Survival of the Biggest: Large Banks and Crises since 1870 *

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Abstract

This paper studies a newly compiled data set of annual balance sheets of more than 11,000 commercial banks across 17 advanced economies since 1870. The new data expose the central role of large banks for credit cycles and financial instability throughout modern financial history and the reorganization of the banking sector in the aftermath of crises. Large banks account for a large and growing share of asset growth during credit booms, take more risks, contract lending more in crises, and suffer higher losses. Yet despite their worse performance, large banks are less likely to fail during crises and *even tend to gain market share*. Our findings are consistent with theories of excessive risk taking by too-big-to-fail institutions and demonstrate how banking sector concentration and financial fragility reinforce one another.

Keywords: banking crises, credit cycles, banking sector concentration
JEL classification codes:

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1. Introduction

Credit cycles and banking crises are recurring phenomena in modern economic history. Understanding their causes and consequences remains an urgent priority for economists. While recent work combining macro-finance and financial history has made important inroads (e.g., Schularick and Taylor, 2012; Mian, Sufi and Verner, 2017; Baron, Verner and Xiong, 2021), the existing literature on credit cycles and financial instability has typically worked either with *aggregate* data over longer time spans (covering many crises), or with bank-level data but only over short windows (focused on a single crisis episode). In this paper we can, for the first time, combine both approaches.

We build a new data set of the annual balance sheets of individual commercial banks since 1870 across 17 advanced economies, comprising more than 11,000 individual banks and more than 216,000 bank-year observations. The data allow us to study credit-cycles and banking crises at the individual bank level over a long time. Using this new data set, our paper aims to push the boundary relative to the recent literature on banking crisis and credit cycles.

The data show a rising concentration in the banking sectors of all 17 economies over the last 150 years. The average share of banking sector assets in a given country held by the largest 5 banks has doubled from 35-40% in the 19th century to more than 70% today. The increase is strongest in countries like the United States that started with a highly fragmented banking system and now have a concentrated banking system; other countries like Canada have banking systems that were already highly consolidated at the end of the 19th century. At the same time, we find that the persistence of large banks is very high. A bank among the largest five in a country is likely to remain one of the top-5 banks ten, fifty, or even over one hundred years later. 37% and 49% of banks that were in the top-5 by country in 1880 or 1910, respectively, remain a top-5 bank today. Large banks are substantially less likely to fail or get acquired than a smaller bank outside the top 5. Importantly, the persistence of top-5 banks over these long horizons is substantially higher than that of nonfinancial firms.

High concentration and persistence raise concerns that large banks in concentrated systems are "too big to fail", giving rise to moral hazard and excessive risk taking due to an implicit government backstop (Flannery, 1998; Stern and Feldman, 2004, Gropp et al., 2014). The evidence we uncover suggests that these concerns may be justified. Measured by their contribution to aggregate credit growth, large banks are at the center of financial boom-bust dynamics in advanced economies. In post-1945 credit booms that precede banking crises, the top-5 banks account for nearly 80% of credit growth during the boom and for 80% of the credit

contraction during and after the crisis. Moreover, their importance to credit fluctuations has grown substantially over time in line with growing concentration of the sector.

The dominance of large banks in driving aggregate credit growth is accompanied by more aggressive risk-taking. We provide evidence that large banks take more risk than smaller banks in the run-up to banking crises, consistent with "too big to fail" concerns. Specifically, we show that during the credit booms preceding banking crises, top-5 banks often go on acquisition booms, a larger fraction of their balance sheet growth is funded with non-deposit short-term liabilities, and their capital ratios decline relative to smaller banks.

To understand risk taking during the crisis in more detail, we collect data on the annual total stock returns of the top-20 banks by country-year (specifically, the subset of those 20 banks that is publicly traded). We show that stock returns of large banks are more negative in crisis episodes, and the contraction of their loan portfolios (excluding acquisitions) is more pronounced than for banks outside the top 5. In other words, large banks are more pro-cyclical, more risk-taking, and more prone to boom-bust dynamics. Moreover, we show that there is a link between large bank concentration and bank performance during crises. A larger top-5 asset share predicts larger declines in stock prices and larger performance differences between large and small banks during banking crises. More concentrated banking systems suffer larger losses during crises. In short, large banks are at the heart of credit cycles and financial instability dynamics.

However, despite their worse performance, large banks tend to gain market shares after crises, measured in terms of their asset or lending share. Comparatively, top-5 banks are considerably less likely to fail. One likely explanation of the reduced failure rate compared to banks outside the top 5 is implicit guarantees or government assistance that prevent creditor runs. The paradoxical finding is that even though large banks tend to have much more pronounced solvency issues, they tend to survive at a substantially higher rate, which likely helps explain the high persistence of top 5 banks described above. Top-5 banks also tend to acquire a substantial number of other smaller failing banks during crises, who might not be protected by implicit guarantees, the net result of which is that the market dominance of the top-5 banks increases after crises, both due to the relatively high failure rate of small banks and the acquisition of smaller banks by top-5 banks. Overall, the asset share of large banks increases in banking crises.

Our work builds on a large literature investigating the causes and consequences of banking crises across history. Aggregate credit cycles have been identified as a key driver of financial instability. Schularick and Taylor (2012) show that an acceleration of credit growth is the

single best predictor of future financial instability. The credit build-up before a financial crisis is a significant indicator of the depth of the subsequent recession (Jordà et al., 2013; Krishnamurthy and Muir, 2017; Mian et al., 2017; Mian and Sufi, 2010). High household and nonfinancial-corporate leverage also has amplifying characteristics in the downturn. Our results highlight that aggregate credit booms and busts are, most of the time, credit booms and bust by a handful of large banks (though with some notable exceptions throughout history in which small banks are most important). The main policy consequence is that macroprudential policy objectives focused on restraining excessive credit growth should primarily target the very largest banks (e.g., countercyclical capital buffers for systemically important institutions).

Our paper also contributes to a literature on bank size and risk. Prior research shows that larger banks tend to take more risk than smaller banks (Boyd and Runkle, 1993; Boyd and Gertler, 1994; Gropp et al., 2011; Huber, 2021) and have higher failure probabilities (De Nicolo, 2001; Nicoló et al., 2004). Prior research has also shown that the banking sector has recently become more concentrated in the US and globally (Berger et al., 1999; Janicki and Prescott, 2006; Fohlin and Jaremski, 2020). Economic theory offers competing channels how banking sector concentration can affect financial stability. On the one hand, a high degree of concentration allows individual banks to be better diversified with lower idiosyncratic risks (Demsetz and Strahan, 1997; Fernholz and Koch, 2017) and might be accompanied by higher charter values that reduce incentives for excessive risk taking (Keeley, 1990). On the other hand, these banks might be perceived as "too-big-to-fail" by regulators and creditors, allowing these banks to take excessive risks. We show that the rise in concentration extends beyond the US and recent decades, is fueled by M&A activity, and is elevated during credit booms and busts. We also find that risk taking during credit booms in the run up to systemic banking crises is higher among large banks suggesting that implicit "too-big-to-fail" guarantees have been a contributor to financial instability across advanced economies and history. Our paper complements Laeven et al. (2016) who study large global banks around the 2007-8 financial crisis and find that the largest banks around this crisis have higher leverage, less deposit funding, are organizationally more complex, and create more systemic risk.

The paper proceeds as follows. Section 2 presents the new dataset. Section 3 outlines long-run trends in banking sector size and persistence. Section 4 presents out main results and Section 5 concludes.

2. New data

At the core of our new dataset is bank-level annual balance sheet information for nearly all commercial banks across 17 advanced economies since 1870, most of which is newly transcribed from a range of archival sources. The dataset also includes information on entries, exits, M&As, and other events (name changes, spinoffs, nationalizations, etc.) needed to trace the lineage of each bank. Finally, the dataset also includes the stock total returns of the 20 largest banks around each banking crisis. We combine this new dataset with prior data on the aggregate bank balance sheets of each country from JRST and with macroeconomic data and banking crisis chronologies from Jordà et al. (2017) (JST henceforth) and Baron et al. (2021) (BVX henceforth).

In this section, we will provide an overview of the sample coverage, data sources, definitions, and accounting conventions used in the construction of our new dataset. The section is accompanied by an extensive Data Appendix that provides additional country-by-country information on the data.

We gather bank balance sheet data for individual banks in 17 advanced economies since 1870, thus covering the same sample of countries as in the Macrohistory Database (Jordà et al., 2017). Keeping the JST country coverage provides us with a rich set of aggregate macroeconomic data that we can combine with the bank-level dataset. The 17 countries are Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

Most of this new bank balance sheet data is newly transcribed, translated, and harmonized from a range of archival sources. While there have been recent efforts by government archivists to make scans of these sources accessible online, most sources are only available in print at specific research libraries or at central bank or government archives for each of the countries. Scanning and transcribing these historical sources required a six-year process that involved the mass scanning of historical documents and records from around the world. We also employed several dozen data-entry contractors and research assistants involved in building the dataset, which was all done by manual data entry, followed by extensive quality-control checks.

The Appendix systematically documents all the sources used for each country and time period. In many countries and time periods, data on individual banks come from records held by central banks, statistical offices, banking associations, and bank regulators. For other countries and time period, data come from periodicals, stock market manuals, and other compendia with annual reports of traded companies that were historically published for many countries. We

are also able to draw from a rich set of previous country specific projects (e.g., Baubeau et al. (2021) on French banks prior to WWII or Natoli et al. (2016) on Italian banks between 1890 and 1973). From the 1990s onward, data is often sourced from commercial data providers. Whenever no other systematic sources for all banks in a given country are available, we turn to information published in individual banks' annual reports, which we gathered from Harvard Business School's Historical Collections and the archives of several central banks around the world. To give the reader a taste of the original sources, Appendix Figure B.1 provides two examples of typical archival sources used in the construction of the dataset. The top panel shows a tabulation of all Canadian joint stock banks in 1900 published each month in the Gazette of the Canadian government. The bottom panel shows pictures from the annual report of Credit Lyonnais in 1905, one of the largest French banks at the time.

The focus of our dataset is on commercial banks. As most of our data comes from supervisory institutions, we therefore follow the regulators' designations of which institutions are commercial banks. In terms of coverage, we have complete coverage of the entire commercial banking system in about half of countries, though we fall short of 100% in other cases (as described in more detail below) due to the incompleteness of some historical sources. For some countries, we also have systematic balance sheet data for savings banks, mortgage banks, cooperative banks, building societies, investment banks, or private banks, which we also use in our analysis when available. However, this individual balance sheet data on other depository institutions besides commercial banks is only available for several but not all countries (see Appendix for details).

We aim to capture the private domestic banking system for each country. The reason is that we want our individual bank data to be able to aggregate to established country-level credit cycle datasets (e.g., from the JST Macrohistory Database or the BIS long credit series) that also cover the private domestic banking system in each country. Thus, our sample also includes domestic commercial bank subsidiaries of foreign banks. For domestically headquartered banks, we always use the highest level of aggregation available and thus use their consolidated balance sheets, which include foreign subsidiaries, since there is often no systematic way to exclude them.

Table 1 lists the average number of banks in each country, in addition to summary statistics of the main variables used in the analysis. The dataset includes more than 11,608 unique bank IDs and 214,671 observations. On average, our dataset includes 265 banks (median 160 banks) per country-year with the average bank remaining in the sample for 48 years (median 41 years). The number of banks differs considerably by country, with some of this variation explained by different banking system structures and some of it due to differences in coverage at the bottom

of the size distribution.

We define a *Large Bank* to mean a top-5 bank by assets as ranked within each country and year. We have placed particular emphasis in the data collection to make sure that, at minimum, the largest 10 banks in each country-year are covered whenever possible; as Table 1 shows, the number of banks is substantially higher than this most of the time. Appendix Figure B.4 compares the coverage of the bank-level data relative to the banking system as a whole, using estimates on total banking sector assets from Jordà et al. (2021) (JRST henceforth). On average, our dataset covers about 75% of banking sector assets in a given year. These aggregate banking statistics include all depository institutions (including savings banks, cooperative banks, etc.), so most of our coverage gaps can be attributed to missing data on savings banks and cooperatives.[1] In some country-years, the sum of individual bank assets exceeds country asset totals from JRST. These deviations are usually due to multinational bank groups with insufficient data to cleanly separate domestic and foreign activity. We redefine total banking sector assets as $max(\sum_i assets_i, total\ assets^{JRST})$ with $\sum_i assets_i$ equal to the sum of individual bank assets whenever appropriate (so that the sum of market share does not exceed 100 percent).

The main balance sheet structure is shown in Table 2. Harmonizing historical balance sheets across countries and time is an inherently difficult exercise. Numerous changes in accounting and reporting standards and detail complicate the construction of consistent data series. We therefore restrict our stylized balance sheet to a few items to guarantee relatively well-defined concepts. The balance sheet structure shown in Table 2 aligns with the aggregate balance sheet compositions of JRST. This allowed us to use their aggregate ratios as benchmark estimates and their underlying sources to guide us through the harmonization of the bank level balance sheet data. A full description of how we classify balance sheet categories can be found in the Appendix.

We combine the main dataset with information on annual (as of December 31) total stock returns (price plus dividend returns) of each listed bank among the top-20 by country in the years around banking crisis episodes (as defined below). The rightmost column of Table B.1

[1] In the United States, our coverage of commercial banks is far from complete: we restrict our analysis to the largest 25 national and New York state banks (determined at the start of each decade) from 1870 to 1929 and follow these institutions over time. The reason for this incomplete coverage is that the U.S. during this period has by far the largest number of banks, and complete coverage of state-chartered banks would require tracking down and digitizing records for all 50 states individually, which is not practically possible. Besides, historical bank-level data for the U.S. has been transcribed and studied extensively by others (Calomiris and Mason, 2003; Fohlin and Jaremski, 2020; Carlson et al., 2022), though not publicly released yet, and our focus is on generating the data for the other 16 countries for which this data has not already been transcribed. For the U.S., we can nevertheless quantify the aggregate contribution of smaller banks by computing the residual between the aggregate banking sector statistics for the U.S. and the sum of the largest banks.

documents for which episodes we were able to find stock prices and dividends. Sources for the bank stock return data for each country are reported in the Appendix.

For all banks in the dataset, we also collect information on entries, exits, M&As, and other events needed to trace the lineage of each bank, link it to predecessor and successor banks, and map the organization of the banking sector over time.[2] We complement the balance sheet data with meta information on a banks' establishment year, the exit year, the reason for the exit (Failure, Merger, Acquisition, Other), other events (name changes unrelated to M&A activity, foreign acquisitions, large spinoffs, nationalizations), and information to link predecessor and successor banks.

In the analysis that follows, we study top-5 banks' contribution to the credit cycle in two samples. The first is the "unconditional" sample that explores the entire dataset, and the second is the "conditional" sample of banking crises that are preceded by a credit boom. The conditional sample is constructed by taking the union of the two banking crisis chronologies of JST and BVX. We then select all of those crises that are preceded by a credit boom, with a credit boom defined as an increase in total bank credit to GDP of 5 percentage points or more, based on data from JST. Table B.1 shows the combined JST and BVX crisis list and which of these episodes are preceded by a credit boom. Finally, we record the year of the credit boom peak to align credit cycles across episodes.

3. The Long-run Evolution of Banking Concentration

In this section, we show two historical trends in our data. First, large-bank concentration has increased over the sample with this trend almost entirely due to M&As (rather than differential rates of organic asset growth, bank entries, or failures). Second, top-5 banks are highly persistent in our sample, in the sense that they are likely to continue to be a top-5 bank ten, or even one-hundred years, later.

[2]Each bank is assigned a unique ID, and we adopt the convention to assign a new bank ID after a "merger," and keep the ID of the acquiring entity in case of an "acquisition." Separating mergers and acquisitions in the historical data is inherently difficult. We classify transactions into mergers and acquisitions based on their names. If a transaction of ownership coincides with a change in the bank name, we classify the transaction as a merger. If the name of one of the predecessor entities is preserved, the combined entity keeps the ID of the acquiring entity. We deviate from this rule whenever historical sources include information that allows us to separate mergers and acquisitions. Figure B.2 shows a schematic example to illustrate the ID assignment in the database. In 1892 the Union Bank of Australasia acquired the Bank of South Australia, preserving its previous ID. In contrast, in 1951 it merged with the Bank of Australasia to form the Australia and New Zealand Bank; in this case, the Australia and New Zealand Bank is assigned a new ID.

3.1. Large bank concentration increased over time and is due to M&As.

We show that large-bank concentration has increased over our sample and this increase is almost entirely due to M&As (rather than organic asset growth, bank entries, or failures). This result can be seen in Figure 1. Panel A shows the size of banking system assets relative to GDP broken down into the top-5 banks and all other banks. The left plot in panel A shows averages across 17 advanced economies and the right plot shows data for the United States. We calculate the size of the "other banks" as the difference between top-5 bank assets and total banking system assets to deal with missing data at the bottom of the distribution in some countries. (Figure A.1 provides a more detailed breakdown of asset shares by bank size groups over time averaged across all countries, and Figure B.5 provides the same information by country.)

From panel A, one can see that for all countries (left plot), the assets-to-GDP of the top-5 banks and other banks has increased over time, diverging sharply after around 1990. Even for the United States (right plot), which is the country in our sample in which the top-5 banks historically have had the least asset share, we see a large increase starting around 1990, in which the top-5 banks overtake the asset share of all the other banks.

We next show that the increase in large-bank concentration is due almost entirely to M&As (rather than organic asset growth, bank entries, or failures). Panel B provides an estimate of the role that M&A activity played in the evolution of banking sector concentration over the last 150 years. The blue line shows the average market share of the largest 5 banks in each country. The red line shows how market shares would have evolved absent of M&A activity by extrapolating total assets of the two predecessor banks forward using the asset growth rate of the successor entity. Since, in this calculation, the combined assets of the two counterfactual entities sum to the total asset of the actual successor bank in all years, banking sector totals are unaffected.

From panel B, one can see that in the counterfactual without M&As (red line), the asset share of the top-5 banks would have remained relatively constant at around 0.4 across the entire sample. In contrast, with M&As, the asset share of the top-5 banks has increased from around 0.4 in 1870 to around 0.7 today, with prominent M&As waves in the 1910-1930 period and the 1990-2010 period. These two M&As waves are documented in Appendix Figure A.6: the left-hand panel shows the time evolution of acquired assets, and the right-hand panel shows the number of M&As with a target bank having assets exceeding 10% of banking sector assets.

3.2. Large banks are highly persistent

Next, we show that top-5 banks are highly persistent in our sample, in the sense that they are likely to continue to be a large bank later and are substantially less likely to exit, compared to smaller banks.

To see this, 2 shows transition probabilities between bank size ranks over future one-year (left plot) and ten-year intervals (right plot). We code a transition to exit if an observation is the last for a bank in the database and if the banks recorded resolution year is within the next three years. For banks with unknown resolution years, we treat the end of data as their exit year. Note that banks can exit the dataset for several reasons: failure, being acquired (by far the most common reason, see Appendix Figure A.5), or other reasons (e.g., incompleteness of our dataset, change of regulatory classification).

Figure 2 shows that banks in the top-5 have a 94% likelihood of remaining in the top 5 after one year and a 73% likelihood after ten years. Even if they fall in ranking to outside the top 5, the likelihood of top-5 banks remaining in the top-10 banks is 98 % after one year and 84% after ten years.

The likelihood of exiting increases sharply, as one goes down the size ranking. Top-5 banks have a 1.25% and 13.6% likelihoods of exiting in the subsequent one or ten years, respectively, while the likelihoods increase monotonically to 4% and 36% for banks outside the top 100. Appendix Figure A.7 shows transition probabilities for longer horizons, confirming the high long-run persistence of top 5 banks.

