2016)	Individual nonfinancial stocks from various sources (1867-1873, 1907-1934). Datastream (1973-2016)	Switzerland 3-month Interbank Rate (IBCHE3D) from GFD (1973-2016), relative to Switzerland 3-month Treasury-Bill Yield (ITCHE3D) from GFD	Switzerland Industrial Bond Average Yield (INCHEID) and Switzerland 7-10 year AA Corporate Bond Yields (_ZDAA7YD) from GFD (1997-2016), relative to Switzerland 10-year Government Bond (IGCHE10D) from GFD
Taiwan	Datastream (1988-2016)	Datastream (1988-2016)		Taiwan 5-year Corporate Bond Yield (INTWN5M) from GFD (1985-2016), relative to Taiwan 10-year Government Bond Yield (IGTWN10D) from GFD
Thailand	Thailand SET Banks (_SETBD) index from GFD (1975-1986), Datastream (1987-2016)	Thailand SET Commerce Index (_SETCD) from GFD (1976-1993), Datastream (1993-2016)		

Table B3: Data sources: Monthly variables (cont.)

	Monthly bank stock returns	Monthly nonfin stock returns	Monthly bank credit spreads	Monthly corp credit spreads
Turkey	Datastream (1990-2016)	Datastream (1990-2016)	Turkey Overnight Interbank Rate (IMTURD) from GFD (1986-2016), relative to Turkey 1-month Time Deposits (ICTURTM, 1973-2008) and Turkey 1-year Government Bond Yield (IGTUR1D, 2008-2016) from GFD	
United Kingdom	same as yearly	same as yearly	United Kingdom Overnight Interest Rate (IMGBRD) from GFD (1937-1965), United Kingdom 3-month Interbank Rate (IBGBR3D) from GFD (1966-2016); all relative to Bank of England Rate (IDGBRD) from GFD (1870-1899) and 3-month Treasury Bill Yield ITGBR3D (1900-2016)	Great Britain Corporate Bond Yield (INGBRW) from GFD (1937-2016), relative to UK Long-term Government Yield (IGGBR10D) from GFD
United States	same as yearly	same as yearly	United States 3-month Interbank Rate (IBUSA3D) from GFD (1963-2016), relative to USA 3-month Tbill Yield (ITUSA3D)	Moody's AAA Corporate Yield (SPAAA15W) from GFD (1900-2016), relative to USA Long-term Government Yield (IGUSA10D)
Venezuela	"Caracas SE Financial Index" (_IBCFD) index from GFD (1946-1993), Datastream (1994-2016)	“Caracas SE Industrials Index” (_IBCID) price index from GFD (1948-1990), Datastream (1990-2016)	Venezuela Interbank Overnight Rate (IMVEND) from GFD (1998-2016), relative to Venezuela 3-month Treasury Bill Yields (ITVEN3D) from GFD	

Table B4: Data sources: Macroeconomic variables

	Bank Credit	Nominal GDP	Inflation	Unemploym.	Other macro variables (real consumption, investment to GDP, broad money supply, govt debt to GDP, mortgage loans, house prices)
Notes:	**IMF*** means newly transcribed data (not available online) from IMF's International Financial Statistics (print versions), 1937-1988. **GFD** refers to Global Financial Data. **League of Nations** refers to their Memorandum on Commercial Banks (eds. 1929, 1933, 1934, 1936, and 1941) covering the period 1918-1937. **BIS** means the BIS Long Credit Series. **JST** means the Jorda, Schularick, Taylor database. Data from the **World Bank** and **IMF** accessed online on their websites. **Maddison** refers to the Maddison Project Database 2018, with occasional data from Barro and Ursua (2010) and the World Bank, when Maddison data is missing; real GDP figures are converted to Nominal GDP using the inflation data from this data set.				
Argentina	Nakamura (1901-1935), IMF* (1936-1939), BIS (1940-2016)	Maddison (1884-1991), World Bank (1992-2016)	GFD (1870-2016)	GFD (1974-2016)	
Australia	JST (1870-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1901-2016)	JST (1870-2016)
Austria	Rieder (1870-1878), League of Nations (1918-1937), BIS (1949-2016)	Maddison (1870-1937), GFD (1948-2016)	GFD (1870-2016)	GFD (1931-2016)	
Belgium	JST (1885-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1921-2016)	JST (1870-2016)
Brazil	Triner (1906-1930), League of Nations (1931-1939), BIS (1993-2016)	Maddison (1870-1960), World Bank (1961-2016)	GFD (1870-2016)	GFD (1976-2016)	
Canada	JST (1870-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1919-2016)	JST (1870-2016)
Chile	League of Nations (1920-1936), IMF* (1937-1984), BIS (1985-2016)	Maddison (1870-2016)	GFD (1870-2016)	GFD (1966-2016)	
Colombia	League of Nations (1924-1936), IMF* (1937-1959), World Bank (1960-2016)	Maddison (1924-1959), World Bank (1960-2016)	GFD (1870-2016)	GFD (1980-2016)	
Czech	League of Nations* (1919-1937), World Bank (1993-2016)	GFD (1919-1938), World Bank (1990-2016)	GFD (1921-2016)	GFD (1990-2016)	
Denmark	JST (1870-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1910-2016)	JST (1870-2016)
Egypt	IMF* (1945-1959), World Bank (1965-2016)	Maddison (1887-1959), World Bank (1960-2016)	Implied from difference between real and nominal GDP		
Finland	JST (1870-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1958-2016)	JST (1870-2016)
France	JST (1900-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1895-2016)	JST (1870-2016)
Germany	JST (1883-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1887-2016)	JST (1870-2016)
Greece	League of Nations (1918-1936), World Bank (1960-2016)	Maddison (1946-2016)	GFD (1924-2016)	GFD (1976-2016)	
Hong Kong	BIS (1978-2016)	World Bank (1960-2016)	GFD (1948-2016)	GFD (1980-2016)	
Hungary	League of Nations (1925-1936), World Bank (1991-2016)	GFD (1870-1913, 1921-1938), World Bank (1991-2016)	GFD (1870-2016)		
Iceland	IMF* (1951-1959), World Bank (1960-2016)	GFD (1901-1959), World Bank (1960-2016)	GFD (1902-2016)	GFD (1957-2016)	

