Survival of the Biggest: Large Banks and Financial Crises

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  - Over 11,000 unique banks, most newly transcribed from archival sources

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- Motivated by this key finding, we ask:
  1. What role do banking crises play in the evolution of banking sector structure?
  2. Is the higher survival rate of large banks after crises, and the resulting banking sector consolidation, due to more prudence of large banks? Natural advantages of large banks? Or to government interventions?

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   - Large banks (i.e., top-5 by assets) rarely exit or fail in crises
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4. Large-bank-dominated systems are not more stable for the macroeconomy
   - Same crisis probability, worse macroeconomic outcomes conditional on crisis

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- Historical dataset covering the balance sheets of commercial banks for 17 advanced economies since 1870
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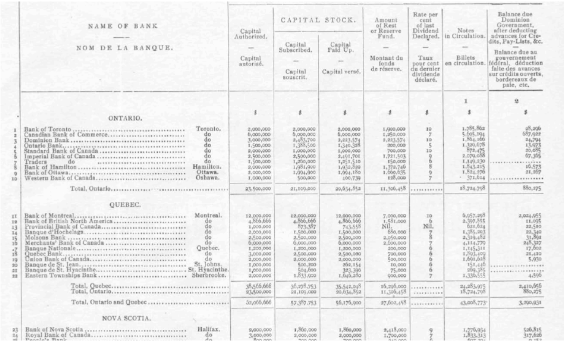
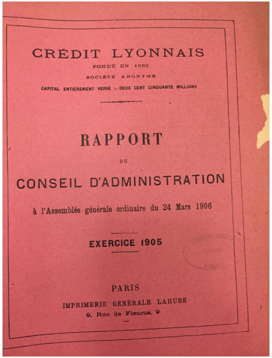
- We also gather information on
  - All entries/exits in our database (New entries, M&As, spinoffs, failures)
  - Stock prices for the largest 20 banks around banking crises

Historical balance sheet examples



	NAME OF BANK — NOM DE LA BANQUE.		Capital Authorized. — Capital autorisé.	CAPITAL STOCK. Capital Subscribed. — Capital souscrit.	CAPITAL STOCK. 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	5,605,194	687,922
3	Dominion Bank	do	3,000,000	2,483,700	2,223,574	2,223,574	10	1,864,166	24,794
4	Ontario Bank	do	1,500,000	1,388,500	1,340,328	200,000	5	1,329,678	13,973
5	Standard Bank of Canada	do	2,000,000	1,000,000	1,000,000	700,000	10	872,475	20,085
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	1,660,635	9	1,824,276	21,267
10	Western Bank of Canada	Oshawa.	1,000,000	500,000	400,739	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	680,000	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	2,600,000	7	4,114,779	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	1,893,409	21,410
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	504,600	323,390	75,000	6	269,385	....
22	Eastern Townships Bank	Sherbrooke.	2,000,000	1,833,920	1,646,280	900,000	7	1,336,555	4,596
	Total, Quebec		38,566,666	36,278,753	35,542,048	16,296,000	....	24,283,975	2,410,656
	Total, Ontario		23,500,000	21,109,000	20,634,852	11,306,458	....	18,724,798	880,275
	Total, Ontario and Quebec		52,066,666	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



CRÉDIT LYONNAIS

FONDÉ EN 1863

SOCIÉTÉ ANONYME

CAPITAL ENTIÈREMENT VERSÉ : DEUX CENT CINQUANTE MILLIONS

RAPPORT

DU

CONSEIL D'ADMINISTRATION

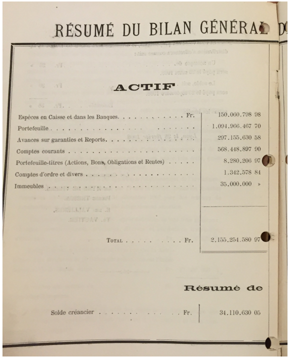
à l'Assemblée générale ordinaire du 24 Mars 1906

EXERCICE 1905

PARIS

IMPRIMERIE GÉNÉRALE LAHURE

9, Rue de Fleurus, 9



RÉSUMÉ DU BILAN GÉNÉRAL D

ACTIF

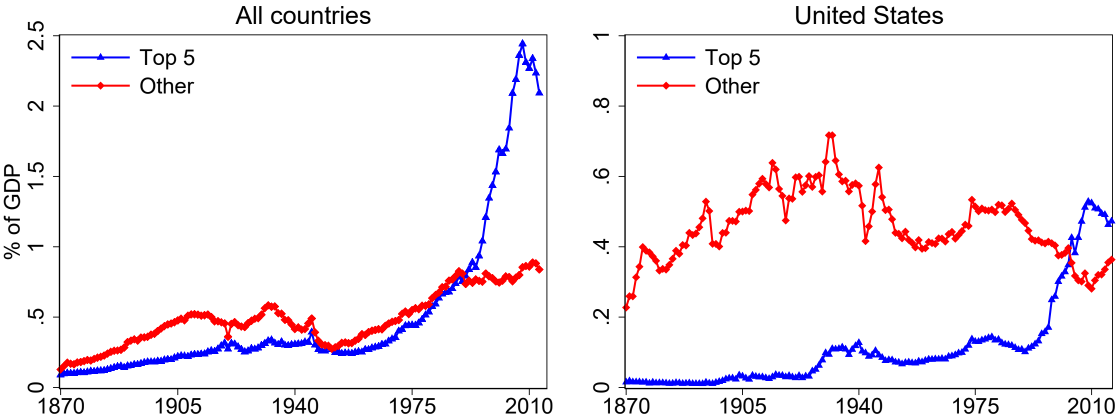
Espèces en Caisse et dans les Banques	Fr.	150.060.798 98
Portefeuille		1.094.966.467 70
Avances sur garanties et Reports		297.155.630 58
Comptes courants		568.448.897 90
Portefeuille-titres (Actions, Bons, Obligations et Rentes)		8.280.206 97
Comptes d'ordre et divers		1.342.578 84
Immeubles		35.000.000 »
TOTAL	Fr.	2.155.254.580 97