The main takeaway is that large banks are likely to stay large banks and are substantially less likely to fail or be absorbed. To see this more dramatically, Table A.1 reports the largest three banks in each country in 1910, 1960, and 2020. From 1910 to 2020, a large number of banks in the top 3 in 1910 are still in the top 3 today (or represent the same principal institution after a merger or name change) including: Bank of New South Wales in Australia (which changed its name in 1982 to Westpac, shortly after acquiring the Commercial Bank of Australia); Royal Bank of Canada in Canada; Den Danske Bank in Denmark (called Den Danske Landmandsbank until a name change 1976); Societe Generale in France; Deutsche Bank in Germany, Schweizerische Kreditanstalt (Credit Suisse) and Schweizerischer Bankverein (UBS) in Switzerland; Lloyds Bank in the U.K., and National City Bank (Citigroup) in the U.S.

To study the relative persistence of banks and nonfinancials we complement our main dataset with statistics of the largest banks and nonfinancial corporations in each country at

benchmark years. Panel B of Figure A.7 shows that banks' persistence among the top 5 (top 20) in a country is significantly higher than that of nonfinancials. For example, only 11.4% (21.4%) of the largest 5 (20) nonfinancials by country in 1910 are still among the largest 5 (20) firms by country in 2020. In contrast about 50% of the largest banks in 1910 are still among the largest 5 banks today. Appendix Table A.2 provides additional detail on the persistence of banks and nonfinancials including statistics on their relative exits by bankruptcies and acquisitions for these benchmark years.

4. Main results

In this section, we show the following four main results. First, top-5 banks account for a large and rising share of aggregate fluctuations in banking sector credit and assets. Second, top-5 banks tend to take more risk during the credit booms preceding banking crises (relative to non-top-5 banks), along the following dimensions: a) they often go on acquisition booms, b) see the share of safe assets on their balance sheets fall, and c) finance a larger fraction of their balance sheet growth with non-deposit short-term funding. Third, top-5 banks tend to do worse during crises, as their share prices fall more during crises and they have lower organic credit growth rates. Fourth, even though top-5 banks tend to have more pronounced solvency issues during crises, they are less likely to fail and gain asset share, both due to their higher survival rate and by acquiring their smaller competitors.

4.1. Large banks dominate the credit cycle

We show our first main result that the top-5 banks by country account for a large and rising share of aggregate credit fluctuations, especially in the period after the Second World War.

Why do top-5 banks dominate the credit cycle? During the credit booms, we show that the main reason for top-5 banks' large contribution to credit growth is simply that they are large to begin with; that is, they make up a large and increasing loan share of the banking system, and their contribution to credit growth during a boom is roughly in line with their loan share. However, in subsection IV.D, we will also find this is true because top-5 absorb a lot of smaller banks during credit booms, further expanding the size of the balance sheets of the top-5 banks.

During the credit busts after banking crises, large banks account for nearly all the nominal credit contraction (as banks outside the top 5 have roughly zero percent nominal credit growth after banking crises).

We establish our first main result in two ways. First, in an "unconditional" analysis over the entire sample, we show that the growth contribution of the top-5 banks to credit cycles (i.e. the share of variation in aggregate credit that can be explained by credit growth of the top-5 banks) has increased from around 25% in the late nineteenth century to around 70% since the 1990s. Second, conditioning on banking crises that are preceded by credit booms, we show that the loan growth of the top-5 banks contributes roughly 70% of total credit growth during credit booms in the post-1945 period. And, as mentioned above, large banks account for nearly all the nominal credit contraction after banking crises.

The second analysis, while limited to a selected sample, has several advantages over the "unconditional" first analysis. First, we can better understand the credit booms and busts that are associated with the sharp and severe macroeconomic consequences of banking crises (as opposed to the milder credit cycles during "normal recessions"). Second, and perhaps more importantly, there are key data advantages, in the sense that, by focusing on specific events, we can develop a highly detailed and accurate database of all the M&A, entries, failure, spinoffs, and other important events in the sample. In addition to allowing us to trace the reorganization of the banking industry during credit booms and crises, we need this information to avoid inaccurate estimates of credit growth by individual banks. For example, the acquisition of a small bank by a large bank may naively look like a surge in loan growth among large banks and a reduction in the aggregate loan portfolio of small bank. We discuss below how we construct comprehensive data on every entry, exit, and related event and how we adjust our measurement of credit growth within bank size categories to avoid such inaccurate estimates.

4.1.1 Analysis across the entire sample

Figure 3 shows the top-5 banks' contribution to the credit cycle in our full-sample analysis. We can decompose aggregate growth as follows:

$$g^{aggregate} = g^{large} * MShare_{t-1}^{large} + g^{small} * MShare_{t-1}^{small},$$

here g^{large} and g^{small} are the weighted average asset growth rates of large and small banks and $MShare_{t-1}^{large}$ and $MShare_{t-1}^{small}$ are their corresponding lagged market shares. This decomposition allows us to decompose aggregate asset growth into the share that can be accounted for by large banks and treat the remainder as a small bank residual. We use M&A adjusted growth rates when constructing the large bank contribution to separate organic from inorganic growth (see section 2 for more detail) .

Figure 3, panel A, illustrates how the growth contribution of the top-5 banks is calculated in two countries - Canada (left-hand plot) and the United States (right-hand plot). The solid navy blue lines show aggregate 5-year real asset growth and the light blue bars show the share of the overall growth accounted for by top-5 banks. Large banks have always accounted for a large share of the aggregate growth dynamics in Canada, while their role in the United States was negligible early on. However, the plot for the United States also shows that the contribution of the largest 5 banks has risen over the last decades.

Panel B quantifies the growth contribution of the top-5 banks over time (left plot), across countries (right plot) and over time and across countries (bottom plot). To collapse annual growth contributions into one average, we regress the top-5 growth contribution on aggregate asset growth using centered ±10-year rolling windows (left plot), country level data (right plot) and three sample periods within each country (bottom plot).

The main result from the left plot of panel B is that the growth contribution of the top-5 banks to credit cycles has increased from around 25% in the late nineteenth century to around 60% since the 2000s. The right plot of Panel B displays the growth contribution of the top-5 banks by country, showing that there is a large variation in the average growth contribution across countries. While the average growth contribution is around 0.4, results differ across countries. Some countries (like Canada and Sweden) have historically been "large bank countries" with the average growth contribution over time of almost 0.7. On the other extreme, other countries (like Germany and the U.S.) are "small bank countries" and have historically had growth contributions around 0.05. Finally, Panel C shows that the increase in the growth contribution of the top-5 banks is a cross-country phenomenon. Across countries the contribution of large banks has risen when comparing the three sample periods, with some of the largest increases observed in countries starting from a low base.

4.1.2 Analysis conditional on banking crises

Next, conditioning on banking crises that are preceded by credit booms, we show that the loan growth of the top-5 banks contributes roughly 70% of total credit growth during credit booms in the post-1945 period. After banking crises, large banks account for nearly all the nominal credit contraction.

Figure 4 plots the contribution, by banks of different sizes, to the credit booms and busts around banking crises. Specifically, the figure shows an event study created by averaging across episodes (within the 1870-1945 subsample, top, and the 1946-2020, bottom), where the

episodes are the combined set of JST and BVX banking crises that are preceded by credit booms (see Table B.1). Within each episode, banks are ranked by asset size at each time t-1; then, the change in total loans (from t-1 to t) is aggregated across all banks within each bank-size category and normalized by GDP_{t-1}.

More specifically, Figure 4 is constructed by first plotting similar plots for each individual episode (shown in Figure A.2), where loan growth in each year is decomposed by bank size. At the individual episode level, it is important to adjust for M&A, entries, failure, spinoffs, and other important events, to avoid inaccurate estimates of credit growth by individual banks. For example, the acquisition of a small bank by a large bank may naively look like a surge in loan growth among large banks and a reduction in the aggregate loan portfolio of small bank.

To make these adjustments, we split our data into two samples, the pre 1945 episodes and the post 1945 episodes. For the pre 1945 episode, we only adjust the data for M&A activity.[3]. For the post 1945 episodes we do a number of additional adjustments in a way that is not feasible on the entire sample. We systematically examine all bank-level entry and exit events from the database, which we use to create a comprehensive database of all M&As, entries, failures, spinoffs, and other corporate transactions.[4] Specifically, we take the set of all entries and exits and code the underlying reason, based on historical research of each instance, which we then document in the database. Entries are coded as "new entries", "M&As" (e.g., two banks combining into one new entity), "spinoffs", and "false entries" (e.g., name changes, cases in which data was previously unavailable). Exits are similarly coded as "failures" (which includes judicial bankruptcies and resolutions, nationalizations, etc.), "purchase and assumptions" (a "failure" or near-failure that is absorbed by another bank in the database), "M&As" (all transactions other than purchase and assumptions), and "false exits." For each M&A transaction, the names of the targets and acquirers of M&As are coded, which allows us link the pre- and post-merger entities in the database.

As a result, we can separate out organic loan growth from changes in the size of loan portfolios arising from entries, failures, M&As, and other corporate transactions. We use this

[3]That is, if bank A in our database is absorbed by bank B, we make sure that the growth of bank B is adjusted for by the size of bank A.

[4]In addition, to make sure we are not missing other unusual types of events, we also investigate all one-year changes in loan growth of more than ±10% at the bank level, which indicate potential discontinuities. While, in theory, all entries and exits into the database would reveal all M&As, entries, and failures, this may not be true in practice—for example, if an acquired entity (or spun-off entity) is missing from the database or if either the target or acquirer is a foreign firm or domestic nonbank firm. We therefore also investigate all bank-level one-year changes in loan growth of more than ±10% and, for each such observation, read historical annual reports of the company, Moody's Manuals on Banking, and other historical documents for each of these observations to code any other M&As, entries, failures, and spinoffs that may have been missed.

database to adjust for discontinuities in the aggregate credit growth of bank-size groups, which would otherwise lead to large inaccurate estimates of credit group by bank-size groups.[5] We also adjust for a variety of other data quality and accounting issues, which are all systematically documented in our transactions database.[6]

The point of emphasizing the above steps is to show, that by going carefully through each banking crisis episode individually in Figure A.2, we can comprehensively make all these needed adjustments, in a way that is not feasible on the entire sample, which would be too time-consuming. After these adjustments, we plot $\Delta_{t-1,t}(loans)/GDP_{t-1}$ over time for each individual banking crisis episode that is also preceded by a credit boom. See Figure A.2. We then take a simple across episodes to form the event study plotted in Figure Figure 4. (We adjust t = 0 for each of the episodes so that the peak of the credit boom occurs at t = 0, see Table B.1, thus making the timing of the credit boom and bust generally synchronous across the events that we average.)

Figure 4 shows that, in the post-1945 period, the top-5 banks contribute roughly 70% of total credit growth during credit booms. After banking crises, large banks account for nearly all the nominal credit contraction.

Thus, we conclude that the top-5 banks dominate the credit cycle in the post-1945, in the sense that their net new lending makes up a majority of aggregate booms and nearly all the credit contractions after crises. As we will see, the latter result about credit contractions is related to the fact that the top-5 banks do worse after crises, according to two key metrics, as we discuss in the next subsection.

4.2. Top-5 banks take more risk before banking crises

The previous section has shown that that credit fluctuations in advanced economies is predominately accounted for by a handful of large banks. We now explore the behavior of large and small banks in the run-up to banking crises in more detail. We find that these episodes are characterized by high risk taking of top-5 banks.

[5]For example, if two medium banks merge to form a large bank, then it naively appears as if medium banks see an aggregate reduction in their loan portfolios, while the aggregate portfolio of large banks would see a gain. Alternatively, if a large bank acquires a small bank, it looks like a jump in the loan portfolio of the large bank and the aggregate reduction in their loan portfolios of small banks.

[6]For example, we adjust for changes in accounting standards (e.g., country-level switches from GAAP to IFRS), switches of accounting unit (e.g., bank-level switches of the accounting unit from parent to consolidated company), and other accounting issues that arise in specific circumstances. We also adjust for data gaps and timing issues related to M&As (e.g., if two banks that merge exit the sample in year t, the new combined entity should enter the sample in year t+1). In rare cases, we substitute data from alternative sources, where there appears to be corrupted data (e.g., due to transcription errors or inconsistencies between various sources).

4.2.1 Large banks pursue M&A waves before banking crises

The run-up to many systemic banking crises is characterized by a boom in credit (Schularick and Taylor, 2012). A faster loan growth rate of individual banks is therefore often interpreted as a sign of increased risk taking of individual institutions (Fahlenbrach et al., 2018).

We study the loan growth of differently sized banks around banking crises in Figures 5 and 6. Figure 5 plots the organic growth rate of bank credit, by banks of different sizes, around banking crises. Specifically, the figure shows an event study created by averaging across episodes (within the 1870-1945 subsample, top, and the 1946-2020, bottom), where the episodes are the combined set of JST and BVX banking crises that are preceded by credit booms (see Table B.1). Within each episode, banks are ranked by asset size at each year t-1; then, the percent increase in total loans (from t-1 to t) due to organic growth (see text) of all banks aggregated within each bank-size category is calculated. Finally, to make the event study, a simple average of the growth rates across episodes is taken. 90% confidence bands are computed using a simple standard error of the mean across episodes of the difference between the two size groups. The Figure shows that organic growth rates of top-5 banks are in the same ballpark as that of smaller banks.

Even so, large banks are growing faster during the boom, but not organically, rather by acquiring smaller banks. Figure 6 shows asset growth due to M&A by bank size group for years 1946 to 20202 around credit boom gone bust episodes. We adopt the same methodology as for organic credit growth rates. The figure shows that bank asset growth of top-5 banks is significantly elevated during the boom and somewhat during the bust.

4.2.2 Large banks fund themselves with less capital and more non-core liabilities

We can also measure bank risk by looking at banks' liability composition. Table 3 compares the funding composition of large and small banks broken down into capital, deposit and other non-deposit funding in the full sample. The specifications shown in columns (1), (3) and (5) include country and year fixed effects to abstract from country and year specific trends and levels. The specifications shown in columns (2), (4) and (6) include country-year fixed effects to focus exclusively on variation across banks.

The table shows that top-5 banks tend to fund themselves less with capital. Their capital ratio is on average 4-5 percentage points lower than that of other banks (columns 1 and 2). To compensate the lower capital share, large banks rely to a larger extend on non-deposit liabilities. Large banks have 4 percentage point higher noncore funding ratios (columns 5 and 6) with

that difference increasing to 15 (11) percentage points after 1975. Appendix Figure A.3 shows the corresponding time trends for top-5 banks (left plot) and other banks (right plot) in our dataset. The figure confirms the significant rise in non-deposit liabilities for large banks, while the small bank funding composition remained largely unchanged.

Are large banks also funding their expansion during the credit boom differently? Panel A of 7 shows the growth rate of noncore liabilities by bank size group. We adopt the same methodology as for organic credit growth rates described in the previous section. We find that top-5 banks grow their noncore liabilities by more during the last two years of the boom and have a stronger contraction during the bust. Panel B shows the evolution of bank capital ratios around the same set of event dates. Capital ratios are aligned at $t = -5$ at the level of the top-5 banks to compare how the level evolves over time across the different size groups. It shows that the rise in noncore liabilities is accompanied by a further reduction in capital ratios of large banks compared to their smaller counterparts.

4.3. Performance during the crisis

4.3.1 Large banks have lower stock returns and lower loan growth

To analyze and compare the performance of top-5 banks and smaller banks during banking crises, we turn to Figure 8, which plots stock returns of different sized banks around banking crises. Specifically, Figure 8 shows an event study created by averaging across episodes (within the 1870-1945 subsample in the top panel, and the 1946-2020 in the bottom panel), where the episodes are the combined set of JST and BVX banking crises (see Table B.1, both those preceded and not preceded by credit booms). Banks are ranked by assets at t=-5 in each episode. An equal-weighted average of nominal returns is first taken within each episode for size groups 1-5 and 6-20, respectively; then, returns for each episode and size group are normalized relative to t=-1; finally, a simple average is taken across episodes of cumulative returns. 90% confidence bands are computed using a simple standard error of the mean across episodes of the difference between the two size groups.

Figure 8 shows that in the post-1945 period (lower plot), the average returns of top-5 banks are significantly lower after banking crises than banks 6-20 (roughly, -50% compared to -40%). We do not find a performance difference in the pre-1945 period. We find similar evidence when comparing loan growth of large and small banks during banking crises. Figure 5 shows that in the post-1945 period (lower plot), the organic credit growth of the top-5 banks is significantly lower in the one- to three-years after the start of a banking crisis compared to banks 6-20 and

banks 21-100. In contrast, there is no difference in the growth rates of different sized banks during the credit boom phase before the banking crisis (t = -5 to t = 0).

The top plots of Figure 8 and 5 compare stock returns and organic credit growth of top-5 banks with smaller listed banks before 1945. The difference between top-5 banks and smaller banks is usually smaller and insignificant. These results suggest that the poor performance of large banks coincided with the rise in banking sector concentration.

We explore the relationship between banking sector concentration and performance differences between large and small banks during banking crises in Table 4. In fact, we show that banking sector concentration before the crisis is correlated with the performance gap between large and small institutions.

The table reports estimates from the following regression specification

$$y_i = a + b \cdot (\textit{Top-5 asset share})_i + \epsilon, \tag{1}$$

where each observation in the regression corresponds to an individual banking crisis episode i, and $(\textit{Top-5 asset share})_i$ is the asset share of top-5 banks three years prior to the start of the banking crisis.

Column (1) shows that the stock prices of large banks tend to fall more during banking crises in countries with concentrated banking systems. The same is true for smaller institutions (column 2), albeit to a lesser extent. Consequently, column (3) indicates that the difference in returns between large and small banks is significantly related to the market share of the largest five banks before the crisis. Columns 4-6 present analogous results for the peak-to-trough declines in organic loan growth between large and small banks during crises. In line with the weaker return performance of large banks we do find that large banks in concentrated banking systems have sluggish loan growth during banking crises in comparison to smaller banks.

Taken together, we show that top-5 banks tend to see larger stock declines and larger declines (in %) in organic credit growth. We show that this performance gap is significantly related to the market share of large banks.

4.3.2 Large banks gain market share and are more likely to survive

Next, in this section, we ask how do the dynamics of organic credit growth, M&A, failures, and other events affect the concentration of the banking sector around banking crises? Overall, we show here that top-5 banks are "rewarded" by their aggressive expansions during credit booms: their loan share increases substantially during the credit boom, both because of high organic

credit growth and an M&A wave, where large banks absorb lots of smaller banks during the boom. During the banking crisis, top-5 banks do not lose loan share, as their more negative organic credit growth is offset by the facts that large banks are less likely to fail than smaller banks and that large banks absorb a lot of smaller banks. The overall result, across the entire boom and bust cycle, is that the large banks gain loan share, despite their worse performance during the crisis in terms of organic credit growth and stock price declines.

To see this, Figure 9 plots the percentage point increase in the lending share of top-5 banks in each past year around banking crises. The lending share is defined as the ratio of total loans of top-5 banks to total loans of all banks in the dataset within a given country. The solid black plot is the unadjusted result, the long-dashed plot corresponds to the result excluding changes due to bank M&As, and the short-dashed plot corresponds to the result excluding changes due to bank M&As, entries, and failures. Specifically, the figure shows an event study created by averaging across episodes, where the episodes are the combined set of JST and BVX banking crises that are preceded by credit booms (see B.1). Only the 1946-2020 subsample is used, as detailed data on bank M&As, entries, and failures was only compiled on that subsample, as described in Section IV.B.

To make the event study, a simple average of the increase in the lending share across episodes is taken. 90% confidence bands are computed using a simple standard error of the mean across episodes of the difference of the unadjusted result and zero.

Figure 9 shows that the loan share of the top-5 banks is increasing by about one percentage point per year during the credit boom preceding the banking crisis (from t=-5 to t=-1). About half of that increase is due to organic credit growth (the dashed lines), and the other half is due to M&As (the difference between the solid and dashed lines).

After the banking crisis (from t=0 to t=5), the loan share of top-5 banks is around zero (black line). Without M&A, their loan share would be decreasing (the dashed lined), but the increase in loan share from M&As offsets the decrease in loan share from organic credit growth.

