The interaction of monetary, macro- and microprudential policies:

Large banks and financial crises

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Banco de Portugal Conference

2 October 2023

Motivation

- Understanding and preventing financial instability remains an urgent priority
- Existing evidence points to complex interaction between monetary and micro and macroprudential policies
- Many open questions on the importance of macro vs. micro factors remain
- New insights from an ambitious research project with Matt Baron (Cornell) and Kaspar Zimmermann (Frankfurt School)

A new project

- Study financial crisis dynamics under the microscope using long-run data for balance sheets of 11.000 commercial banks in 17 advanced economies over the period 1870-2016.
- Investigate banking industry structure and bank-level dynamics before, during, and after financial crises, focusing on role of **"large banks" (top-5 by assets, by country)**.
- **Key initial finding:** A large increase in the size of the top-5 banks, both relative to GDP and relative to the rest of the banking system, across all 17 economies.

Key findings

1. "Survival of the Biggest"
   - Large banks (i.e., top-5 by assets) rarely exit or fail in crises
   - In fact, market share of large banks grows in crises, making them even more dominant after

2. Large banks take more risks in the crisis run-up, perform worse *ex post*
   - Increased risk-taking along a number of dimensions during the credit boom
   - After crisis: larger bank stock declines, larger bank-level credit contractions

3. Reasons for large banks' higher survival rates, despite their worse performance:
   - Large banks have a more stable funding structure
   - Regulators are substantially more likely to rescue top-5 banks on the verge of failure

4. Large-bank-dominated systems are not more stable for the macroeconomy
   - Same crisis probability, worse macroeconomic outcomes conditional on crisis

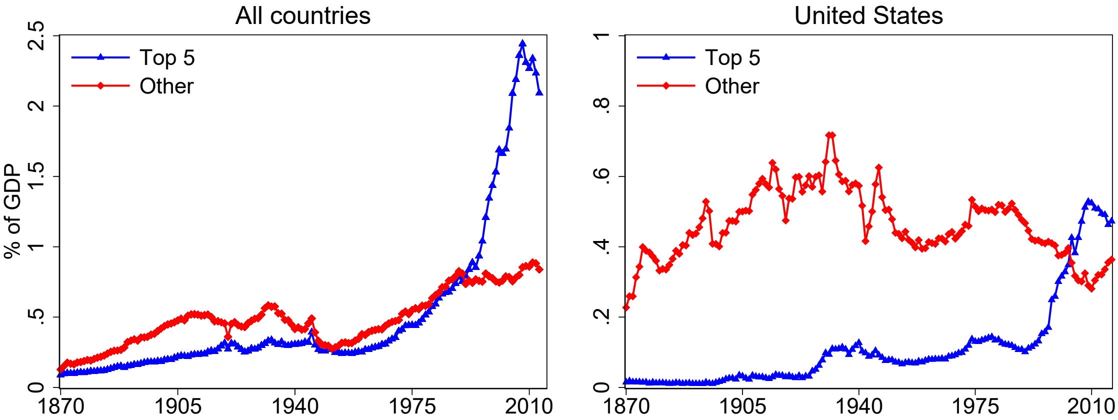
Data

- Historical data set covering the balance sheets of commercial banks for 17 advanced economies since 1870
  - Countries: Australia, Belgium, Canada, ... Portugal, U.K., U.S.
  - 11,600 unique banks, most newly transcribed from archival sources

- We also gather information on
  - All entries/exits in our database (New entries, M&As, spinoffs, failures)
  - Stock prices for the largest 20 banks around banking crises

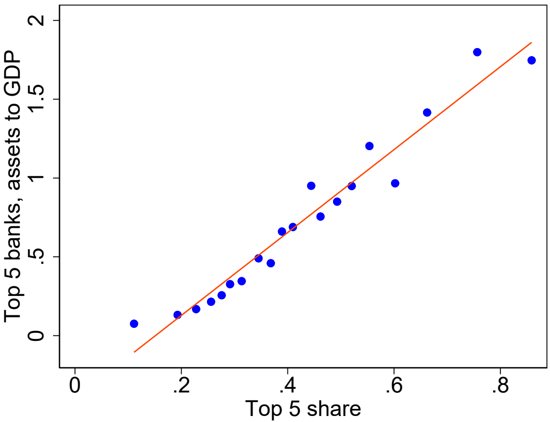
- Some definitions:
  1. **"Large" bank** = Top-5 by assets
  2. **"Banking crises"** defined by *aggregate credit crunches* (less than -1 s.d., using Jorda-Schularick-Taylor data on aggregate bank credit-to-GDP)
  3. **"Large-bank-dominated"** systems = Asset share of top-5 banks $\geq$ 50%