Table B4: Data sources: Macroeconomic variables (cont.)

	Bank Credit	Nominal GDP	Inflation	Unemploym.	Other macro variables (real consumption, investment to GDP, broad money supply, govt debt to GDP, mortgage loans, house prices)
India	IMF* (1937-1950), BIS (1951-2016)	Maddison (1870-1959), World Bank (1960-2016)	GFD (1871-2016)	GFD (1994-2016)	
Indonesia	IMF* (1951-1987), World Bank (1988-2016)	GFD (1921-2016)	GFD (1926-2016)	GFD (1982-2016)	
Ireland	The Economist (1903-1922), League of Nations (1923-1936), IMF* (1937-1960), World Bank (1961-1994), BIS (1995-2016)	Maddison (1870-2016)	GFD (1870-2016)	GFD (1939-2016)	
Israel	IMF* (1945-1971), World Bank (1972-2016)	GFD (1950-1980), World Bank (1981-2016)	GFD (1923-2016)	GFD (1960-2016)	
Italy	JST (1870-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1947-2016)	JST (1870-2016)
Japan	JST (1875-2016)	JST (1875-2016)	JST (1870-2016)	GFD (1930-2016)	JST (1870-2016)
Korea	IMF* (1953-1961), BIS (1962-2016)	Maddison (1953-2016)	GFD (1949-2016)	GFD (1960-2016)	
Luxembourg	IMF* (1950-1959), World Bank (1960-2016)	Maddison (1950-1959), World Bank (1960-2016)	GFD (1922-2016)	GFD (1983-2016)	
Malaysia	IMF* (1952-1959), World Bank (1960-1964), BIS (1965-2016)	Maddison (1955-2016)	GFD (1949-2016)	GFD (1982-2016)	
Mexico	League of Nations (1925-1936), IMF* (1937-1959), World Bank (1960-2016)	GFD (1895-1979), World Bank (1980-2016)	GFD (1887-2016)	GFD (1975-2016)	
Netherlands	JST (1900-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1911-2016)	JST (1870-2016)
New Zealand	Statistics of the Dominion of New Zealand, 1918, vol. III (1870-1918), League of Nations (1918-1939), IMF* (1940-1959), BIS (1960-2016)	Maddison (1870-2016)	GFD (1915-2016)	GFD (1971-2016)	
Norway	JST (1870-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1904-2016)	JST (1870-2016)
Peru	League of Nations (1925-1936), IMF* (1937-1959), World Bank (1960-2016)	GFD (1926-1959), World Bank (1960-2016)	GFD (1900-2016)	GFD (1969-2016)	
Philippines	IMF* (1948-1988), World Bank (1989-2016)	GFD (1946-1959), World Bank (1960-2016)	GFD (1899-2016)	GFD (1980-2016)	
Portugal	JST (1870-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1953-2016)	JST (1870-2016)
Russia	World Bank (1993-2016)	Maddison (1870-1917), World Bank (1993-2016)	GFD (1870-1917, 1990-2016)		
Singapore	BIS (1963-2016)	Maddison (1950-1959), World Bank (1960-2016)	GFD (1949-2016)	GFD (1968-2016)	

Table B4: Data sources: Macroeconomic variables (cont.)

	Bank Credit	Nominal GDP	Inflation	Unemploym.	Other macro variables (real consumption, investment to GDP, broad money supply, govt debt to GDP, mortgage loans, house prices)
South Africa	League of Nations (1918-1936), IMF* (1937-1964), BIS (1965-2016)	Madisson (1911-2016)	GFD (1896-2016)	GFD (1991-2016)	
Spain	JST (1900-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1964-2016)	JST (1870-2016)
Sweden	JST (1871-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1919-2016)	JST (1870-2016)
Switzerland	JST (1870-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1926-2016)	JST (1870-2016)
Taiwan	IMF* (1950-1973)	GFD (1950-2016)	GFD (1896-2016)	GFD (1964-2016)	
Thailand	IMF* (1946-1956), BIS (1957-2016)	GFD (1946-2016)	GFD (1949-2016)	GFD (1980-2016)	
Turkey	League of Nations (1929-1936), IMF* (1937-1950), IMF (1951-1959), World Bank (1960-2016)	Maddison (1950-1959), World Bank (1960-2016)	GFD (1870-2016)	GFD (1985-2016)	
United Kingdom	JST (1880-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1855-2016)	JST (1870-2016)
United States	JST (1880-2016)	JST (1870-2016)	JST (1870-2016)	GFD (1890-2016)	JST (1870-2016)
Venezuela	IMF* (1937-1987), World Bank (1988-2016)	GFD (1901-2016)	GFD (1901-2016)		