Figure 10 demonstrates a related fact, that top-5 banks are substantially less likely to fail or exit due to other reasons (e.g., by being acquired) than smaller banks. Figure 10 plots bank failure probabilities (left plot) and bank exit probabilities (right plot) by bank size in normal times and during banking crises. Since this analysis is over the full sample, we define exits and failures more generally than we do in Section IV.B where we have more detailed data. Specifically, we define an observation as a bank exit if the observation is the last for a bank in the database and if the banks recorded resolution year is within the next three years. Exits that are due to outright bankruptcies, liquidations, ceased banking operations, and revoked

licenses are classified as failures.[7] Figure 10 also distinguishes between failures "during crises" (exits in the three years after the start of a JST banking crisis) and "normal times" (all other times).

Figure 10 shows that the probability of a failure during banking crises (left plot) is around 0.4% for top-5 banks and rising to 0.9% and 0.8% for banks 6-20 and 21-100, respectively. However, it should be noted that failures, even among small banks and around crises, are relatively rare in our database, as being absorbed before outright failing is substantially more common after banking crises. The right plot thus looks at all exits and find that the probability of a failure during banking crises is around 2% for top-5 banks and rises to around 4% for banks in both the 6-20 and 21-100 size categories. The overall conclusion is that the probability of a top-5 bank failing or exiting is less than half of a smaller bank failing. Figure 10 shows a similar result is also true during "normal times" also.

5. Conclusion

This paper introduces a new long-run, bank-level, cross-country dataset to study the behavior and performance of large and small banks over the credit cycle. We show that large banks account for a rising share of the aggregate financial cycle, take more risk during pre-crisis credit booms and have higher losses during the crisis. We also show that large banks grow their market shares over the boom-bust cycle due to lower failure rates and by acquiring smaller banks. Our results are consistent with theories of excessive risk taking of large banks and implicit bailout guarantees and shows that large banks have been at the epicenter of financial instability and risk taking throughout history.

[7] Figure A.3 plots descriptive statistics on bank entries across the entire sample, and Figure A.4 plots descriptive statistics on bank exits across the entire sample.

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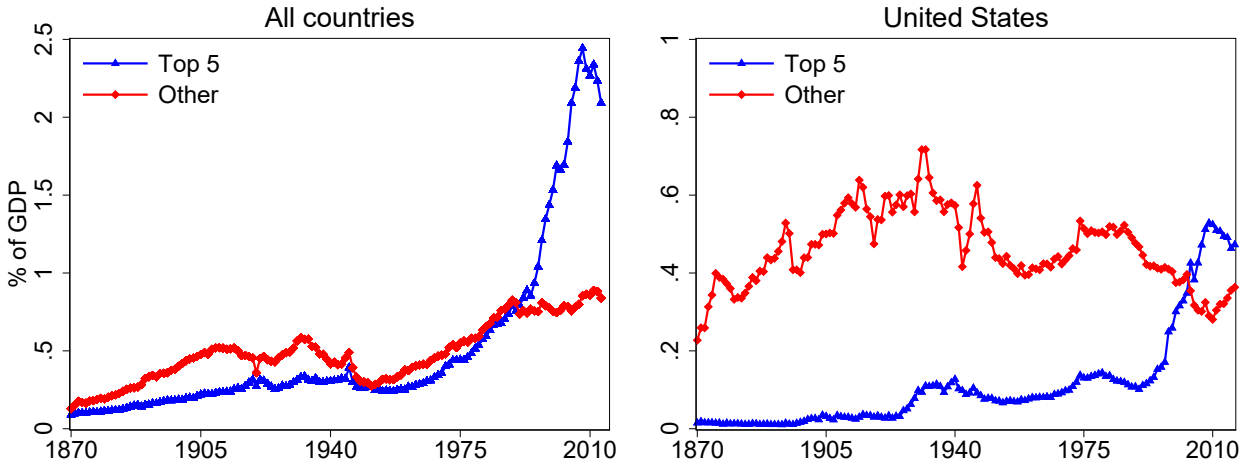
Figure 1: Assets and concentration of the top-5 largest banks by country

Panel A shows the size of banking system assets relative to GDP broken down into the top-5 banks and all other banks. The left plot in panel A shows averages across 17 advanced economies and the right plot shows data for the United States. We calculate the size of the "Other banks" as the difference between top-5 bank assets and total banking system assets to deal with missing data at the bottom of the distribution in some countries. Panel B provides an estimate of the role that M&A activity played in the evolution of banking sector concentration over the last 150 years. The blue line shows the average market share of the largest 5 banks in each country. The red line shows how market shares would have evolved absent of M&A activity by extrapolating total assets of absorbed banks forward using the asset growth rate of the acquiring (or new) entity.

Panel A: Bank assets-to-GDP of the top-5 banks versus all other banks



Panel B: Concentration increase attributable to M&A activity

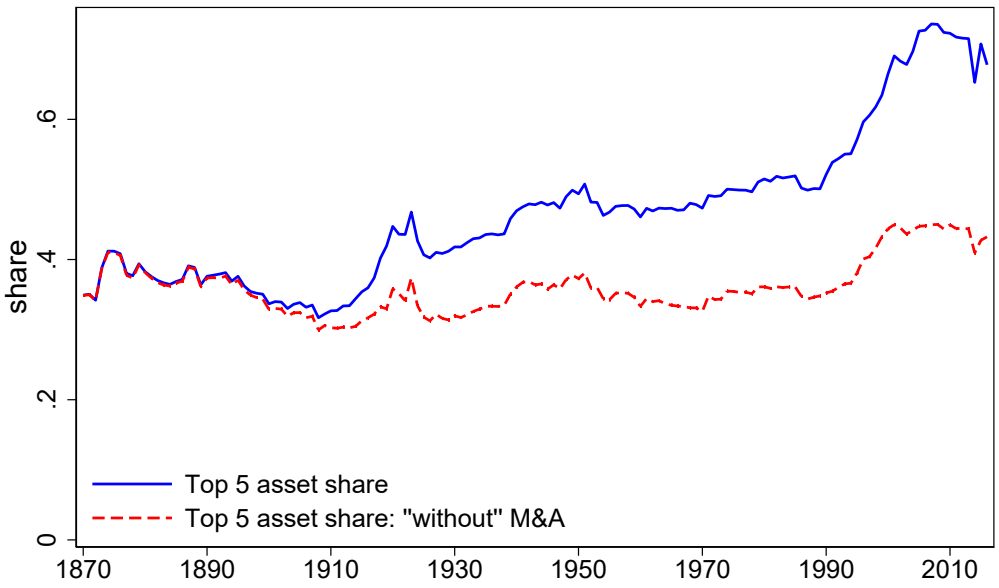
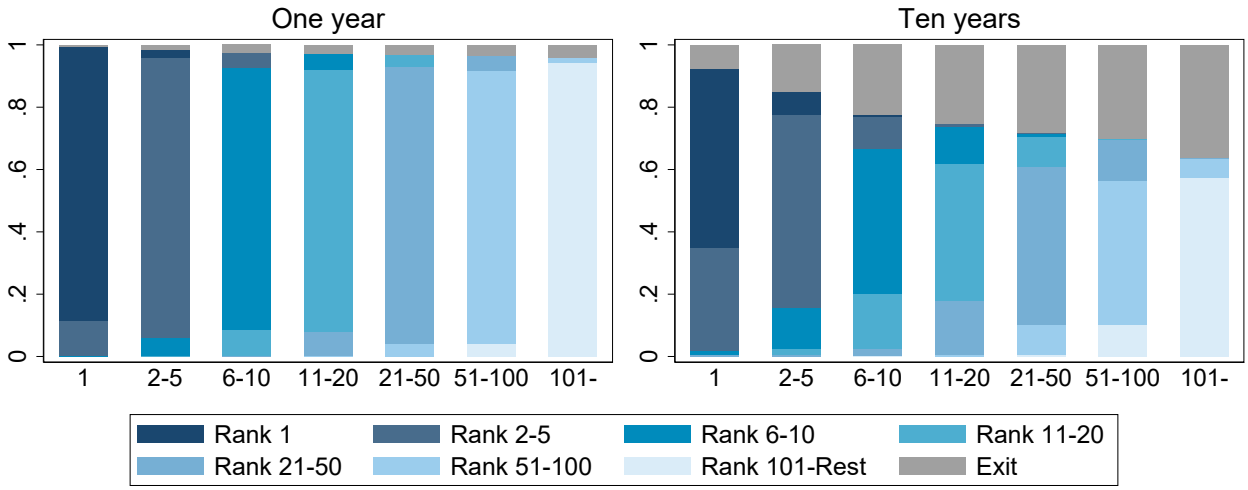


Figure 2: Large banks are highly persistent

Panel A shows transition probabilities between bank size ranks from year to year (left plot) and for ten year intervals (right plot). We code a transition to exit if an observation is the last for a bank in the database and if the banks recorded resolution year is within the next three years. For banks with unknown resolution years we treat the end of data as their exit year.

Panel A: Transition matrix between bank size groups



Panel B: Persistence of banks vs nonfinancials

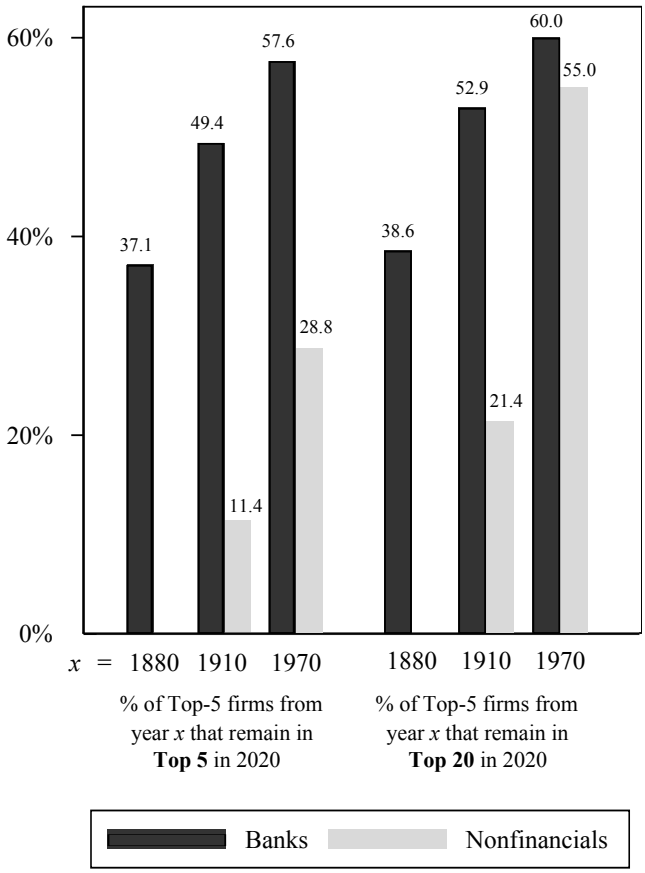
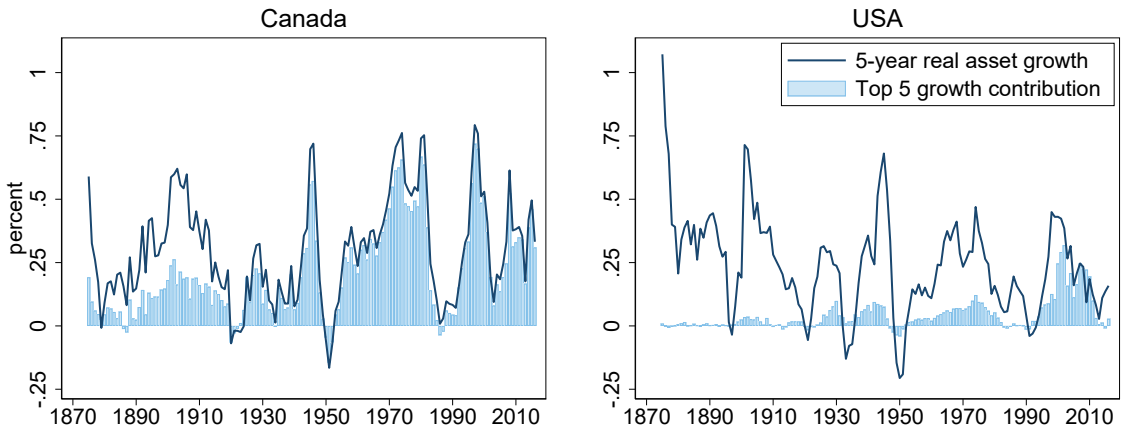


Figure 3: Top-5 banks' contribution to the credit cycle

Panel A illustrates how the growth contribution of the top-5 banks is calculated for two countries. Panel B shows how the growth contribution of the top-5 banks changes over time (left plot) and across countries (right plot), as measured by the asset share of the top-5 banks. The Top 5 growth contribution is calculated as the M&A adjusted weighted growth rate of the top 5 banks times their lagged market share. Panel A is based on 5-year growth rates for illustrative purposes and the right hand panel of panel B is calculated using centered ±10-year rolling window regressions of the top-5 growth contribution on the aggregate growth rate.

Panel A: Growth contribution example for the United States and Canada



Panel B: Growth contribution over time and by country

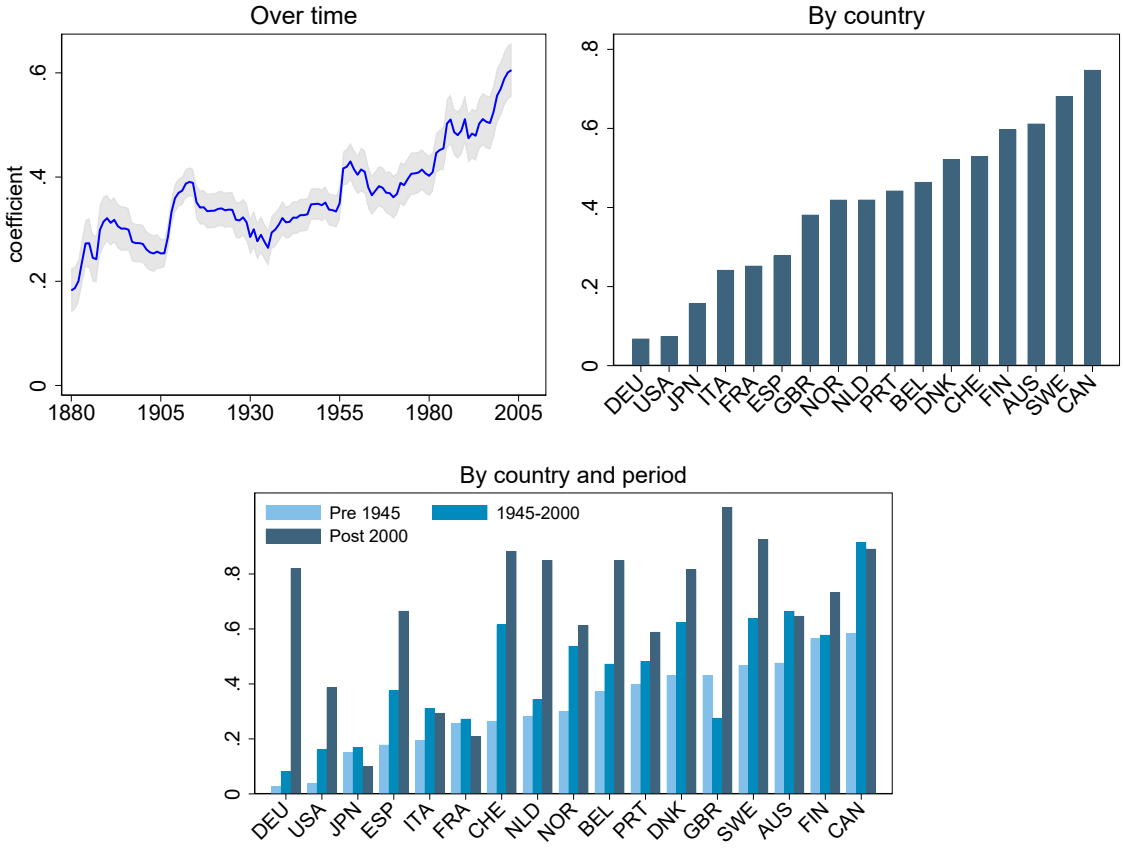


Figure 4: Large banks' contribution to credit booms preceding banking crises

This figure plots the contribution, by banks of different sizes, to the credit booms and busts around banking crises. Specifically, the figure shows an event study created by averaging across episodes (within the 1870-1945 subsample, top, and the 1946-2020, bottom), where the episodes are the combined set of JST and BVX banking crises that are preceded by credit booms (see Table B.1). Within each episode, banks are ranked by asset size at each time *t-1*; then, the change in total loans (from *t-1* to *t*) is aggregated across all banks within each bank-size category and normalized by GDP_{t-1}.

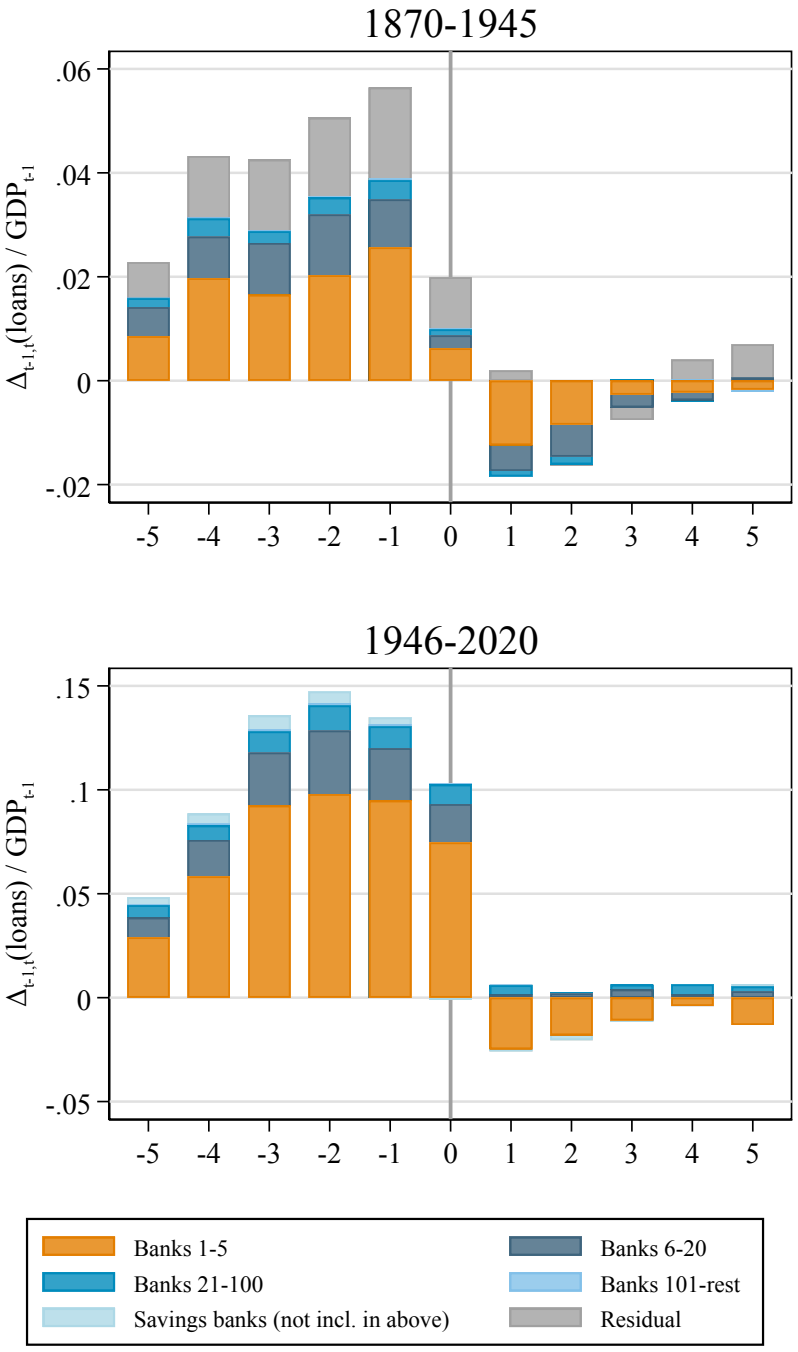


Figure 5: Organic growth rate of bank credit by bank size around crises

This figure plots the organic growth rate of bank credit, by banks of different sizes, around banking crises. Specifically, the figure shows an event study created by averaging across episodes (within the 1870-1945 subsample, top, and the 1946-2020, bottom), where the episodes are the combined set of JST and BVX banking crises that are preceded by credit booms (see Table B.1). Within each episode, banks are ranked by asset size at each year *t-1*; then, the percent increase in total loans (from *t-1* to *t*) due to organic growth (see text) of all banks aggregated within each bank-size category is calculated. Finally, to make the event study, a simple average of the growth rates across episodes is taken. 90% confidence bands are computed using a simple standard error of the mean across episodes of the difference between the two size groups.