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

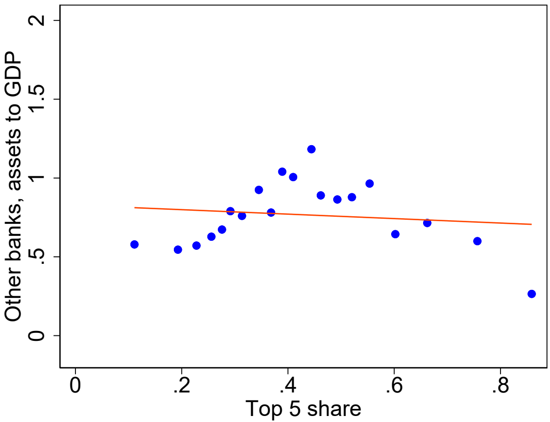


Expansion of top-5 banks accounts for most of recent rise in banking sector size

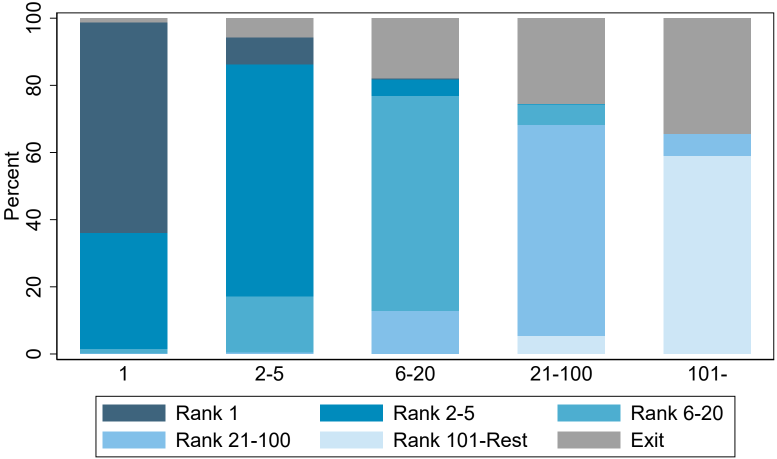
Top-5 banks: assets-to-GDP



All other banks: assets-to-GDP

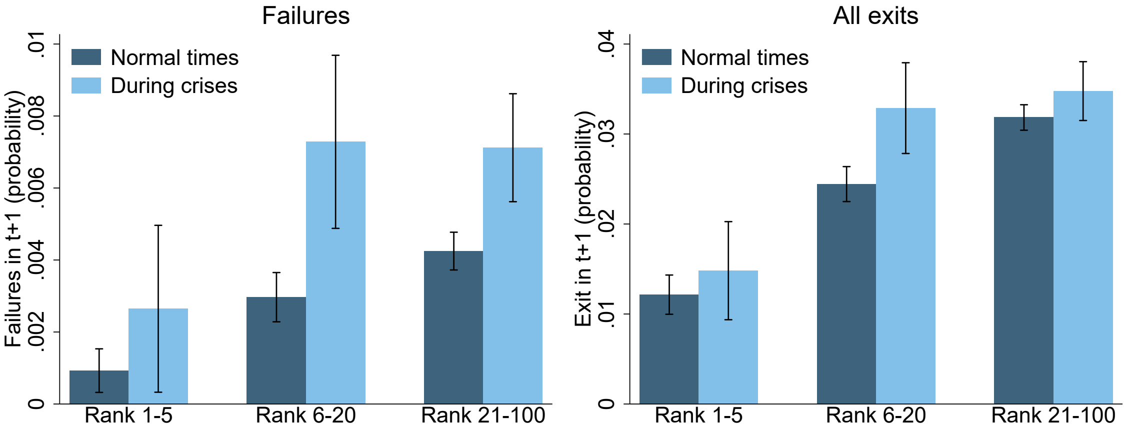


Large banks are highly persistent across history



Top-5 banks rarely fail or exit during crises

Failures and exit rates by bank size



Top-5 banks are *not* more prudent around crises

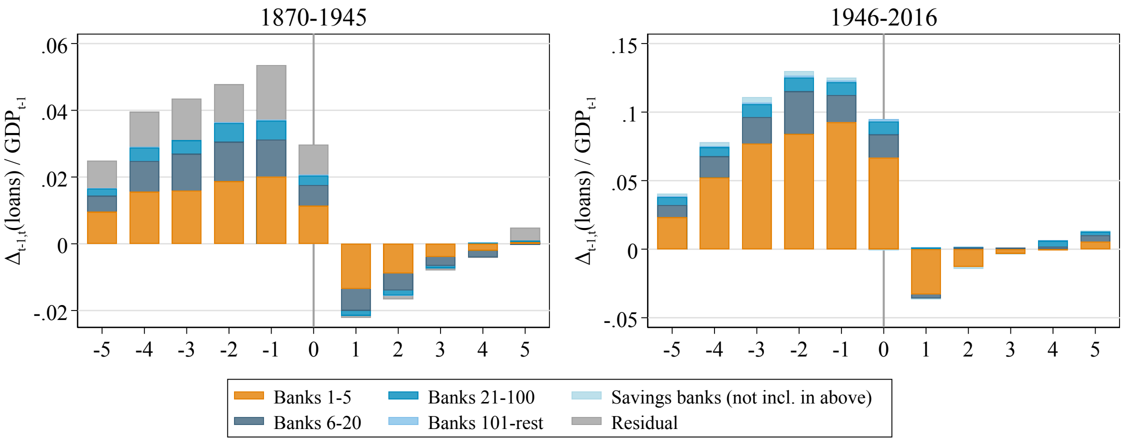
⟶ Take more risks in run-up to crises *(relative to other banks)*

1. Increase their loan growth at a faster rate
2. Decrease equity-to-assets ratio more
3. Increase noncore-liabilities-to-assets ratio more
4. Decrease "safe assets"-to-assets ratio more