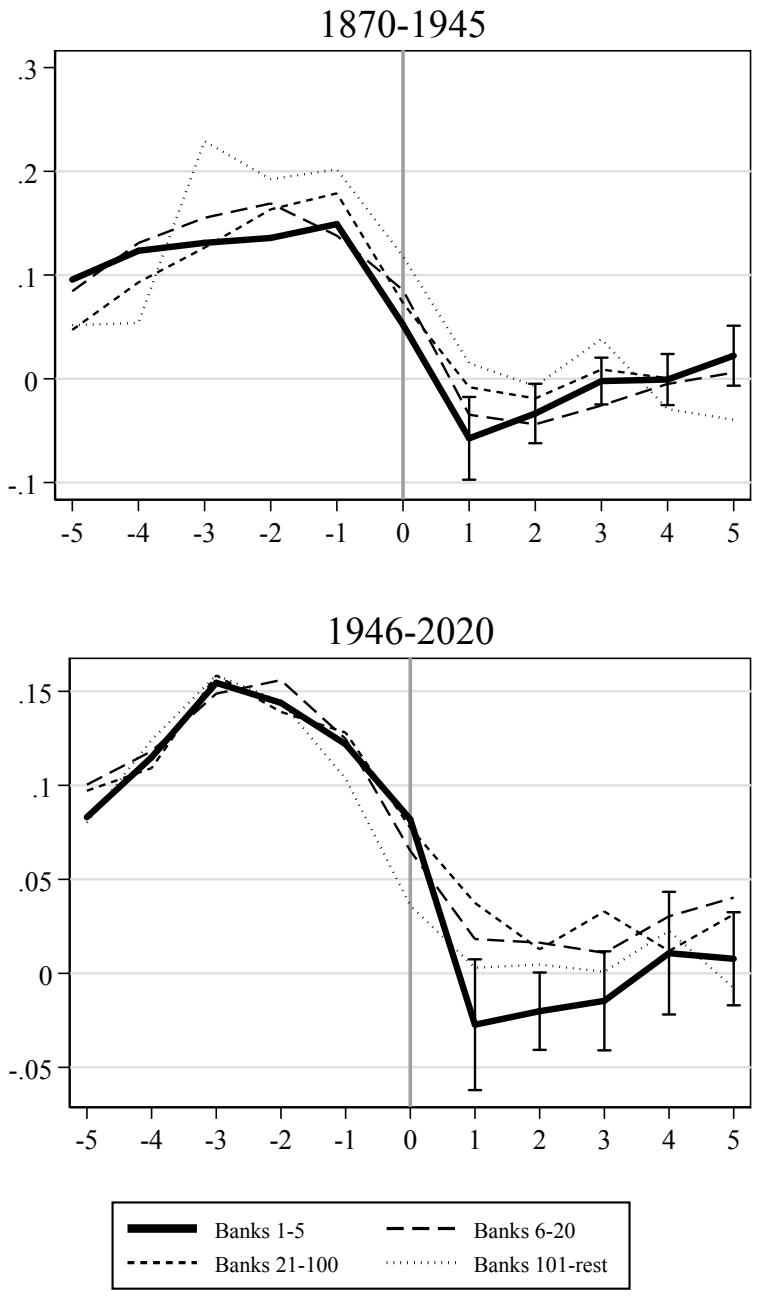


Figure 6: Asset growth around banking crises due to acquisitions

This figure shows asset growth around banking crises due to acquisitions, by banks of different sizes. Specifically, the figure plots an event study created by averaging across episodes over the period 1946-2020. Acquisitions are defined here as when a bank in one size group acquires a target in a different size group. For example, the thick black line for "Banks 1-5" corresponds to the acquisitions by top-5 banks of non-top-5 banks, and the magnitude is measured based on the aggregate assets of the (non-top-5) targets divided by the aggregate assets of all top-5 banks. 90% confidence bands are computed using a simple standard error of the mean across episodes of the difference between the two size groups.

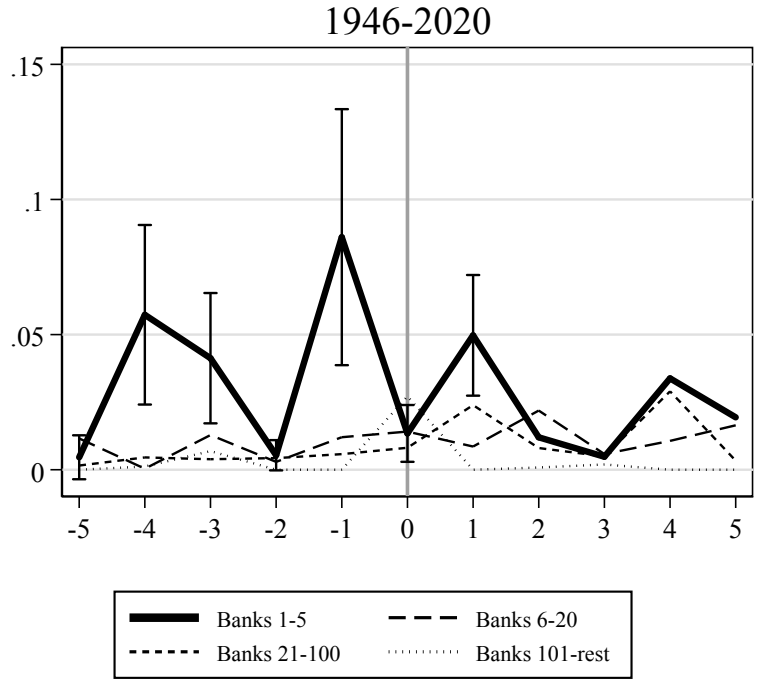
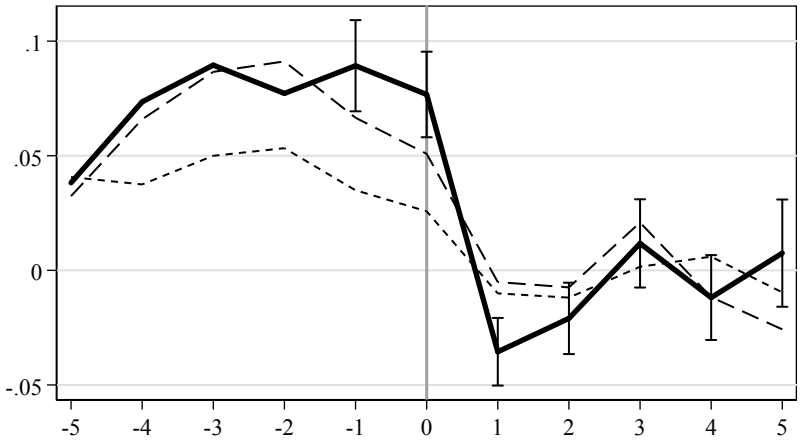


Figure 7: Noncore liabilities and capital ratios around banking crises

This figure plots the growth rate of noncore liabilities (panel A) and the level of capital ratios (panel B) around banking crises, by banks of different sizes. Specifically, the figure plots an event study created by averaging across episodes over the period 1946-2020. Noncore liabilities are defined as liabilities that are neither equity nor deposits (with deposits defined to include certain deposit-like liabilities, see text). Panel A plots the organic growth rate, averaged across episodes, of aggregate noncore liabilities of banks in each size group. Panel B plots the level of the capital ratio, averaged across episodes, where the capital ratio is computed in each episode based on the aggregate equity and total assets in each size group. The capital ratio levels are aligned at $t = -5$ at the level of the top-5 banks, in order to compare how the level evolves over time across the different size groups. 90% confidence bands are computed using a simple standard error of the mean across episodes of the difference between the Top 5 versus all other size groups.

Panel A: Noncore liabilities growth



Panel B: Capital ratios levels (aligned at $t = -5$)

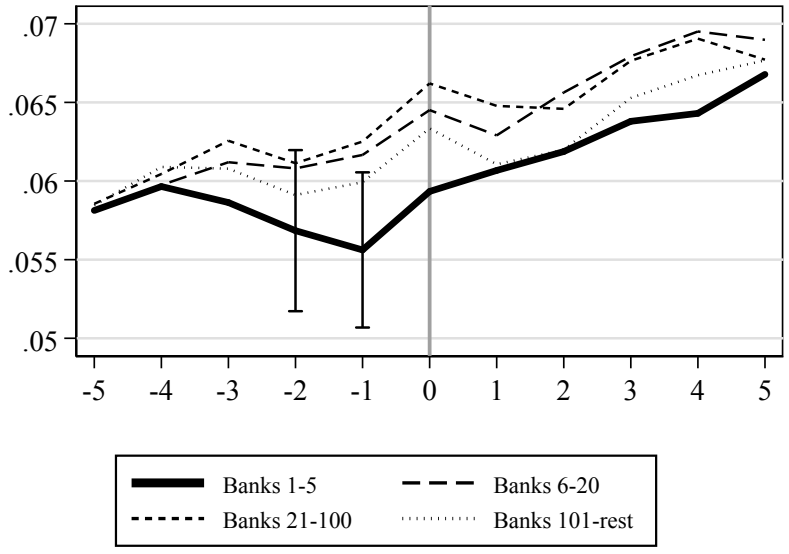


Figure 8: Stock returns of different sized banks around banking crises

This figure plots average stock returns of banks of different size groups, conditional on banking crises. Specifically, the figure shows an event study created by averaging across episodes (within the 1870-1945 subsample, top, and the 1946-2020, bottom), where the episodes are the combined set of JST and BVX banking crises (see Table B.1, both those preceded and not preceded by credit booms). Banks are ranked by assets at t=-5 in each episode. An equal-weighted average of nominal returns is first taken within each episode for size groups 1-5 and 6-20, respectively; then, returns for each episode and size group are normalized relative to t=-1; finally, a simple average is taken across episodes of cumulative returns. 90% confidence bands are computed using a simple standard error of the mean across episodes of the difference between the two size groups.

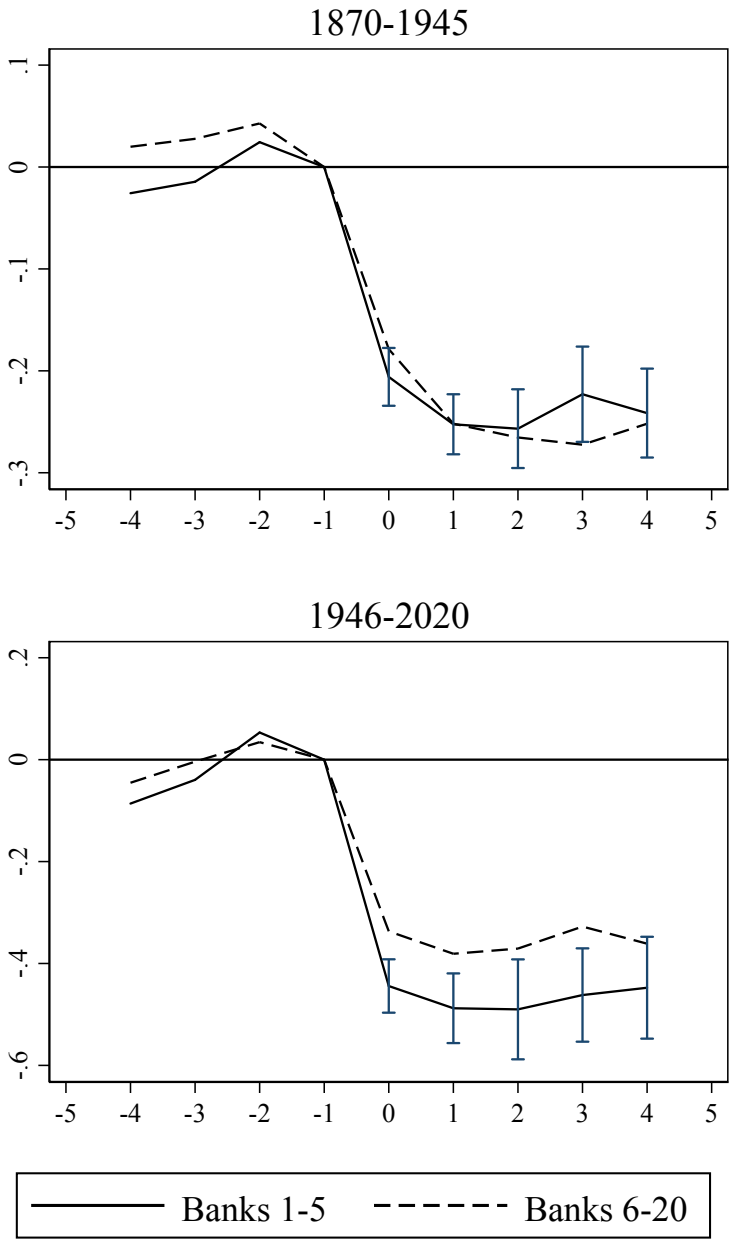


Figure 9: Increase in top-5 concentration around banking crises

This figure plots the percentage point increase in the lending share of top-5 banks in each past year around banking crises. The lending share is defined as the ratio of total loans of top-5 banks to total loans of all banks in the dataset within a given country. The solid black plot is the unadjusted result, the long-dashed plot corresponds to the result excluding changes due to bank M&As, and the short-dashed plot corresponds to the result excluding changes due to bank M&As, entries, and failures. Specifically, the figure shows an event study created by averaging across episodes, where the episodes are the combined set of JST and BVX banking crises that are preceded by credit booms (see Table B.1). Only the 1946-2020 subsample is used, as detailed data on bank M&As, entries, and failures was only compiled on that subsample. To make the event study, a simple average of the increase in the lending share across episodes is taken. 90% confidence bands are computed using a simple standard error of the mean across episodes of the difference of the unadjusted result and zero.

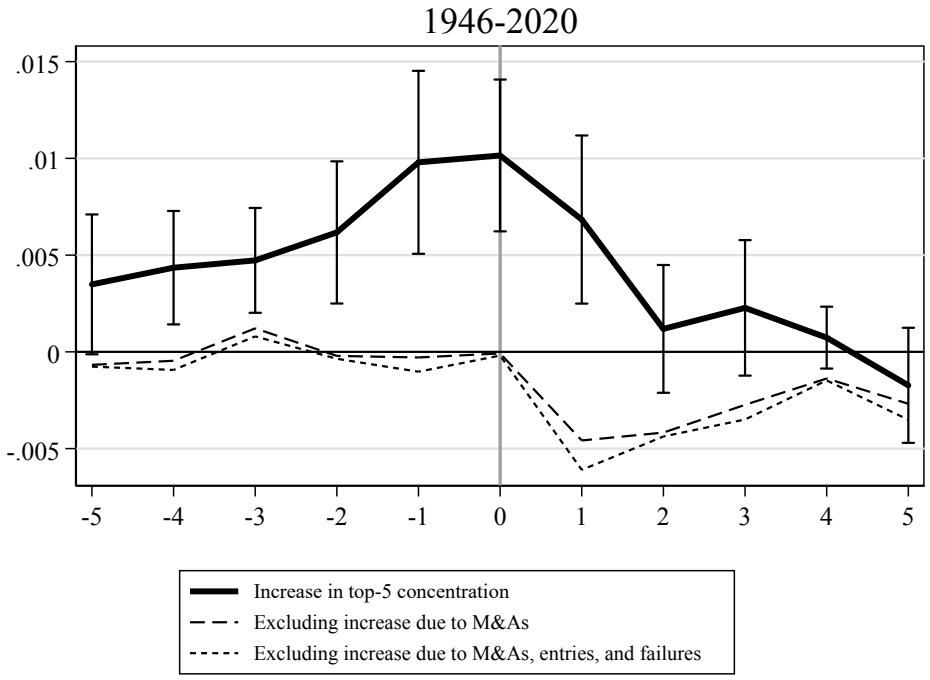


Figure 10: Failures and exit rates by bank size

The figure shows bank failure probabilities (left plot) and bank exit probabilities (right plot) by bank size in normal times and during banking crises. We define an observation as a bank exit if the observation is the last for a bank in the database and if the banks recorded resolution year is within the next three years. Exits that are due to outright bankruptcies, liquidations, ceased banking operations, and revoked licenses are classified as failures. "During crises" includes all exits in the three years after the start of a JST banking crisis.

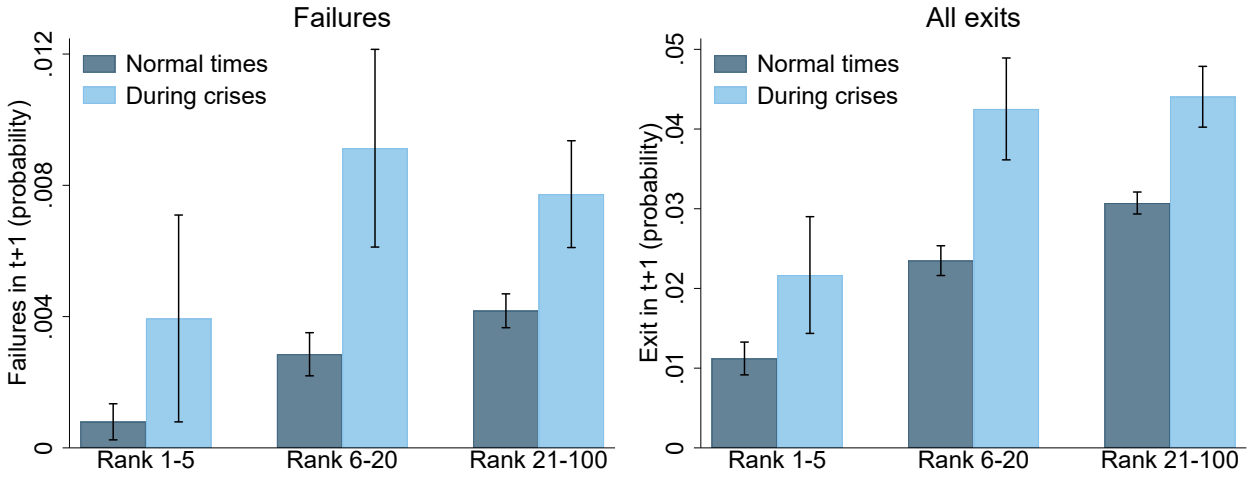


Table 1: Summary statistics

This table reports summary statistics of the main variables. Asset growth and loan growth are winsorized at the 1 percent level.