⟶ Worse stock declines and credit contractions

⟶ Risk-taking differential magnified in large-bank-dominated systems

Top-5 banks' contribution to credit cycles around banking crises



Post-1945 period: Top-5 banks comprise **75% of aggregate credit boom, 100% of bust**

Funding dynamics and government interventions during banking crises

$\longrightarrow$ Large banks more stable funding:

- Deposit outflows less sensitive to large declines in their bank stock
- Methodology of Calomiris and Wilson (2004), Blickle, Brunnermeier, and Luck (2022)

$\longrightarrow$ Regulators substantially more likely to rescue top-5 banks on the verge of failure

Government interventions: rescuing banks on the verge of failure

Frequency, conditional on bank equity returns $\leq$ -90%

	Top-5 banks (N=88, freq=13%) (1)	Top 6-20 banks (N=174, freq=11%) (2)	Difference (3)
Bank did not fail or exit	78%	26%	52%***
Saved by regulators from failing	64%	13%	51%***
All creditors protected from losses	90%	59%	31%***

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If (hypothetically) regulators never did any of these interventions, then survival rates between large vs. small would be similar:

- (78% - 64%) = 14% vs. (26% - 13%) = 13%

Large-bank-dominated systems:

Same crisis probability, but worse macroeconomic outcomes

Banking sector structure and financial stability

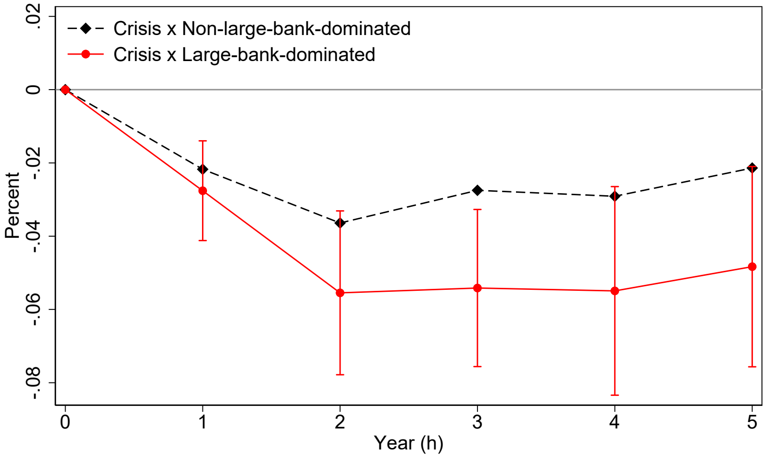
In large-bank-dominated (LBD) financial systems:

1. No evidence that crises are less frequent (null result)
2. Conditional on experiencing a crisis, GDP declines and credit contractions are deeper

Crises are not less frequent

	BSZ crisis					JST crisis				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Top 5 asset share$_{t-1}$	-0.01	-0.00	-0.02	-0.03	0.20	-0.02	-0.00	0.01	0.02	0.05
	(0.01)	(0.02)	(0.03)	(0.03)	(0.14)	(0.01)	(0.02)	(0.03)	(0.04)	(0.07)
$\Delta_{t-6,t-1}\text{Loans/GDP}_{t-1}$				0.15**	0.24***				0.16***	0.21***
				(0.05)	(0.08)				(0.04)	(0.06)
Country fixed effect		✓	✓	✓	✓		✓	✓	✓	✓
Decade fixed effect			✓	✓	✓			✓	✓	✓
Post 1980					✓					✓
Observations	2177	2177	2177	1976	596	2177	2177	2177	1976	596

Conditional on crises, GDP declines are deeper



Conclusions

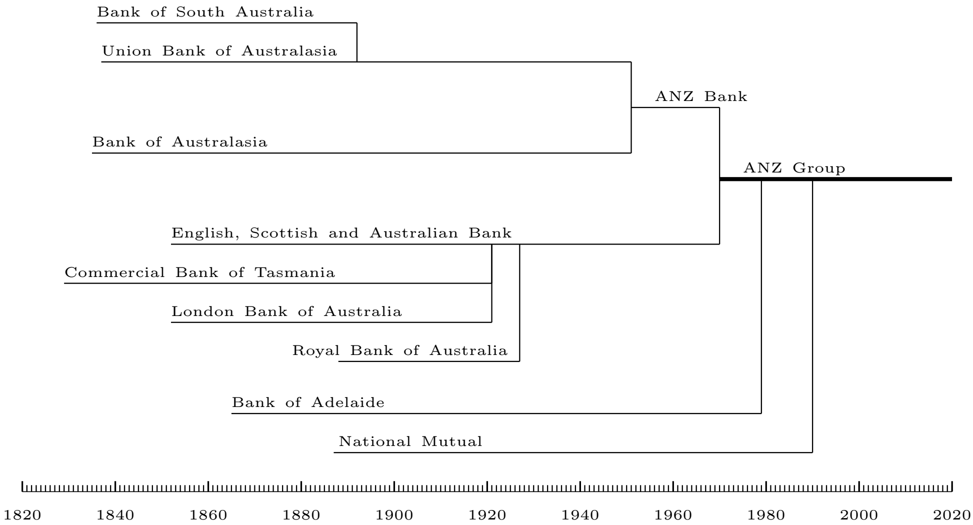
1. Banking crises tend to expand the dominance of the largest banks.
   - This is despite the fact that the largest banks tend to take more risk before crises and suffer greater equity losses in crises.