	Median	Mean	S.D.	Min	Max
Number of banks by country-year	160.00	264.95	291.31	1.00	1988.00
Number of observations by bank	41.00	48.37	33.41	1.00	147.00
Bank age	41.00	54.15	46.44	0.00	423.00
Top 5 asset share	0.41	0.44	0.20	0.00	1.00
1-year asset growth	0.07	0.11	0.20	-0.34	1.13
1-year $M\&A$ adjusted asset growth	0.07	0.10	0.19	-0.34	1.10
1-year loan growth	0.08	0.13	0.30	-0.50	1.80
Number of banks by year					
Australia	30.00	26.84	7.70	3.00	45.00
Belgium	60.00	72.30	31.39	6.00	146.00
Canada	37.00	37.52	17.59	10.00	76.00
Denmark	162.00	162.91	52.88	18.00	272.00
Finland	11.00	12.64	4.69	2.00	23.00
France	27.00	30.99	21.03	5.00	62.00
Germany	141.00	624.95	728.68	3.00	1988.00
Italy	212.00	249.48	113.13	8.00	529.00
Japan	41.00	42.60	23.91	1.00	89.00
Netherlands	54.00	57.29	17.68	5.00	88.00
Norway	101.00	99.46	45.62	13.00	195.00
Portugal	33.00	33.62	12.59	5.00	61.00
Spain	104.00	110.63	46.72	2.00	213.00
Sweden	46.00	52.77	25.81	9.00	99.00
Switzerland	419.00	399.10	72.81	8.00	476.00
UK	117.00	101.43	44.84	8.00	157.00
USA	652.00	542.07	301.94	34.00	878.00

Table 2: Stylized balance sheet structure

Total assets	Total liabilities
= Loans	= Capital
+ Other	+ Deposits
	+ Other non-core funding

Table 3: Bank size and funding composition

This table reports regression estimates of bank funding ratios (capital ratio, deposit ratio, noncore ratio) on a top-5 bank dummy with country, year and country-year fixed effects. The regression also includes an interaction of the top-5 bank dummy with a post 1975 dummy to capture recent differential trends between large and small banks.

	Capital ratio		Deposit ratio		Noncore ratio	
	(1)	(2)	(3)	(4)	(5)	(6)
Top 5	-0.04***	-0.05***	-0.00	0.00	0.04***	0.04***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Top 5 x Post 1975	-0.00	0.01***	-0.14***	-0.10***	0.12***	0.07***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Country FEs	✓		✓		✓	
Year FEs	✓		✓		✓	
Country x Year FEs		✓		✓		✓
Observations	214602	214602	179850	179850	174810	174810

Table 4: Concentration and bank losses during crises

This table shows that large (i.e. top 1-5) banks do relatively worse than small (i.e. top 6-20) banks following banking crises when the banking system is more concentrated. Specifically, this table reports estimates from the following regression: $y_i = a + b \cdot (\textit{Top-5 asset share})_i + \epsilon$, where each observation in the regression corresponds to an individual banking crisis episode i, and $\textit{Top-5 asset share}_i$ is the asset share of top-5 banks three years prior to the start of the banking crisis. The outcome variable y_i is, alternatively, the peak-to-trough decline during crises in bank stock returns of large banks (col. 1), small banks (col. 2), or the difference in returns of large minus small banks (col. 3). Columns 4-6 correspond analogously to the peak-to-trough declines in organic loan growth between large and small banks during crises.

	Bank stock returns			Organic loan growth		
	Large	Small	Diff.	Large	Small	Diff.
	(1)	(2)	(3)	(4)	(5)	(6)
Top-5 asset share	-0.70***	-0.34*	-0.36**	-0.01	0.06	-0.08**
	(0.21)	(0.20)	(0.14)	(0.04)	(0.04)	(0.03)
Constant	0.16	0.01	0.15*	-0.02	-0.04*	0.02
	(0.11)	(0.11)	(0.08)	(0.02)	(0.02)	(0.02)
R^2	0.149	0.043	0.087	0.002	0.044	0.083
N	66	66	66	56	56	56

Appendix

Figure A.1: Market shares by bank size groups

This figure plots the share of bank assets by size group over time. Banks are ranked by assets in each year. The share of bank assets is normalized by the total assets of the banking system in each country from aggregate data of Jordà et al. (2021), not by summing all the banks in the database–hence the white space in the plot.

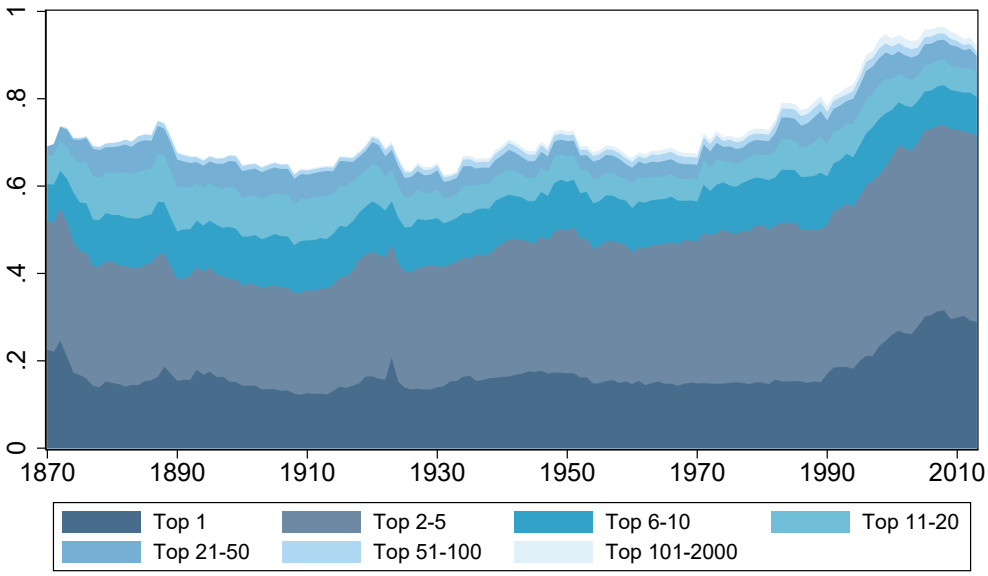
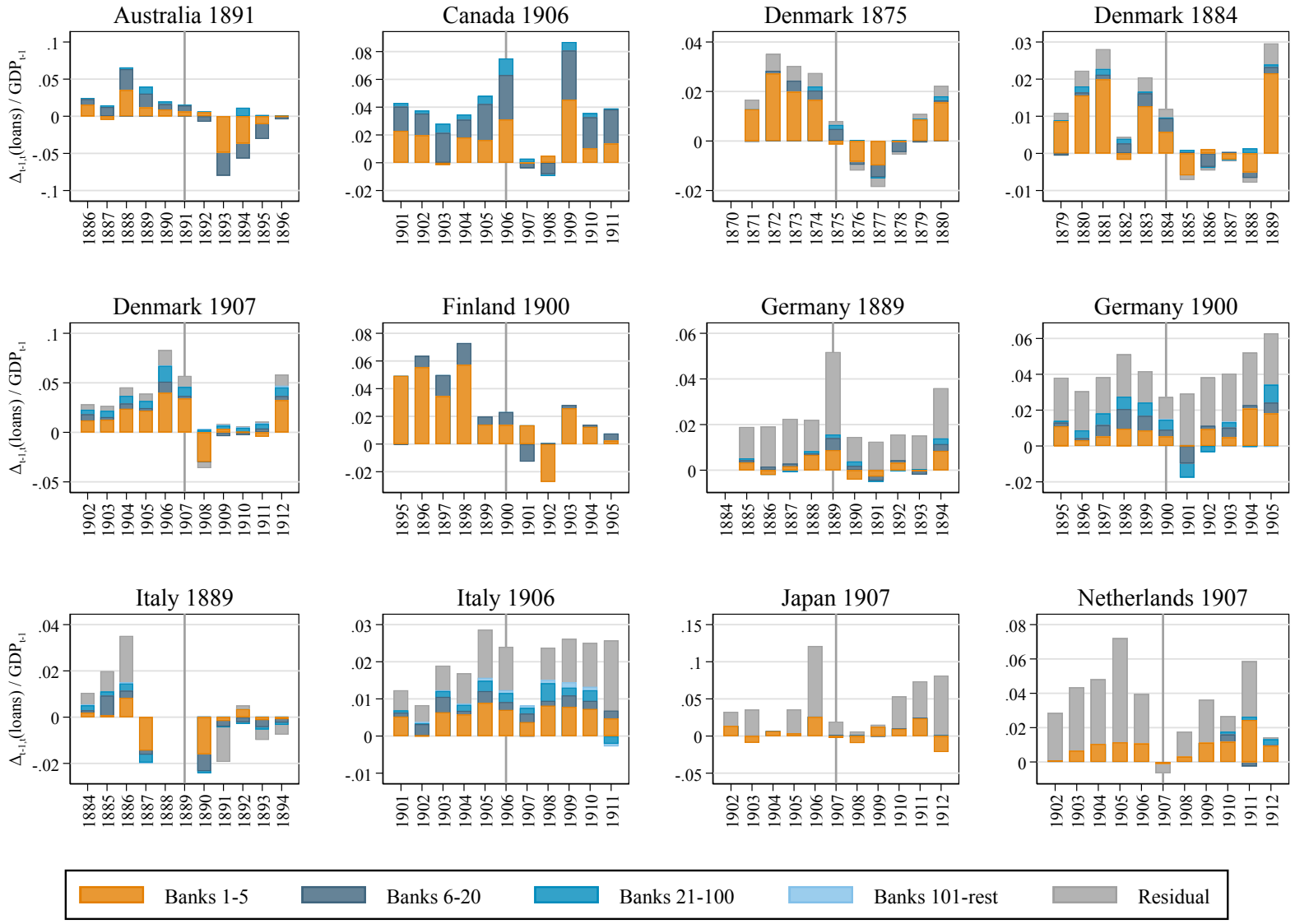
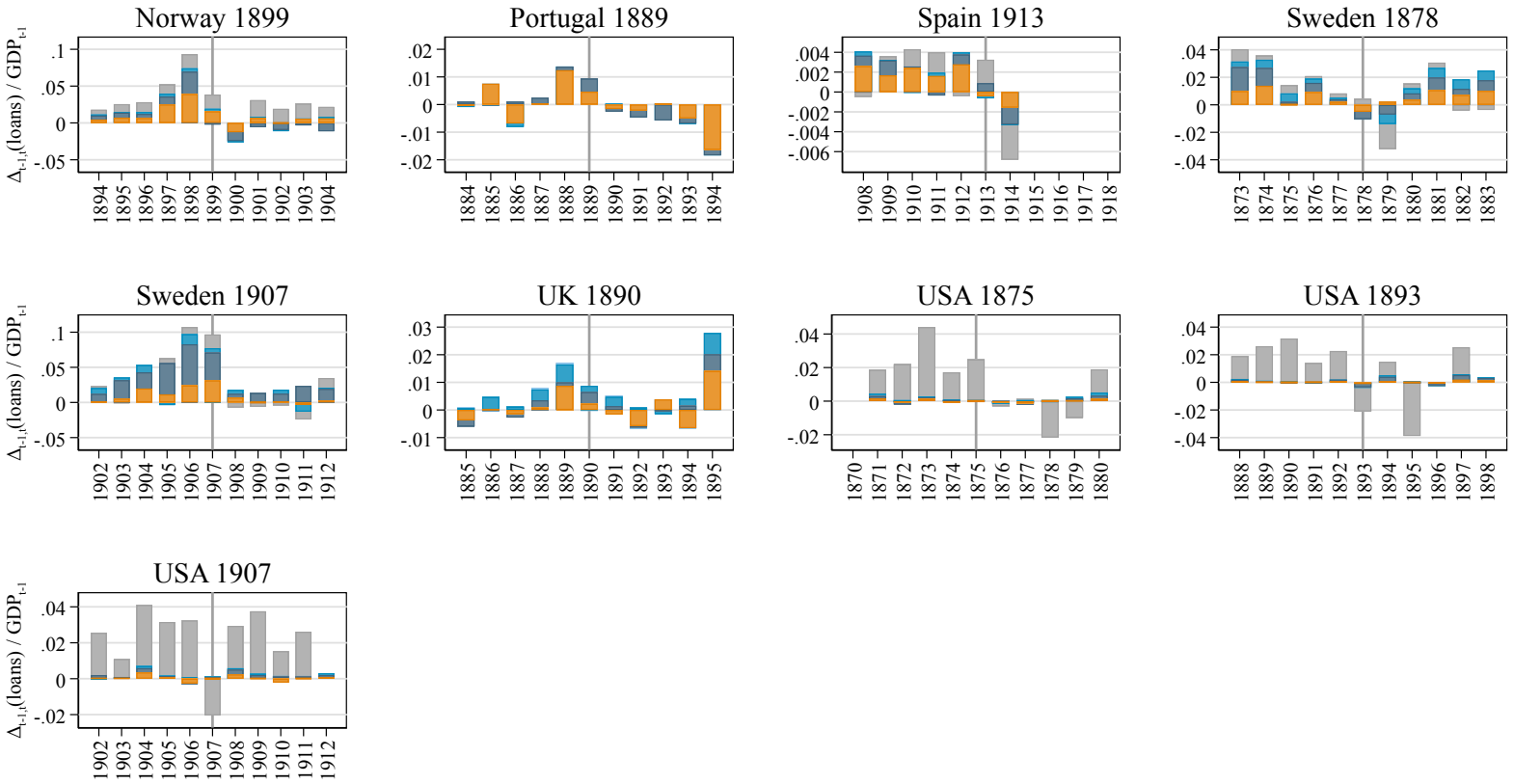


Figure A.2: Credit growth around individual banking crises

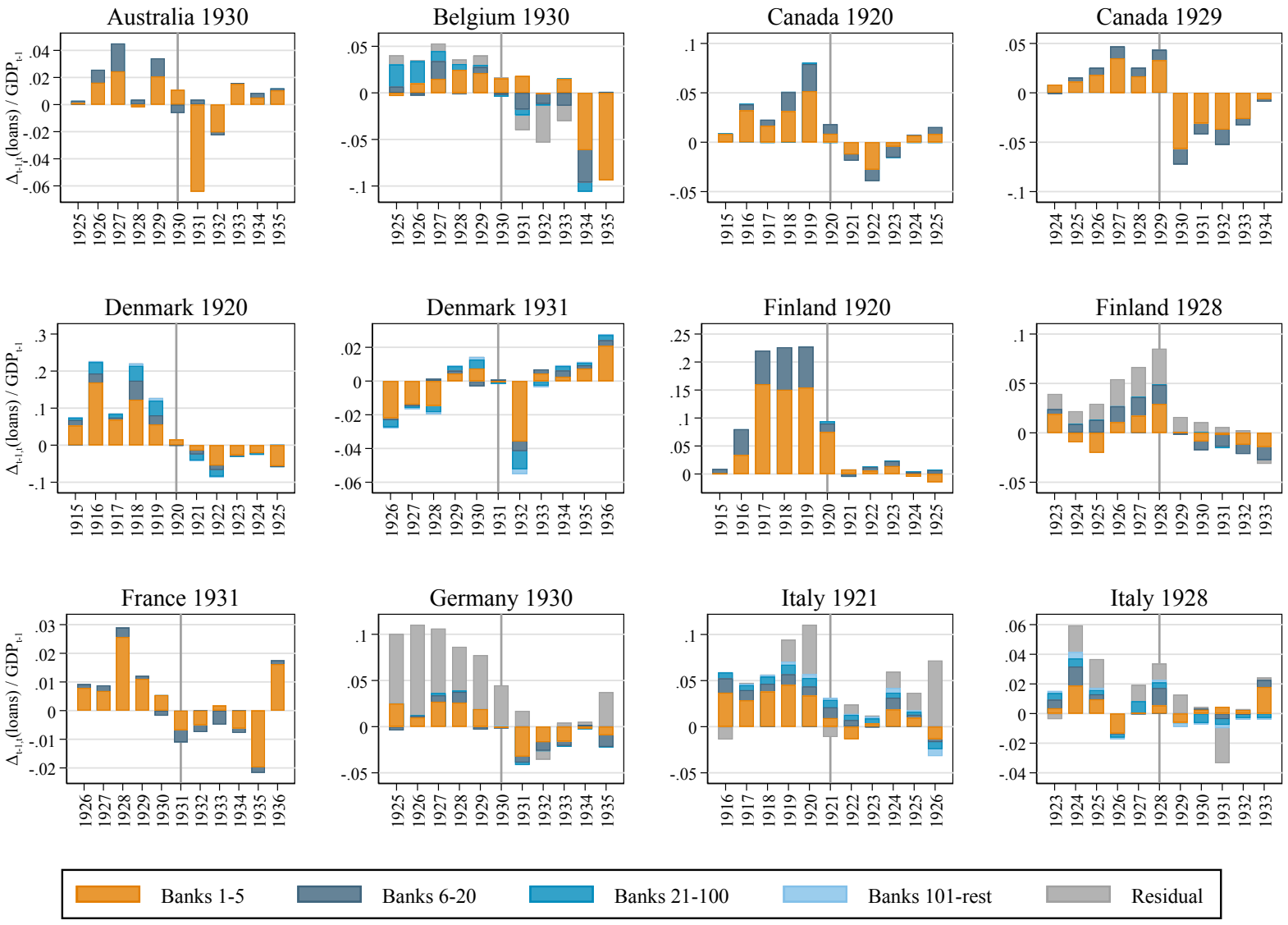
These plots are similar to Figure 4 but for each individual episode on the BSZ list.

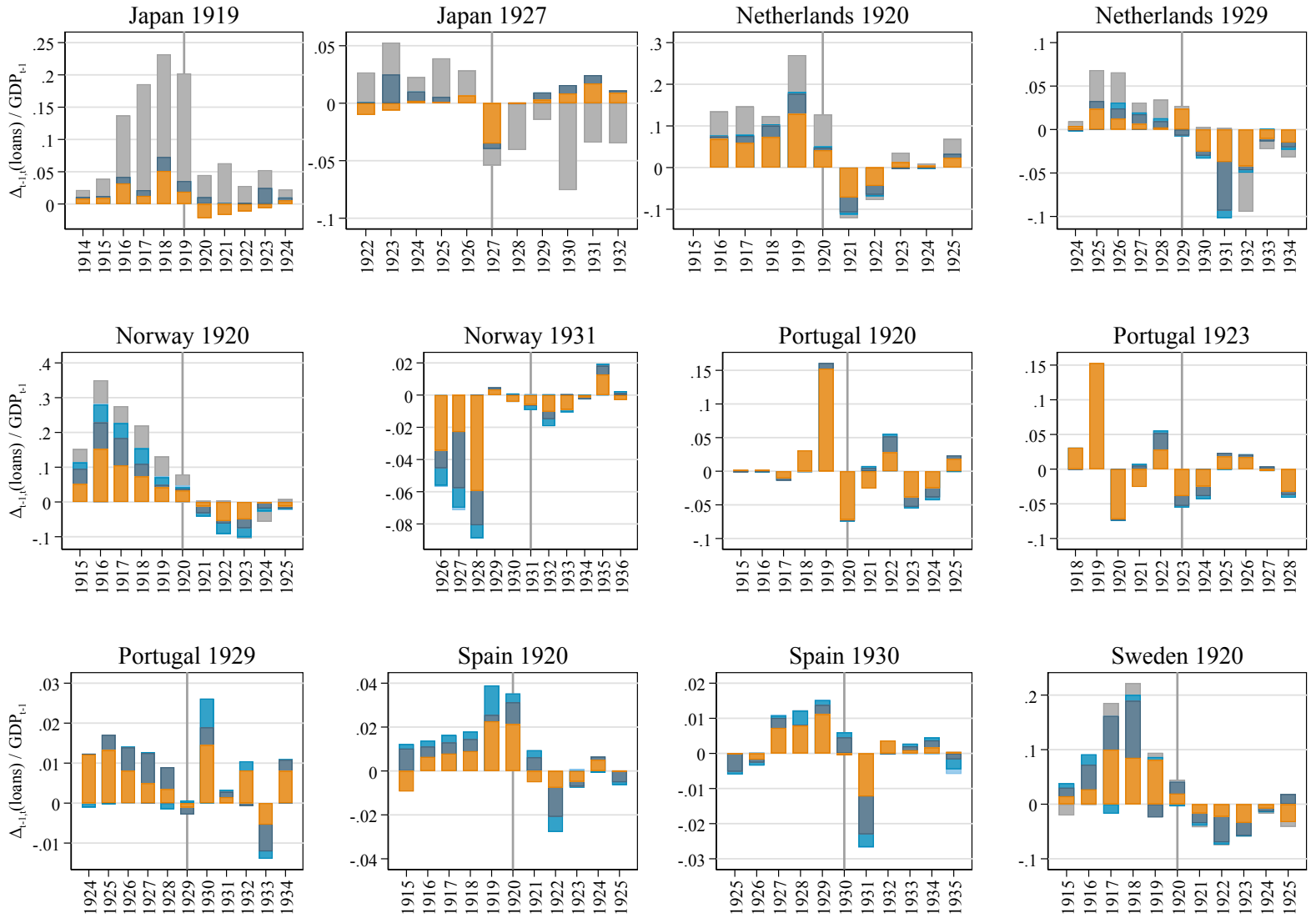
Panel A: 1870-1914 banking crises

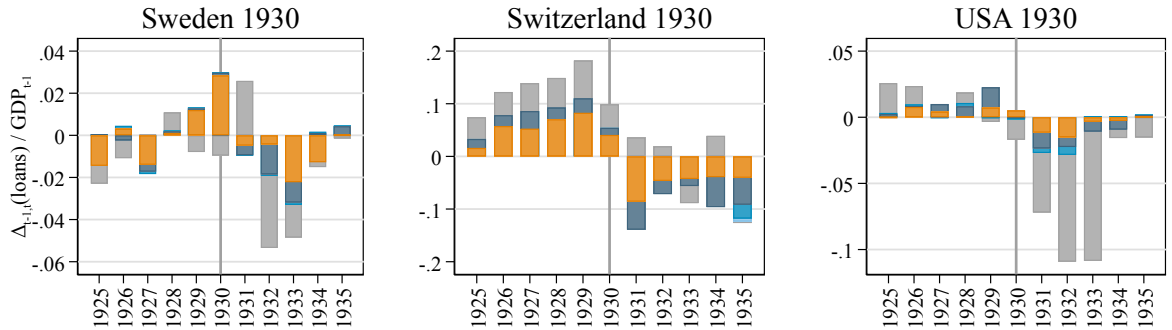



Norway 1899
Portugal 1889
Spain 1913
Sweden 1878
Sweden 1907
UK 1890
USA 1875
USA 1893
USA 1907
Δt-1,t(loans) / GDPt-1

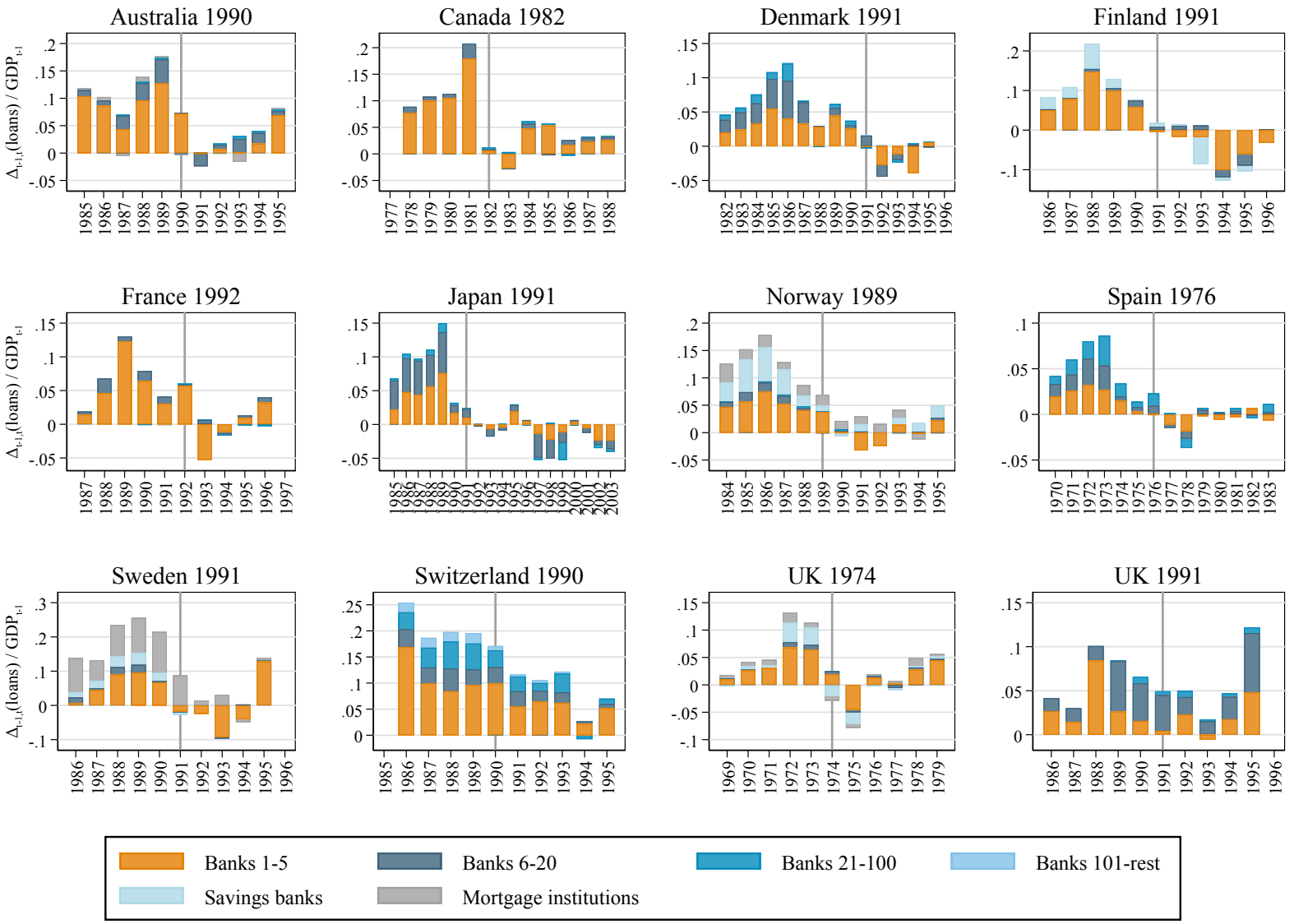
Panel B: 1915-1945 banking crises

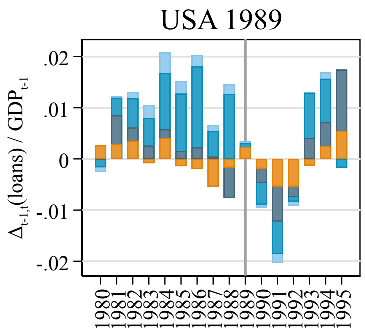



Japan 1919
Japan 1927
Netherlands 1920
Netherlands 1929
Norway 1920
Norway 1931
Portugal 1920
Portugal 1923
Portugal 1929
Spain 1920
Spain 1930
Sweden 1920
Δt-1,t(loans) / GDPt-1


Sweden 1930
Switzerland 1930
USA 1930
$\Delta_{t-1,t}$(loans) / GDP_{t-1}
.04
.02
0
-.02
-.04
-.06
.2
.1
0
-.1
-.2
.05
0
-.05
-.1
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935

Panel C: 1946-2006 banking crises



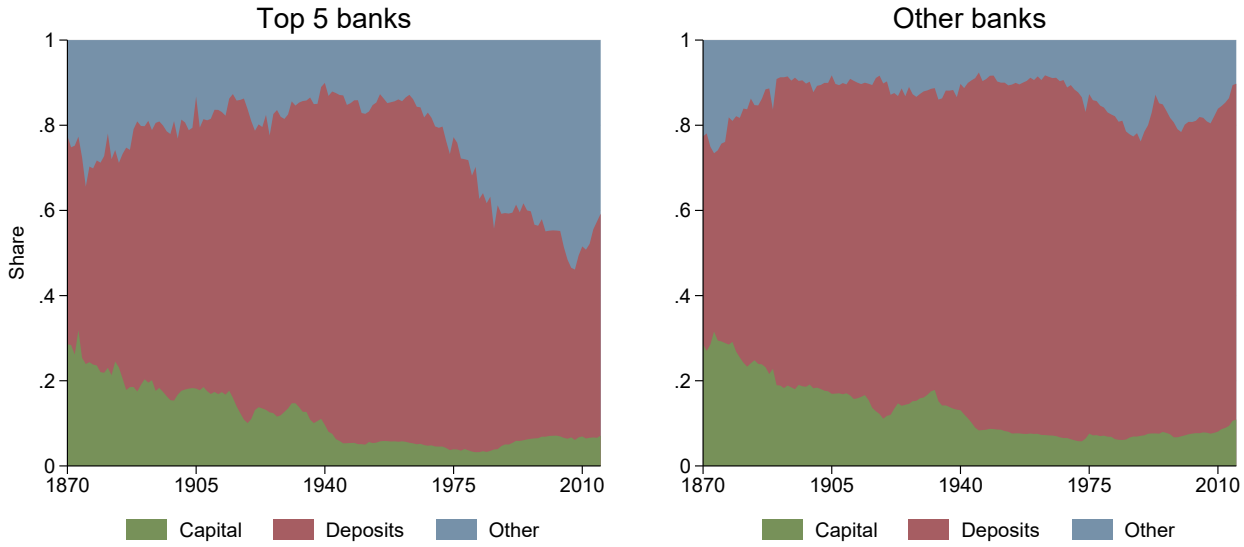

USA 1989
Δ t-1,t (loans) / GDP t-1
.02
.01
0
-.01
-.02
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995

Panel D: 2007-2020 banking crises

Figure A.3: Balance sheet composition of large and small banks

The top panel shows the liability composition of top-5 banks and all other banks. The bottom panel shows the asset composition of top-5 banks and all other banks. Median across banks in the two groups.

Panel A: Liabilities of the median top-5 and other banks



Panel B: Assets of the median top-5 and other banks

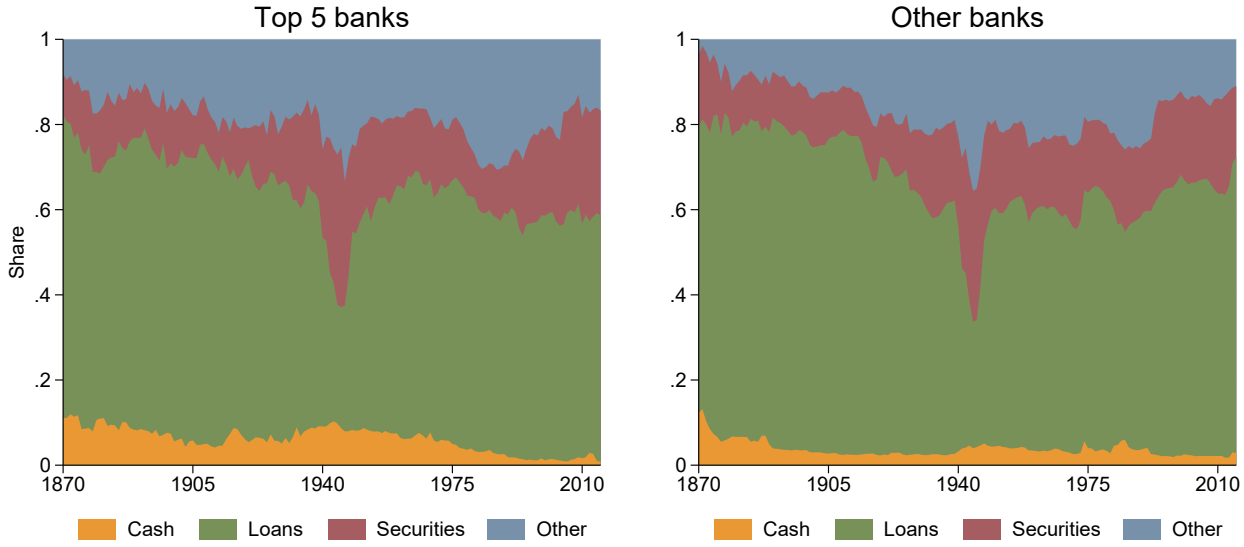
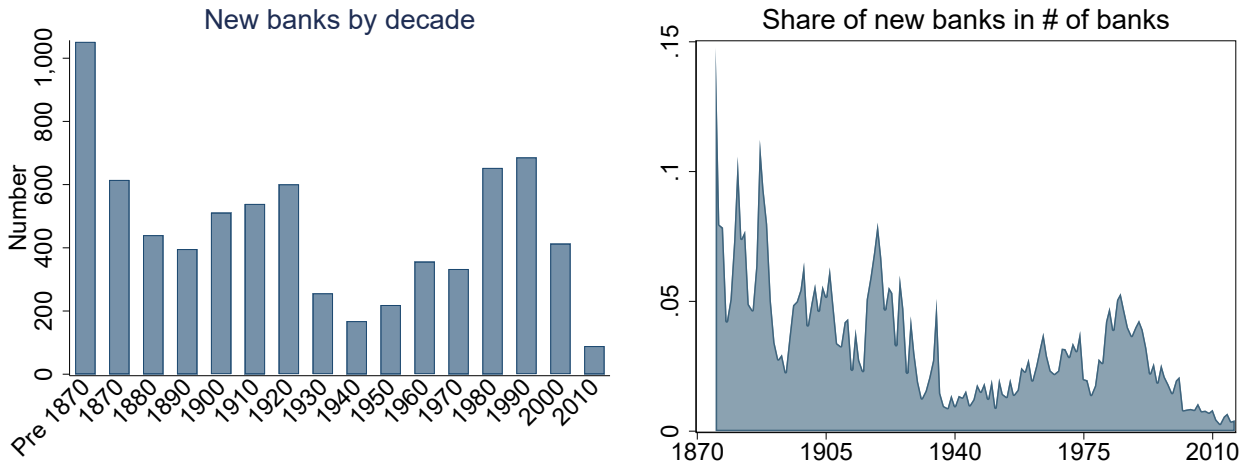


Figure A.4: Bank entry

Panel A plots the number of new banks by decade (left) and the fraction of new banks to total banks (right) across all the countries. Panel B plots the average bank age over time (left) and the distribution of banking sector assets by bank age groups over time (right), where "young" is defined as banks established within the last 10 years, "middle" is defined as banks 10 to 50 years old, and "old" is defined as banks older than 50 years. Figure only includes banks with non-missing establishment years.

Panel A: Bank entry over time



Panel B: Age structure of the banking system

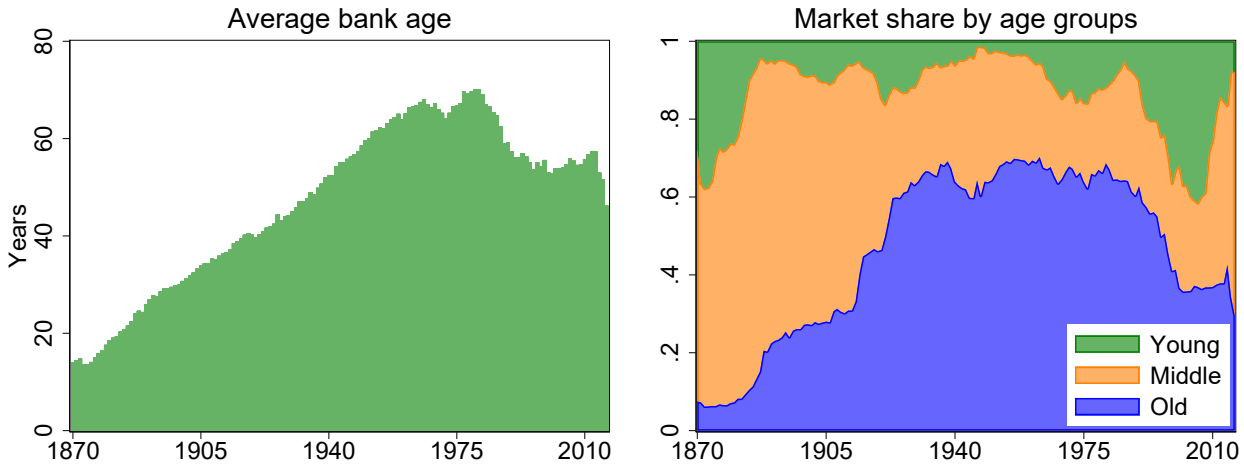
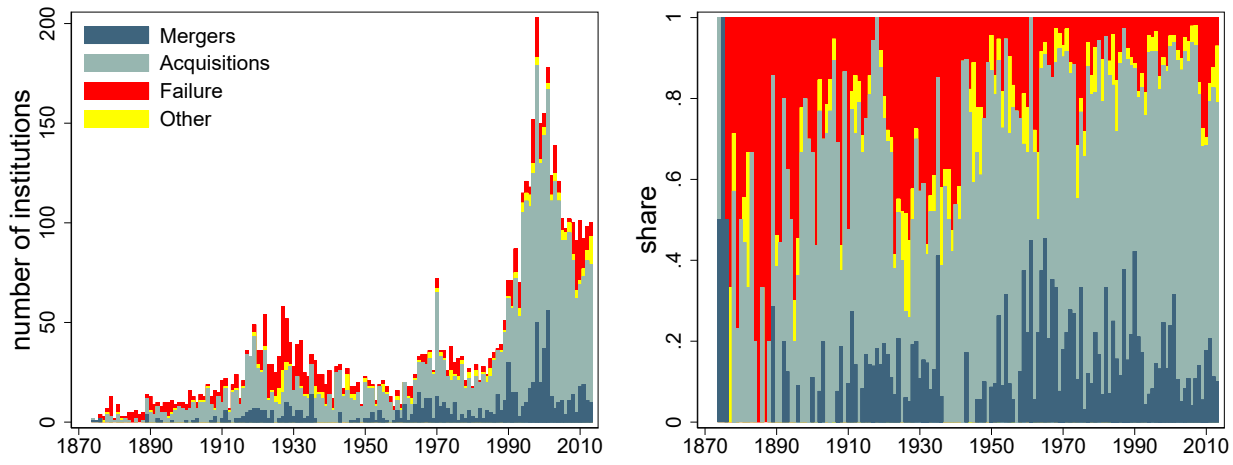


Figure A.5: Bank exit

Panel A shows the absolute (left) and relative (right) frequency of types of bank exits over time. Panel B shows the relative frequency of types of bank exits by bank size. Panel A only includes banks with known exit reason, while panel B also shows unclassified bank exits (grey bars).

Panel A: Number and type of bank exits over time



Panel B: Type of exit by bank size groups

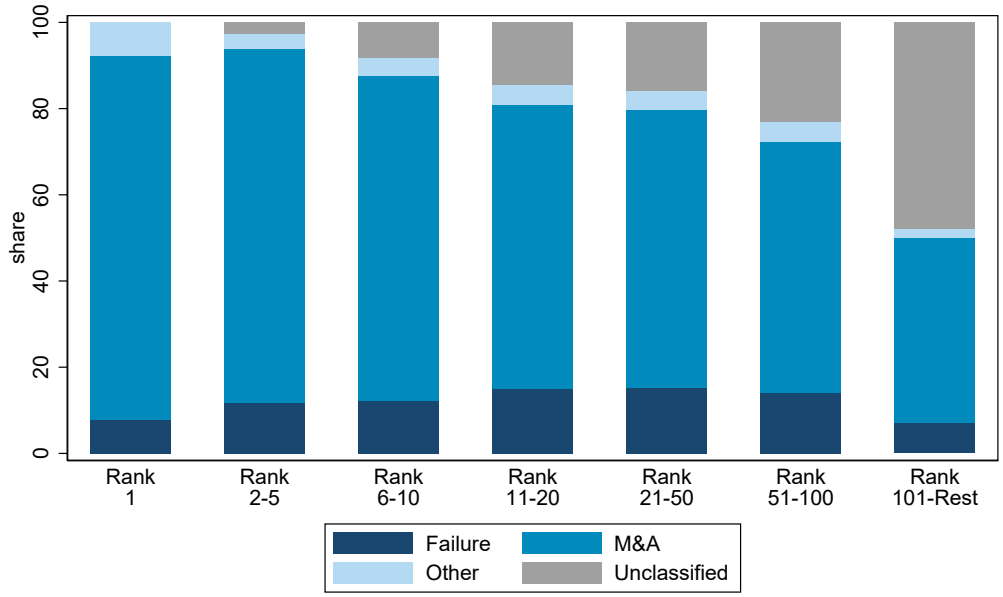


Figure A.6: M&A trends

The figure shows trends in M&A activity in our database. The left-hand plot shows the share of banking sector assets acquired or involved in a merger in a given year averaged across the 17 countries in our sample. The right-hand plot shows the number of individual Mergers and Acquisitions with target assets exceeding 10% of banking sector assets.