2. This trend towards agglomeration of the top-5 not entirely due to market forces.
   - Government interventions in crises preventing top-5 failures play an important role.

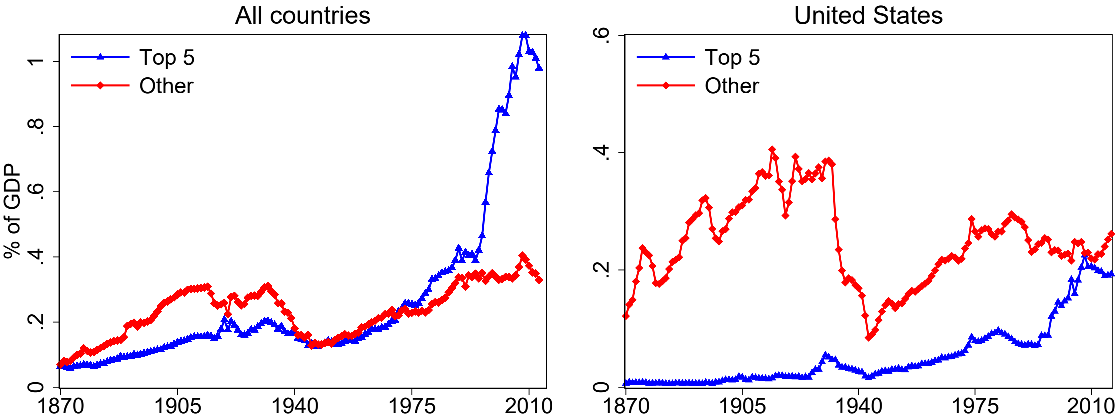
3. Emergence of a financial sector dominated by a few large banks does not appear to be beneficial for financial stability.
   - No evidence that large-bank-dominated systems have lower crisis frequency. Conditional on crises, large-bank-dominated systems see more severe economic outcomes.

Appendix

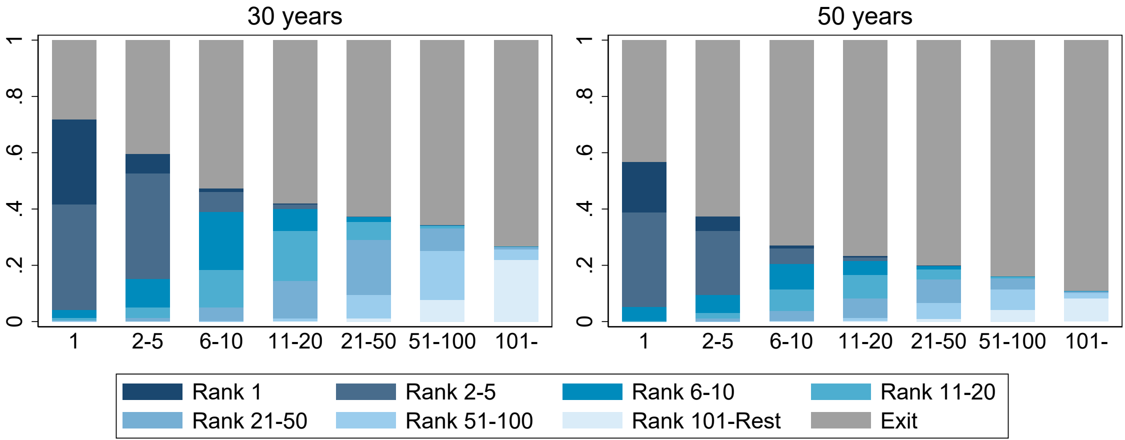
Schematic illustration of bank evolution back



Bank loans-to-GDP of the top-5 banks versus all other banks

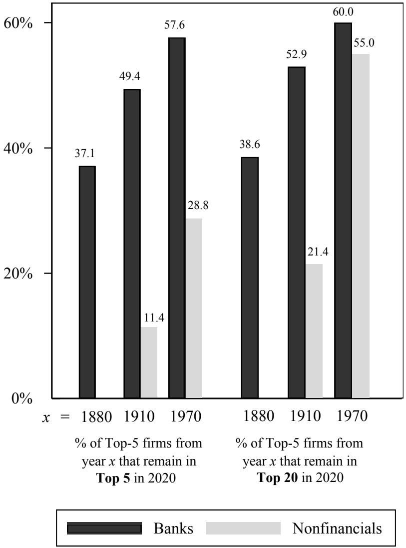


Transition matrix between bank size groups over long horizons



back

Persistence of banks vs nonfinancials

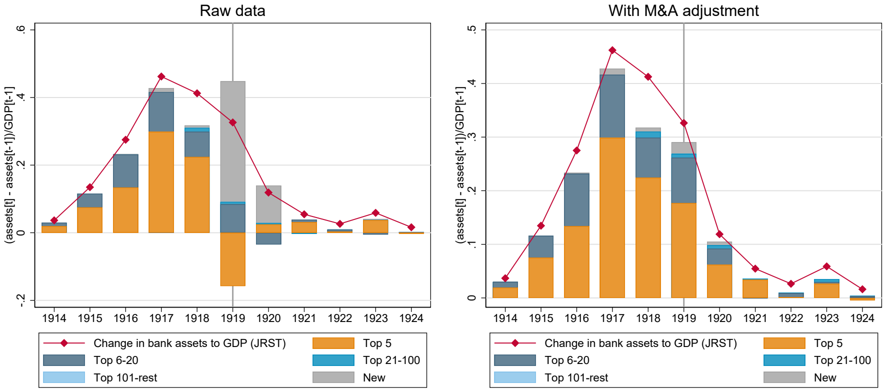


back

Careful treatment of accounting issues, M&As, etc.

Example: Finland 1921 Back

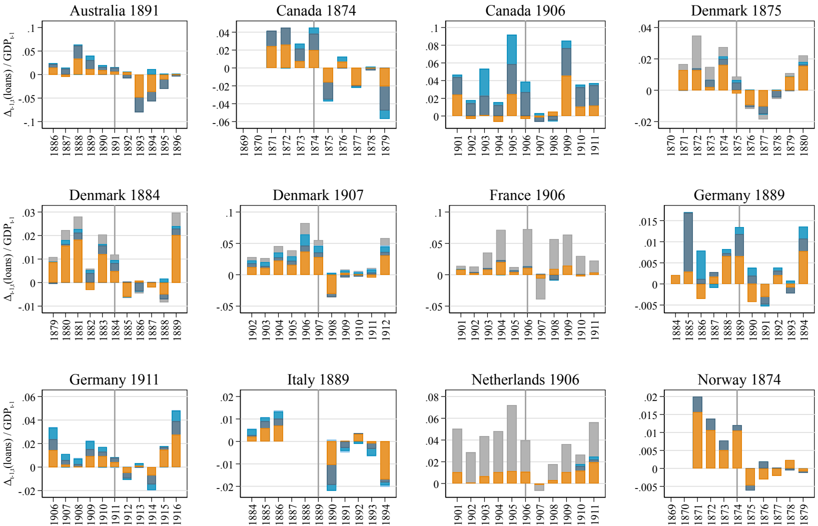
- Need to carefully account for M&A, spinoffs, new entries, failures, etc.
  - Also other data issues: gaps, accounting changes, change in bank status
  - As an added check, we compare our individual bank data to aggregate statistics



Credit growth around individual banking crises

1870-1914 banking crises

Back



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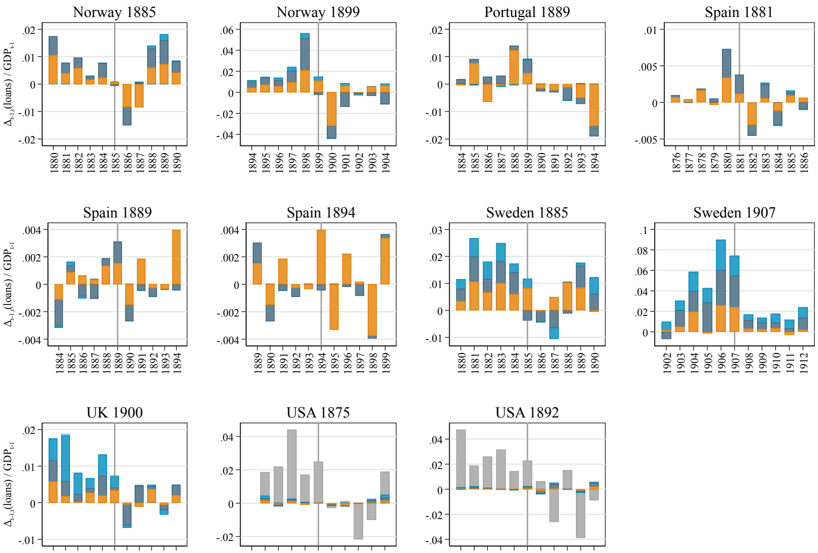
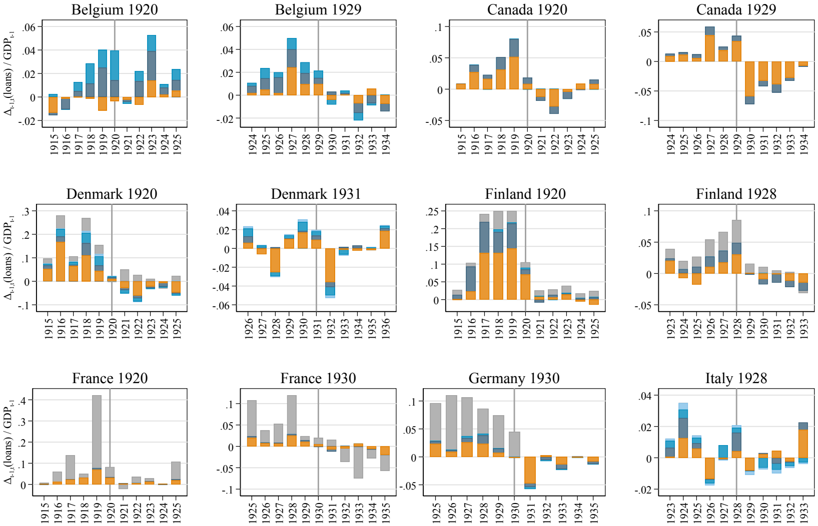