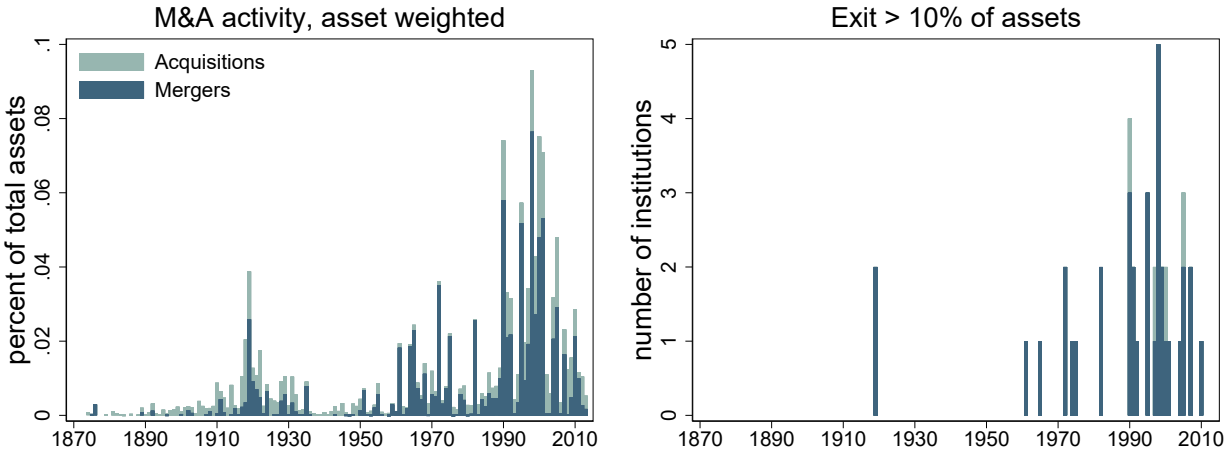


Figure A.7: Transition matrix between bank size groups over long horizons

The figure shows transition probabilities between bank size ranks for 30 year (left plot) and for 50 year intervals (right plot). We code a transition to exit if an observation is the last for a bank in the database and if the banks recorded resolution year is within the next three years. For banks with unknown resolution years we treat the end of data as their exit year.

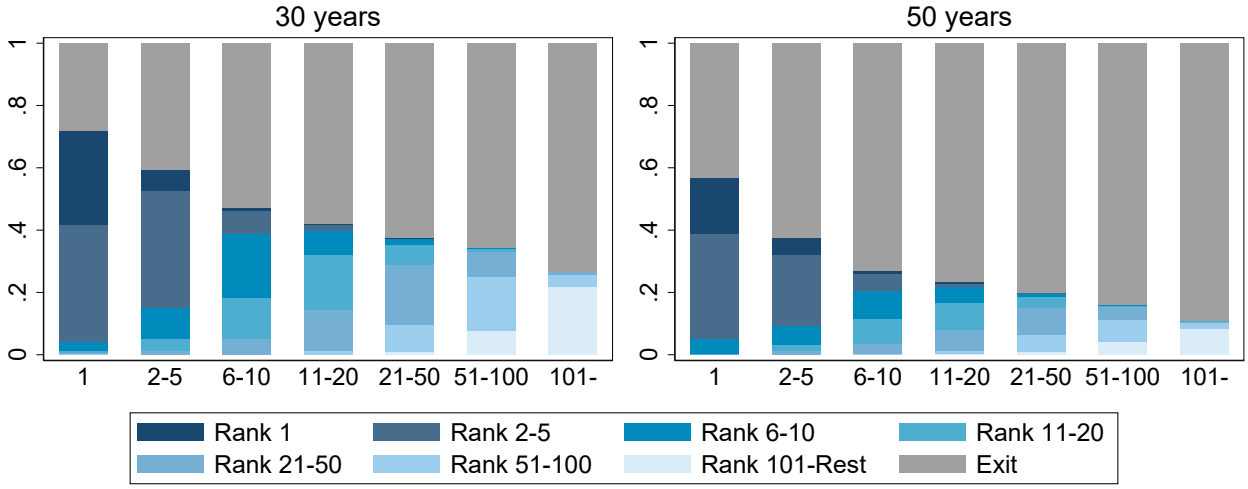


Table A.1: Largest three banks in 1910, 1960 and 2010 by country

Notes: Table shows the largest three banks in 1910, 1960 and 2010 in our database. Bank names are constant in the database and might therefore deviate from banks historical names.

Country	Year	Top 1	Top 2	Top 3
Australia	1910	Bank of New South Wales	Union Bank of Australia	Bank of Australasia
Australia	1960	Bank of New South Wales	Australia and New Zealand Bank	Commonwealth Bank of Australia
Australia	2010	National Australia Bank	Commonwealth Bank of Australia	Westpac
Belgium	1910	Societe Generale de Belgique	Caisse Generale Reports et Depots	Societe Francaise de Banque et de Depots
Belgium	1960	Banque de la Societe Generale de Belgique	Banque de Bruxelles	Societe Belge de Banque
Belgium	2010	Fortis Bank (Paribas)	KBC Bank Groep	KBC Bank
Canada	1910	Bank of Montreal	Canadian Bank of Commerce	Royal Bank of Canada
Canada	1960	Royal Bank of Canada	Bank of Montreal	Canadian Bank of Commerce
Canada	2010	Royal Bank of Canada	Toronto-Dominion Bank	Bank of Nova Scotia
Denmark	1910	Den Danske Bank	Kjobenhavns Handelsbank	Privatbanken
Denmark	1960	Den Danske Bank	Kjobenhavns Handelsbank	Privatbanken
Denmark	2010	Den Danske Bank	Nordea Bank Danmark	Jyske Bank
Finland	1910	Yhdyspankki Suomessa	Kansallis Osake Pankki	Pohjoismaiden Osake Pankki
Finland	1960	Kansallis Osake Pankki	Pohjoismaiden Yhdyspankki	Postisäästöpankki
Finland	2010	Nordea Bank Finland Plc	OP-Pohjola Group	Sampo plc
France	1910	Credit Lyonnais	Societe Generale	Comptoir National d'Escompte
France	1960	Credit Foncier de France	Credit Lyonnais	Societe Generale
France	2010	BNP Paribas	Credit Agricole-Credit Agricole Group	Credit Agricole S.A.
Germany	1910	Deutsche Bank	Dresdner Bank	Berliner Disconto-Gesellschaft
Germany	1960	Deutsche Bank	Dresdner Bank	Commerzbank
Germany	2010	Deutsche Bank	Commerzbank	DZ Bank
Italy	1910	Cariplo	Banca Commerciale Italiana	Credito Italiano
Italy	1960	Banca Nazionale del Lavoro	Banca Commerciale Italiana	Credito Italiano
Italy	2010	Unicredito Italiano Spa	Gruppo Bancario Intesa Sanpaolo	Monte dei Paschi di Siena
Japan	1910	Yokohama Specie Bank	Mitsui Bank	Nippon Kangyo Bank
Japan	1960	Fuji Bank	Sanwa Bank	Sumitomo Bank
Japan	2010	Mitsubishi UFJ Financial Group	Japan Post Bank	Mizuho Financial Group
Netherlands	1910	Nederlandsche Handel Maatschappij	Twentsche Bank	Amsterdamsche Bank
Netherlands	1960	Amsterdamsche Bank	Nederlandsche Handel Maatschappij	Rotterdamsche Bankvereeniging
Netherlands	2010	ING Bank NV	Cooperative Centrale Raiffeisen-Boerenleen Bank	Abn Amro Bank
Norway	1910	Centralbanken for Norge, Kr.a	Den Norske Creditbank	Bergens Privatbank
Norway	1960	Den Norske Creditbank	Bergens Privatbank	Christiania Bank og Kreditkasse
Norway	2010	DNBank	Nordea Norge	SpareBank 1 SR-Bank ASA
Portugal	1910	Banco Nacional Ultramarino	Caixa Geral de Depositos	Banco Lisboa & Açores
Portugal	1960	Caixa Geral de Depositos	Banco de Angola	Banco Português do Atlântico
Portugal	2010	Caixa Geral de Depositos	Banco Commercial Portugues	Banco Espirito Santo
Spain	1910	Hipotecario de Espana	Banco Hispano Americano	Banco de Bilbao
Spain	1960	Banco Espanol de Credito	Banco Hispano Americano	Banco Central
Spain	2010	Banco de Santander	BBVA	Caixabank, S.A.
Sweden	1910	Skandinaviska Kreditaktiebolaget	Inteckningsbanken aktiebolag	Aktiebolaget Svenska Handelsbank
Sweden	1960	Aktiebolaget Svenska Handelsbank	Skandinaviska Kreditaktiebolaget	Sveriges Kreditbank
Sweden	2010	Nordea Bank AB (publ)	Skandinaviska Enskilda Banken	Aktiebolaget Svenska Handelsbank
Switzerland	1910	Schweizerischer Bankverein	Schweizerische Kreditanstalt	Züricher Kantonalbank
Switzerland	1960	Schweizerischer Bankverein	Schweizerische Kreditanstalt	Schweizerische Bankgesellschaft
Switzerland	2010	UBS AG	Schweizerische Kreditanstalt	Schweizer Verband der Raiffeisenkassen
UK	1910	Lloyds Bank	Westminster Bank	Midland Bank
UK	1960	Barclays Bank	Midland Bank	Lloyds Bank
UK	2010	Barclays Bank	Royal Bank of Scotland	Lloyds Bank
USA	1910	National City Bank, New York	National Bank of Commerce, New York	Continental and Commercial National Bank, Chicago
USA	1960	BankAmerica Corp-Old	Chase Manhattan Corp-Old	Citicorp
USA	2010	Bank of America Corp	JPMorgan Chase & Co	Citigroup

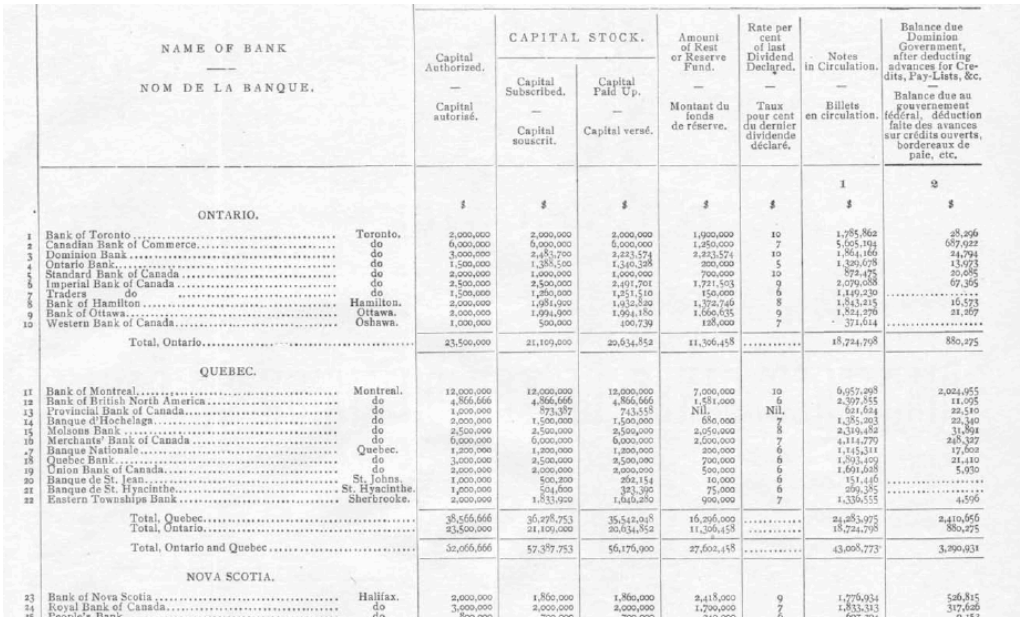
Table A.2: Persistence of banks and nonfinancials

Top-5 firms from the year:	Status in 2020:	Banks %	Nonfinancials %
1880	Top 5	37.1	(no data)
	Top 6-20	1.4	
	Rank 21+	0.0	
	Acquired	54.3	
	Bankrupt	7.1	
		(N=70)	
1910	Top 5	49.4	11.4
	Top 6-20	3.5	10.0
	Rank 21+	0.0	15.7
	Acquired	40.0	57.1
	Bankrupt	7.1	5.7
		(N=85)	*(N=70)*
1970	Top 5	57.7	28.8
	Top 6-20	2.4	26.3
	Rank 21+	0.0	8.8
	Acquired	38.8	33.8
	Bankrupt	1.2	2.5
		(N=85)	*(N=80)*

Data Appendix

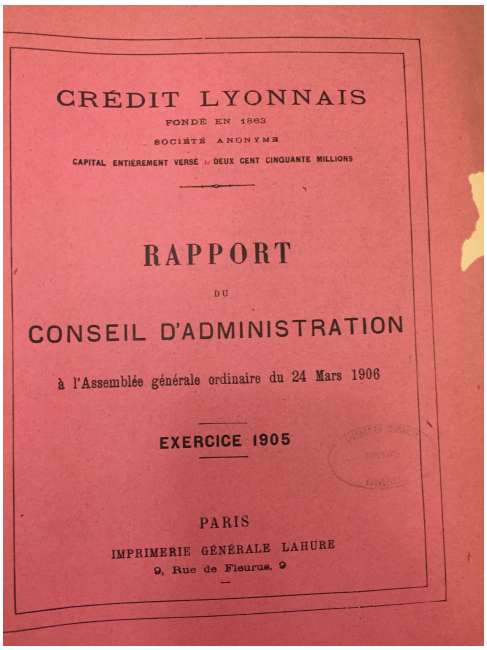
Figure B.1: Historical balance sheet examples

Panel A: Canadian banks in 1900 (cropped from larger table)



	NAME OF BANK — NOM DE LA BANQUE.		CAPITAL STOCK. Capital Authorized. — Capital autorisé.	Capital Subscribed. — Capital souscrit.	Capital Paid Up. — Capital versé.	Amount of Rest or Reserve Fund. — Montant du fonds de réserve.	Rate per cent of last Dividend Declared. — Taux pour cent du dernier dividende déclaré.	Notes in Circulation. — Billets en circulation.	Balance due Dominion Government, after deducting advances for Credits, Pay-Lists, &c. — Balance due au gouvernement fédéral, déduction faite des avances sur crédits ouverts, bordereaux de paie, etc.
			$	$	$	$	$	1 $	2 $
	ONTARIO.								
1	Bank of Toronto	Toronto.	2,000,000	2,000,000	2,000,000	1,900,000	10	1,785,862	28,296
2	Canadian Bank of Commerce	do	6,000,000	6,000,000	6,000,000	1,250,000	7	5,508,194	687,922
3	Dominion Bank	do	2,000,000	2,483,700	2,223,574	2,223,574	10	1,861,166	24,794
4	Ontario Bank	do	1,500,000	1,385,500	1,340,388	200,000	5	1,320,078	13,973
5	Standard Bank of Canada	do	2,000,000	1,000,000	1,000,000	700,000	10	872,425	20,685
6	Imperial Bank of Canada	do	2,500,000	2,500,000	2,491,701	1,721,503	9	2,079,088	67,365
7	Traders do	do	1,500,000	1,260,000	1,251,510	150,000	6	1,149,230	
8	Bank of Hamilton	Hamilton.	2,000,000	1,981,900	1,932,820	1,372,746	8	1,843,215	16,573
9	Bank of Ottawa	Ottawa.	2,000,000	1,994,900	1,994,180	1,666,635	9	1,824,276	21,267
10	Western Bank of Canada	Oshawa.	1,000,000	500,000	490,739	128,000	7	371,614	
	Total, Ontario		23,500,000	21,109,000	20,634,852	11,306,458		18,724,798	880,275
	QUEBEC.								
11	Bank of Montreal	Montreal.	12,000,000	12,000,000	12,000,000	7,000,000	10	6,957,298	2,024,955
12	Bank of British North America	do	4,866,666	4,866,666	4,866,666	1,581,000	6	2,397,855	11,095
13	Provincial Bank of Canada	do	1,000,000	873,387	743,558	Nil.	Nil.	621,624	22,510
14	Banque d'Hochelaga	do	2,000,000	1,500,000	1,500,000	686,000	7	1,385,203	22,340
15	Molsons Bank	do	2,500,000	2,500,000	2,500,000	2,050,000	8	2,319,482	31,891
16	Merchants' Bank of Canada	do	6,000,000	6,000,000	6,000,000	2,500,000	7	4,114,770	248,327
17	Banque Nationale	Quebec.	1,200,000	1,200,000	1,200,000	200,000	6	1,145,311	17,602
18	Quebec Bank	do	3,000,000	2,500,000	2,500,000	700,000	6	1,893,469	21,110
19	Union Bank of Canada	do	2,000,000	2,000,000	2,000,000	500,000	6	1,691,628	5,930
20	Banque de St. Jean	St. Johns.	1,000,000	500,200	262,154	10,000	6	151,446	
21	Banque de St. Hyacinthe	St. Hyacinthe.	1,000,000	504,800	323,390	75,000	6	269,375	
22	Eastern Townships Bank	Sherbrooke.	2,000,000	1,833,900	1,640,280	900,000	7	1,339,555	4,596
	Total, Quebec		38,566,666	36,278,753	35,542,048	16,296,000		24,283,975	2,410,956
	Total, Ontario		23,500,000	21,109,000	20,634,852	11,306,458		18,724,798	880,275
	Total, Ontario and Quebec		62,066,666	57,387,753	56,176,900	27,602,458		43,008,773	3,290,931
	NOVA SCOTIA.								
23	Bank of Nova Scotia	Halifax.	2,000,000	1,860,000	1,860,000	2,418,000	9	1,776,934	526,815
24	Royal Bank of Canada	do	3,000,000	2,000,000	2,000,000	1,700,000	7	1,833,313	317,626

Panel B: Credit Lyonnais, France, in 1905



CRÉDIT LYONNAIS

FONDÉ EN 1863

SOCIÉTÉ ANONYME

CAPITAL ENTIÈREMENT VERSÉ : DEUX CENT CINQUANTE MILLIONS

RAPPORT

DU

CONSEIL D'ADMINISTRATION

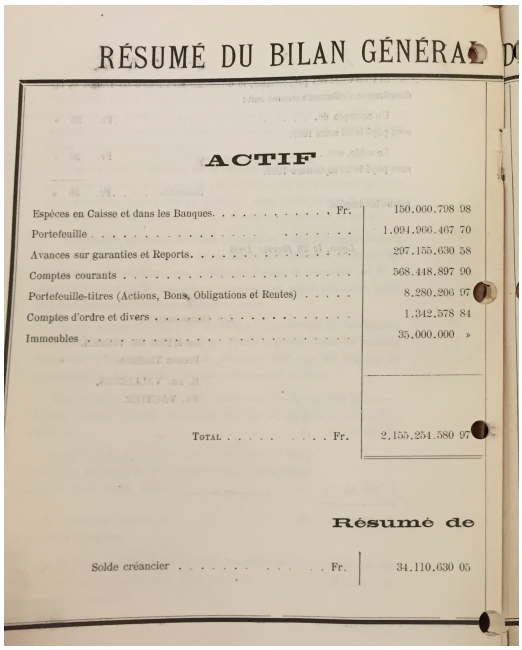
à l'Assemblée générale ordinaire du 24 Mars 1906