Credit growth around individual banking crises

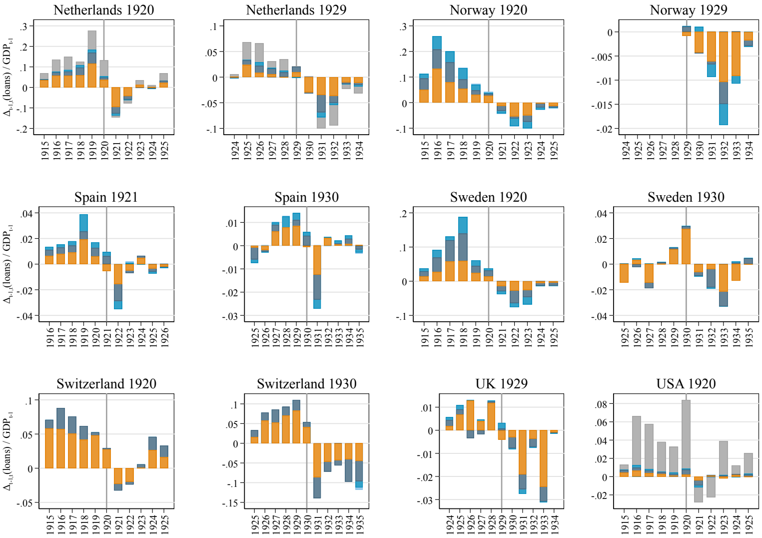
1915-1945 banking crises

Back



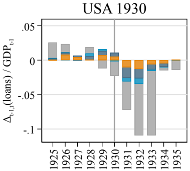
Credit growth around individual banking crises

1915-1945 banking crises



Credit growth around individual banking crises

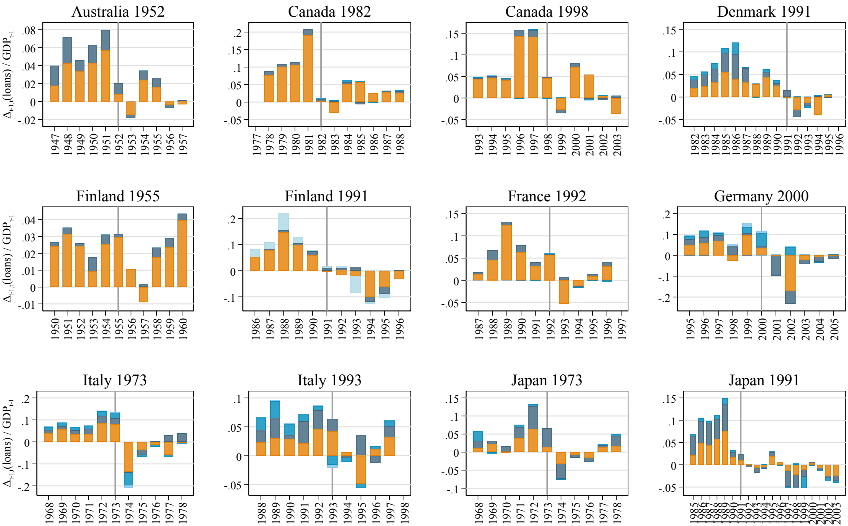
1915-1945 banking crises



Credit growth around individual banking crises

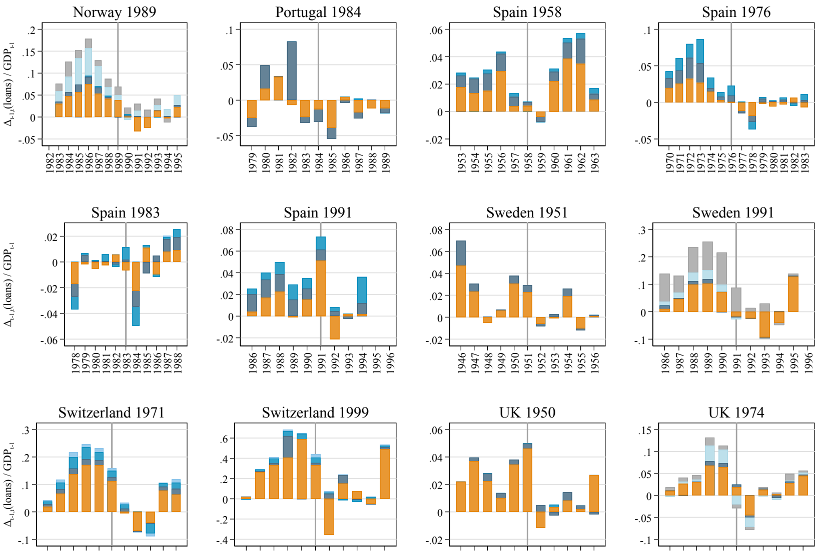
1946-2006 banking crises

Back



Credit growth around individual banking crises

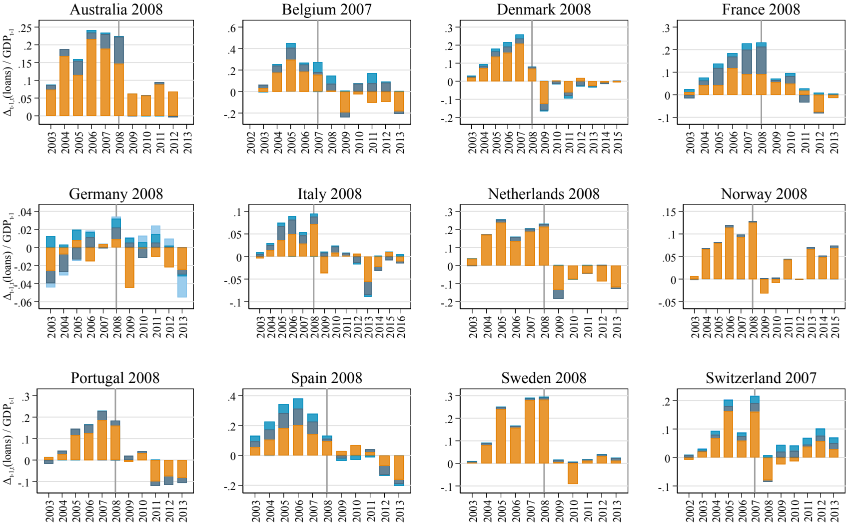
1946-2006 banking crises



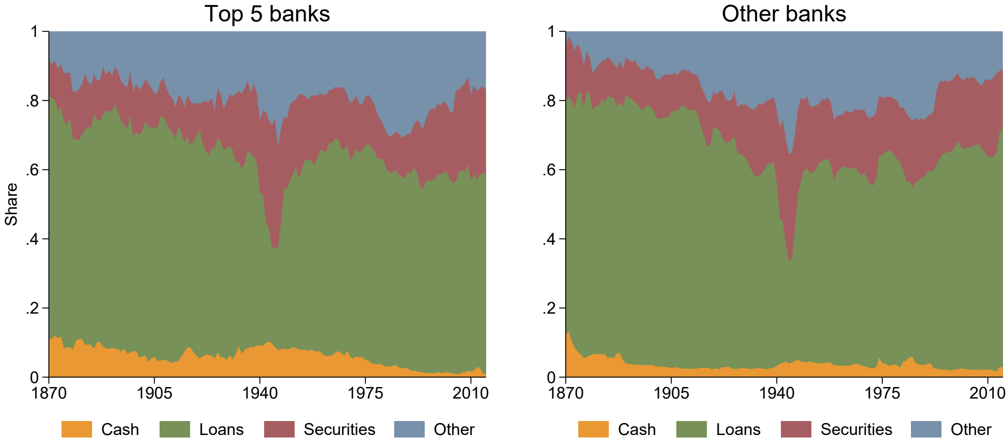
Credit growth around individual banking crises

2007-2020 banking crises

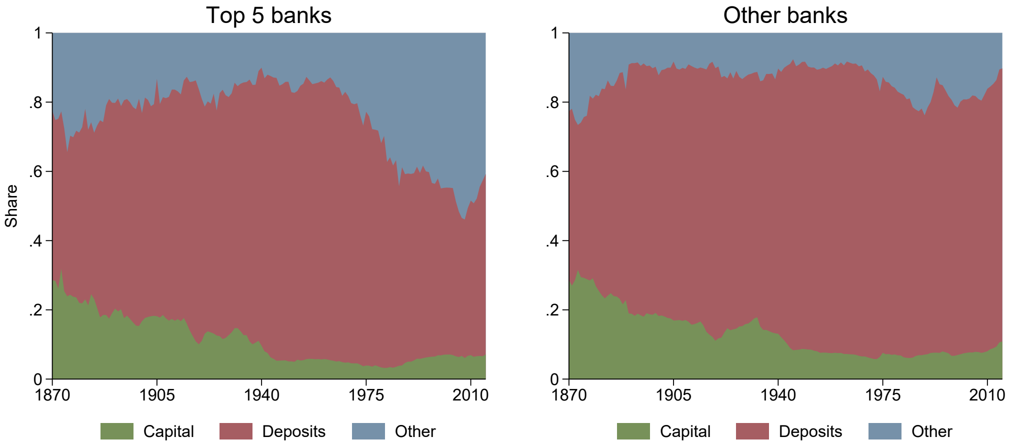
Back



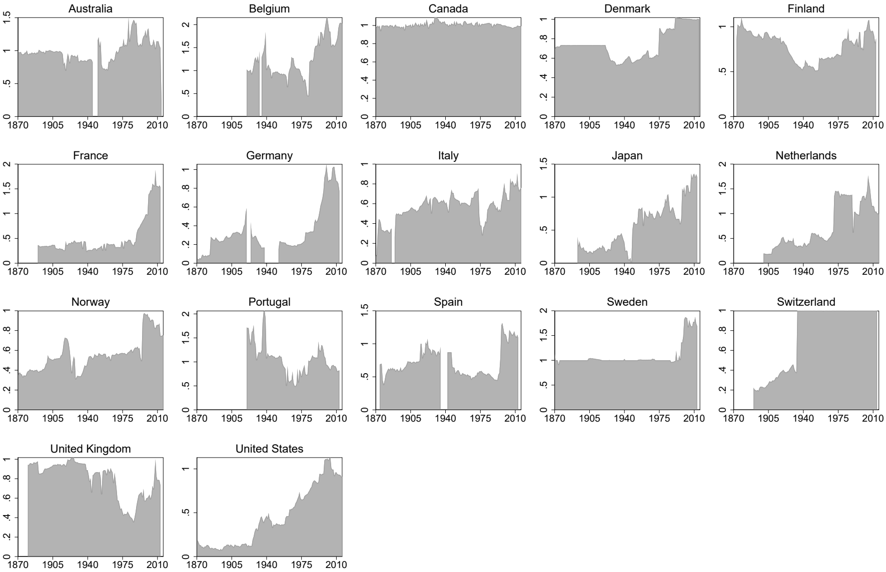
Assets of the median top-5 and other banks