EXERCICE 1905

PARIS

IMPRIMERIE GÉNÉRALE LAHURE

9, Rue de Fleurus, 9



RÉSUMÉ DU BILAN GÉNÉRAL

ACTIF

Espèces en Caisse et dans les Banques	Fr.	150.060.708 98
Portefeuille		1.094.906.467 70
Avances sur garanties et Reports		297.155.630 58
Comptes courants		568.448.897 90
Portefeuille-titres (Actions, Bons, Obligations et Rentes)		8.280.206 97
Comptes d'ordre et divers		1.342.578 84
Immeubles		35.000.000 »
TOTAL	Fr.	2.155.254.580 97

Résumé de

Solde créancier	Fr.	34.110.630 05

Figure B.2: Schematic illustration of bank evolution

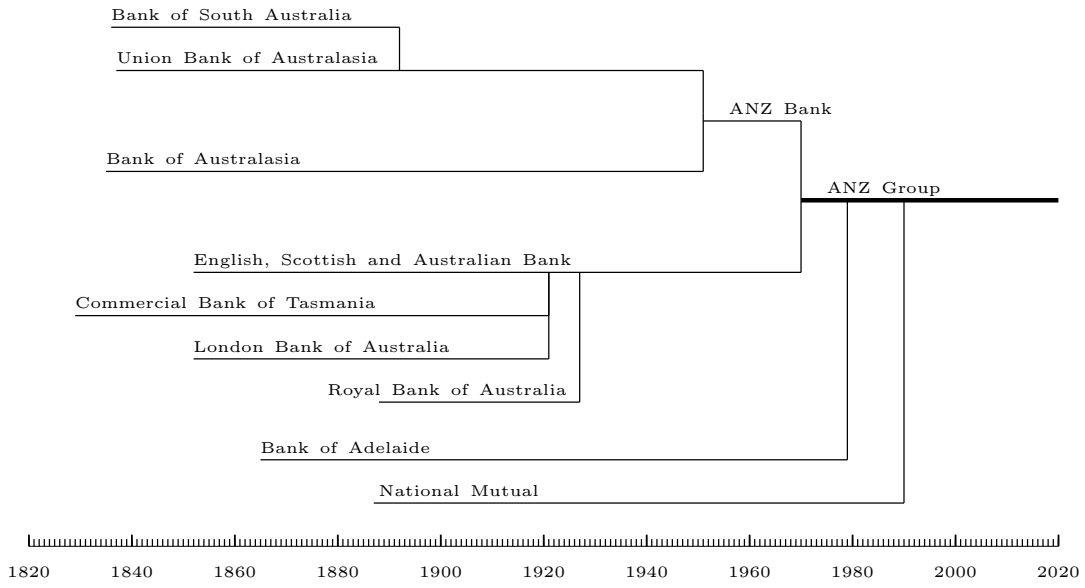


Figure B.3: Credit growth by bank size

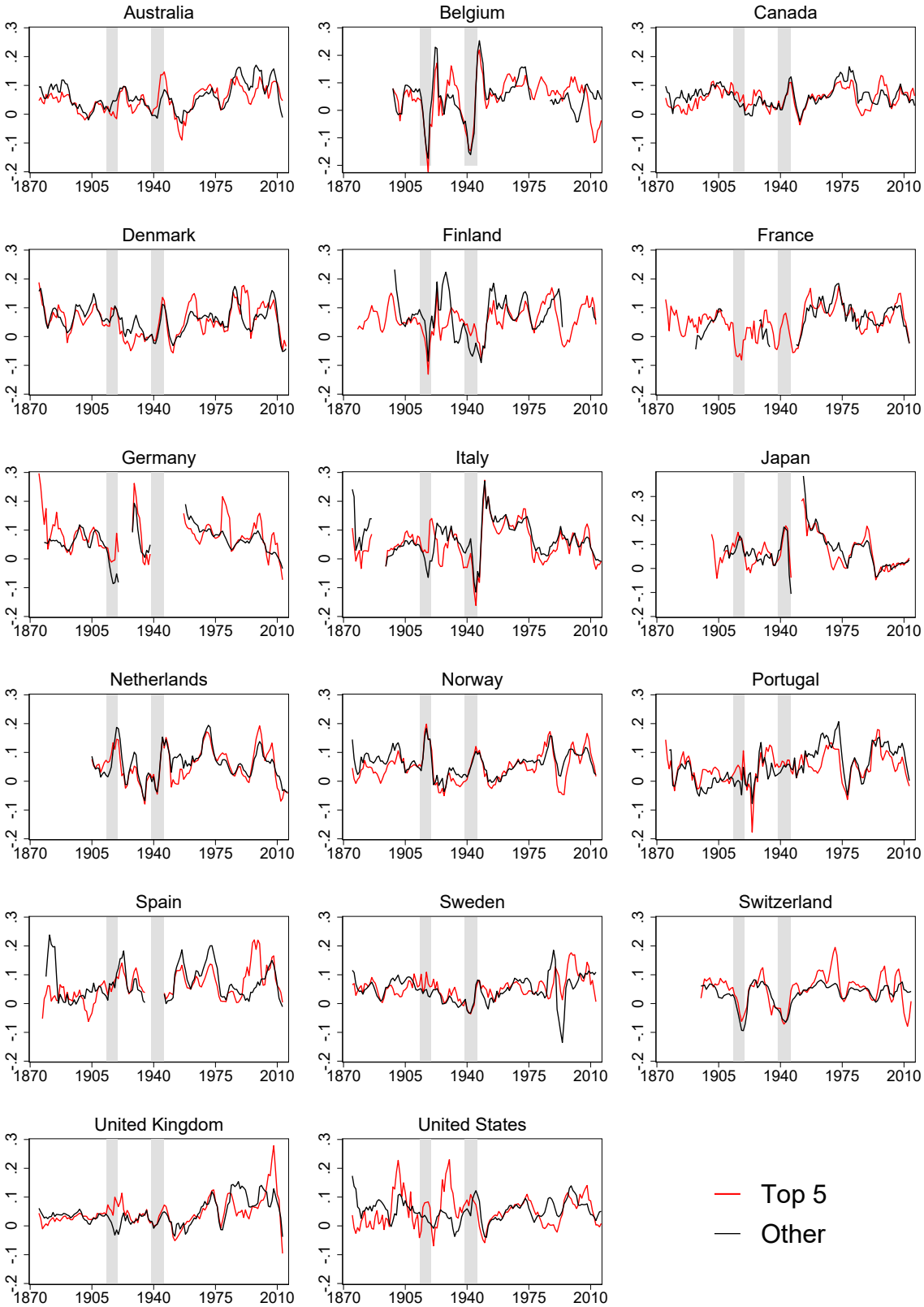


Figure B.4: Ratio of total assets relative to JRST (2021)

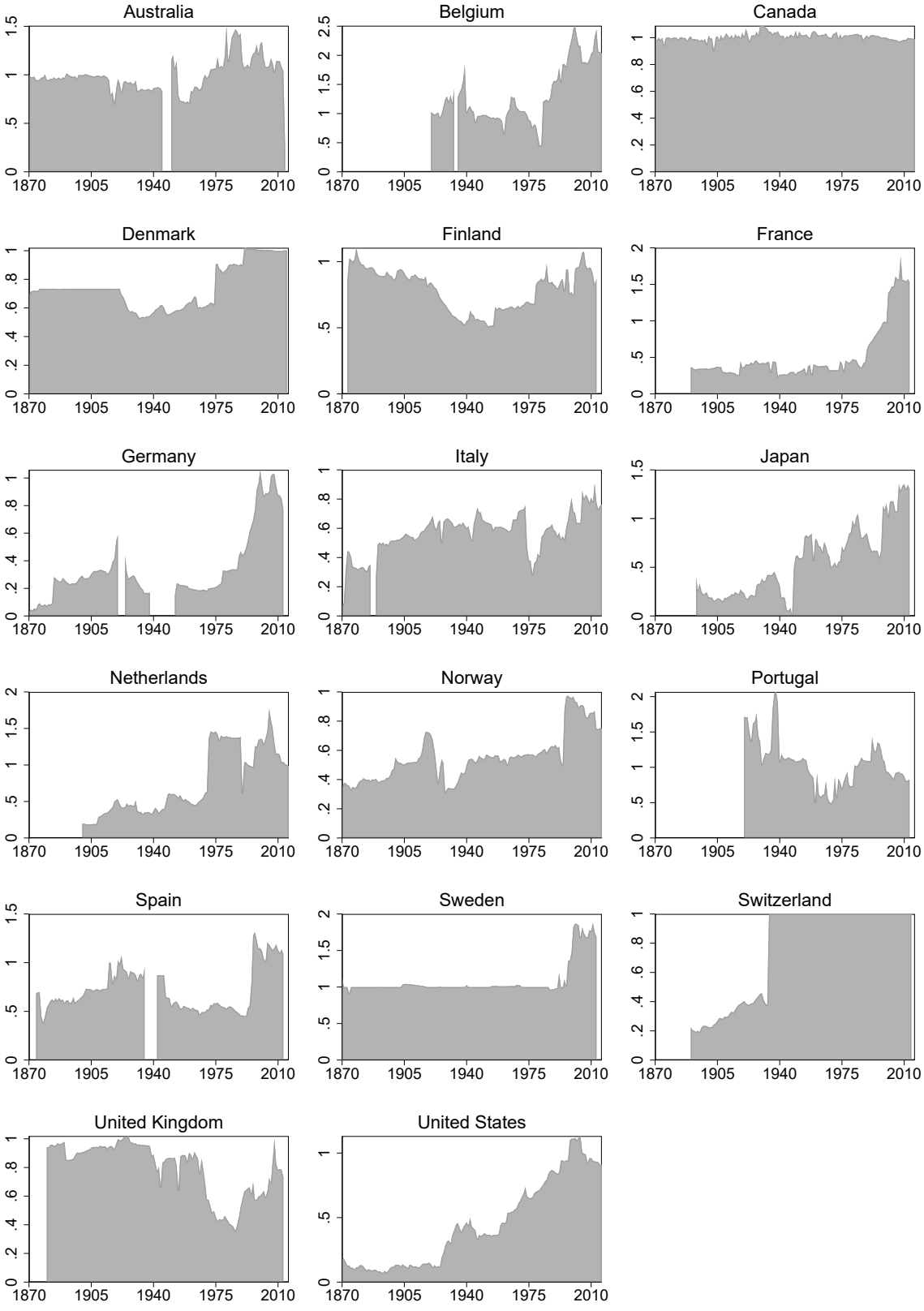


Figure B.5: Concentration by country

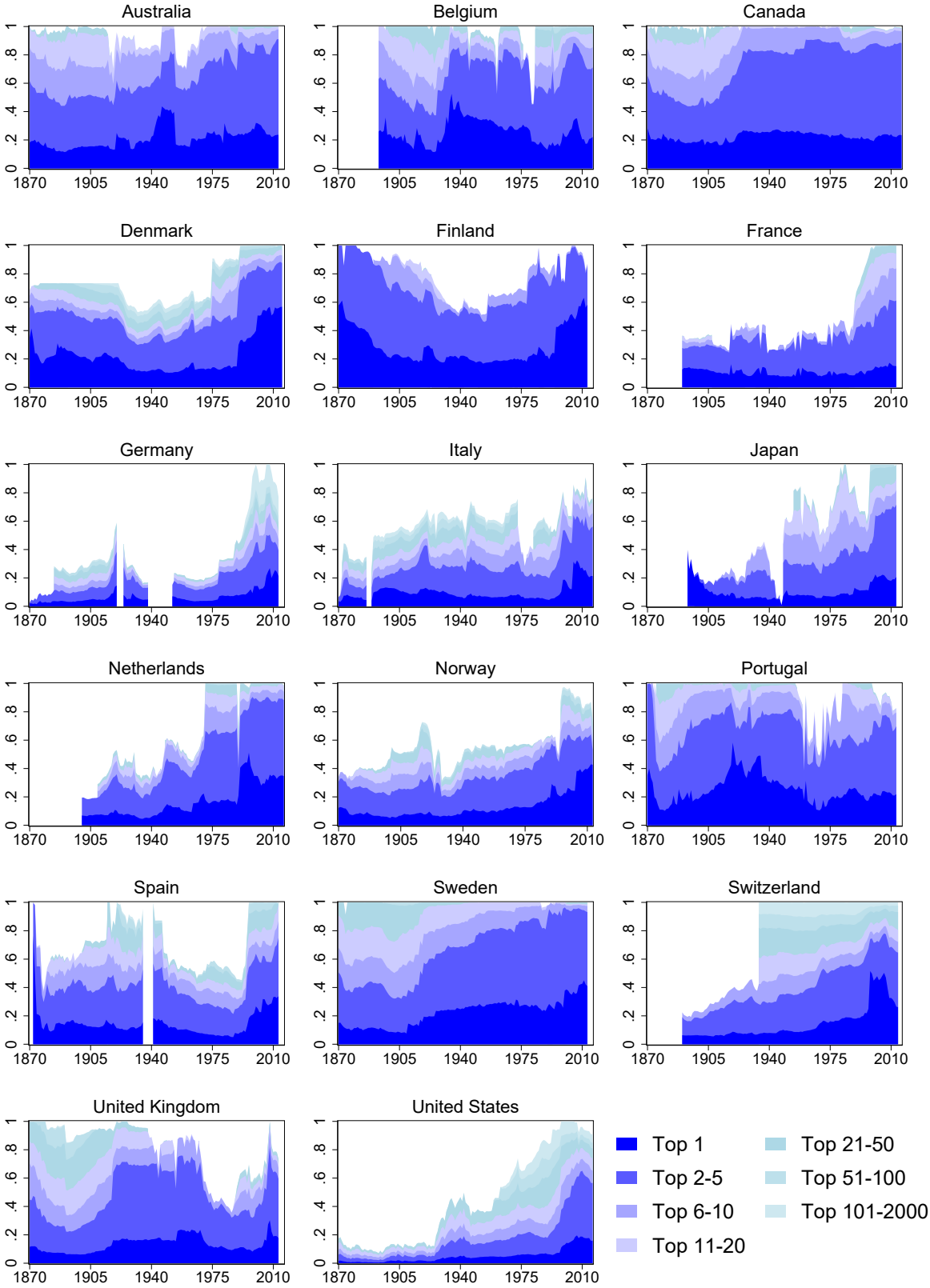


Table B.1: Banking crises

This table lists the set of banking crises studied in this paper, which is formed by combining the set of JST and BVX banking crisis episodes on the set of 17 countries studied in this paper. We then select out those that are preceded by credit booms (defined as aggregate bank credit to GDP increasing cumulatively by more than 5 percentage points in the five years preceding the crisis). The table also lists the episodes *not* preceded by credit booms (below).

Country	BVX year	JST year	Preceded by credit boom?	Year of credit boom peak (if different)	Used in bank stock return analysis?	Notes on bank stock data
Preceded by credit boom						
Australia	1893	1893	1	1891	1	
Australia	1931		1	1930	1	
Australia	1989	1989	1	1990	1	
Belgium	1883	1885	1		1	
Belgium	1929	1931	1	1930	1	
Belgium	2008	2008	1	2007	1	
Canada		1907	1	1906	1	
Canada	1920		1		1	
Canada	1930		1	1929	1	
Canada	1982		1		1	
Denmark	1877	1877	1	1875	1	
Denmark	1885	1885	1	1884	1	
Denmark	1907	1908	1	1907	1	
Denmark	1919	1921	1	1920	1	
Denmark	1931		1		1	
Denmark	1992	1987	1	1991	1	
Denmark	2008	2008	1		1	
Finland	1900	1900	1		0	no bank stock data
Finland	1921	1921	1	1920	1	
Finland	1931	1931	1	1928	1	
Finland	1990	1991	1		1	
France	1930	1930	1	1931	1	
France	1994		1	1992	1	
France	2008	2008	1		1	
Germany	1874	1873	1	1873	1	
Germany	1891	1891	1	1889	1	
Germany	1901	1901	1	1900	1	
Germany	1930	1931	1	1930	1	
Italy	1889	1887	1		1	1887 and 1893 treated as distinct episodes
Italy	1907	1907	1	1906	1	
Italy	1921	1921	1		1	
Italy	1930	1930	1	1928	1	
Italy	2008	2008	1		1	
Japan	1920	1920	1	1919	0	very limited bank stock data
Japan	1927	1927	1		1	
Japan	1990	*	1		1	JST date this banking crisis as 1997, which we
Netherlands	1907		1		1	mark as a separate episode (see below).
Netherlands	1921	1921	1	1920	1	
Netherlands	1931		1	1929	1	
Netherlands	2008	2008	1		1	
Norway	1898	1899	1		0	1898 and 1903 treated as distinct episodes
Norway	1919	1922	1		1	
Norway	1931	1931	1		0	no stock data
Norway	1987	1988	1	1989	1	
Norway	2008		1		0	very limited bank stock data
Portugal	1890	1890	1	1889	0	very limited bank stock data
Portugal	1921	1920	1	1920	0	very limited bank stock data
Portugal	1923	1923	1		0	very limited bank stock data
Portugal	1931	1931	1	1929	1	
Portugal	2008	2008	1		1	
Spain	1920	1920	1		0	very limited bank stock data
Spain	1931	1931	1	1930	0	very limited bank stock data
Spain	1975	1977	1	1976	1	
Spain	2008	2008	1		1	
Sweden	1907	1907	1		1	

Sweden	1919	1922	1	1920	1	
Sweden	1931	1931	1	1930	1	
Sweden	1991	1991	1		1	
Sweden	2008	2008	1		1	
Switzerland	1931	1931	1	1930	1	
Switzerland	1990	1991	1	1990	1	
Switzerland	2008	2008	1	2007	1	
U.K.	1890	1890	1		1	
U.K.	1973	1974	1	1973	1	
U.K.	1991	1991	1		1	
U.K.	2008	2007	1		1	
U.S.	1873	1873	1	1875	0	very limited bank stock data
U.S.	1893	1893	1		0	very limited bank stock data
U.S.	1907	1907	1		0	very limited bank stock data
U.S.	1930	1930	1	1930	1	
U.S.	1990	*	1	1989	1	JST date this banking crisis as 1984, which we
U.S.	2007	2007	1	2007	1	mark as a separate episode (see below).
Not preceded by credit boom						
Belgium	1870	1870	0		0	no bank stock data
Belgium	1876	1876	0		0	no bank stock data
Belgium	1914		0		0	no bank stock data
Belgium		1925	0		1	
Belgium		1934	0		0	we combine with 1931 episode
Belgium	1939	1939	0		0	no bank stock data
Canada	1873		0		1	
Finland		1877	0		0	no bank stock data
France	1871		0		0	no bank stock data
France	1882	1882	0		1	
France	1889	1889	0		1	
France	1914		0		0	no bank stock data
France	1937		0		0	no bank stock data
Germany	1914		0		0	no bank stock data
Germany	2008	2008	0		1	
Italy	1873	1873	0		0	no bank stock data
Italy	1914		0		0	no bank stock data
Italy		1935	0		0	no bank stock data
Italy	1992	1990	0		1	
Japan	1871	1871	0		0	no bank stock data
Japan	1882		0		0	no bank stock data
Japan	1890	1890	0		0	no bank stock data
Japan	1901	1901	0		0	no bank stock data
Japan	1907	1907	0		0	very limited bank stock data
Japan	1922		0		0	very limited bank stock data
Japan	1923		0		0	very limited bank stock data
Japan	1997	1997	0		1	
Japan	2001		0		1	
Netherlands	1914		0		0	no bank stock data
Netherlands			0		0	no bank stock data
Norway	1914		0		0	no bank stock data
Portugal	1876		0		0	no bank stock data
Spain	1890	1890	0		0	very limited bank stock data
Spain	1913	1913	0		0	very limited bank stock data
Spain	1924	1924	0		0	very limited bank stock data
Sweden	1878	1878	0		1	
Switzerland	1870	1870	0		0	very limited bank stock data
Switzerland		1910	0		1	
Switzerland	1914		0		0	no bank stock data
Switzerland	1919		0		1	
U.K.	1878		0		1	
U.K.	1914		0		0	no bank stock data
U.S.	1884		0		0	very limited bank stock data
U.S.	1890		0		0	very limited bank stock data
U.S.	1984	1984	0		1	