Liabilities of the median top-5 bank and other banks



Ratio of total assets relative to JRST (2021) back



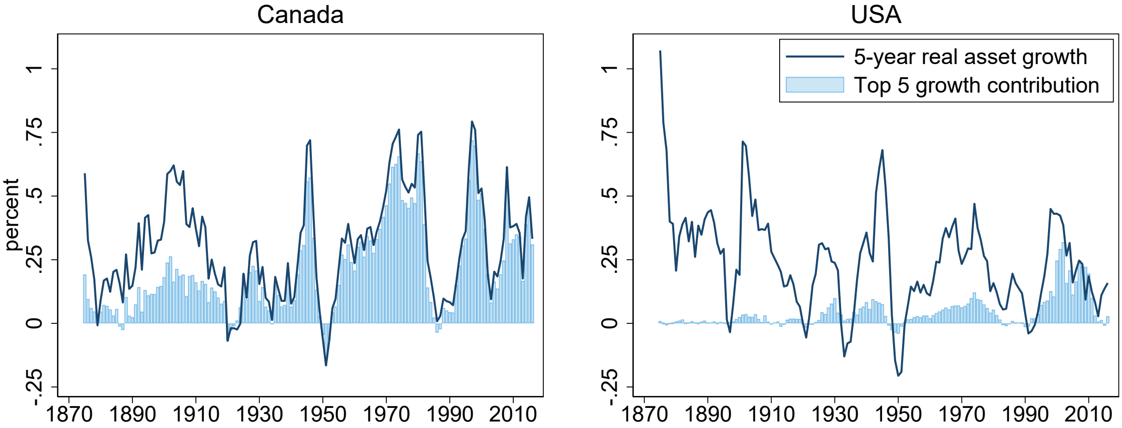
Deposit sensitivity specification

$$
\begin{aligned}
y_{i,t=0,3} = a_{episode} &+ b_1 \cdot \text{Return}_{i,t=0,3}(range) \times \text{Large}_i \\
&+ b_2 \cdot \text{Return}_{i,t=0,3}(range) \times \text{Small}_i \\
&+ \gamma \cdot \text{Small}_i + \epsilon
\end{aligned} \tag{1}
$$

Top-5 banks' contribution to the credit cycle in Canada and the US

- Decompose aggregate asset growth by bank size using

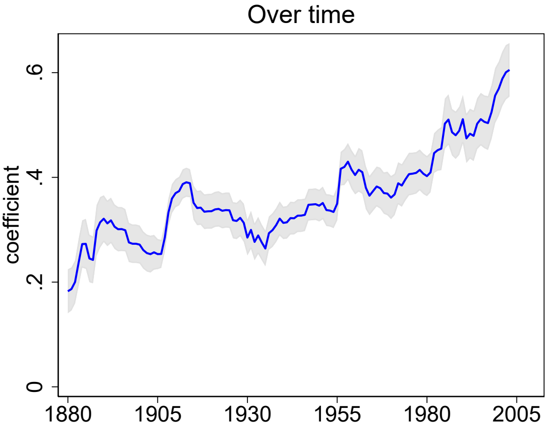
$$g^{aggregate} = \underbrace{g^{large} * MShare_{t-1}^{large}}_{Top\ 5\ growth\ contribution} + g^{small} * MShare_{t-1}^{small}$$

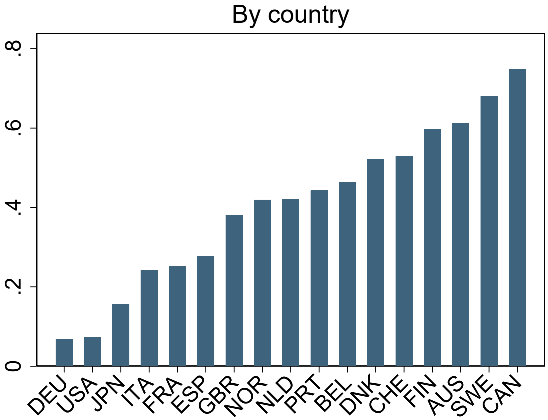


Top-5 banks' contribution to the credit cycle over time and by country

- Decompose aggregate asset growth by bank size using

$$g^{aggregate} = \underbrace{g^{large} * MShare^{large}_{t-1}}_{Top\ 5\ growth\ contribution} + g^{small} * MShare^{small}_{t-1}$$





Literature

- Credit growth and financial instability: Schularick and Taylor (2012), Jordà et al. (2013), Krishnamurthy and Muir (2017), and Mian et al. (2017)

  ⇒ We show that credit booms gone bust are, predominately, credit booms and bust of a handful of large banks

- Bank size and risk taking: Boyd and Runkle (1993), Boyd and Gertler (1994), Gropp et al. (2011), Huber (2021), De Nicolo (2001), Nicoló et al. (2004), and Laeven et al. (2016)

  ⇒ We show that risk taking before banking crises is higher among large banks

- Bank concentration and financial instability Berger et al. (1999), Janicki and Prescott (2006), Fohlin and Jaremski (2020), Demsetz and Strahan (1997), Fernholz and Koch (2017), and Keeley (1990)

  ⇒ We show that the rise in concentration extends beyond the US and recent decades, is fueled by M&A activity, is elevated during credit booms and busts and explains performance gaps between large and small banks during crises.