Résumé de

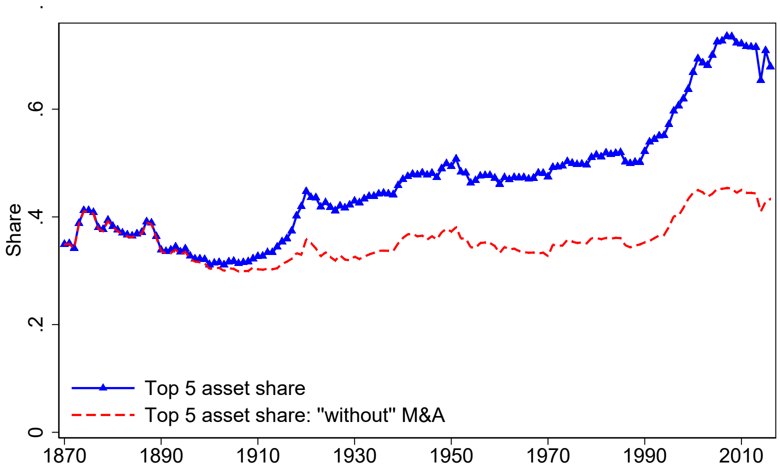
Solde créancier	Fr.	34.110.630 05

Key facts

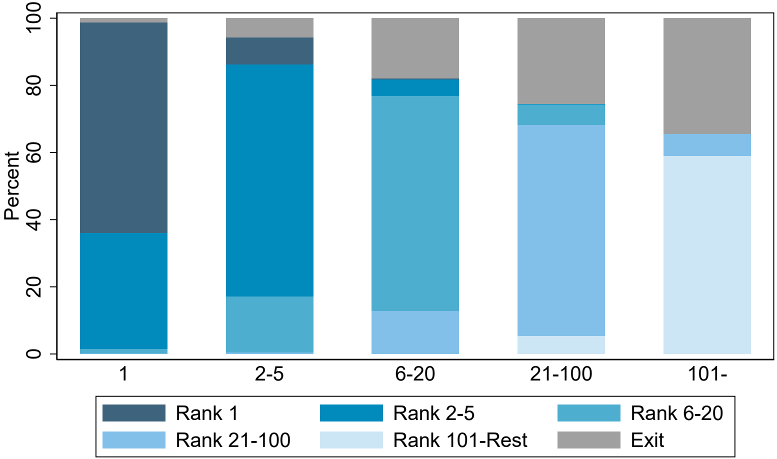
Bank assets-to-GDP of the top-5 banks versus all other banks



Increase in top-5 asset share attributable to M&A activity



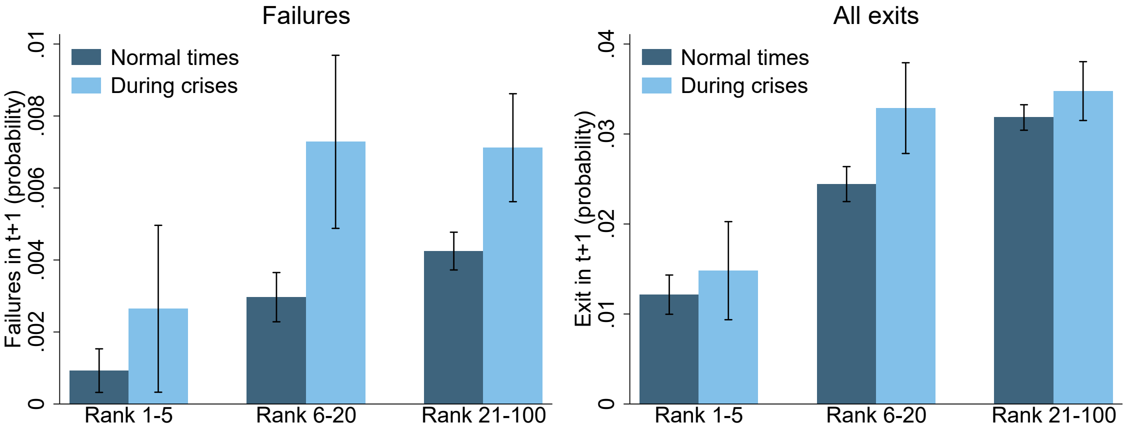
Large banks are highly persistent across history



1. “Survival of the Biggest”

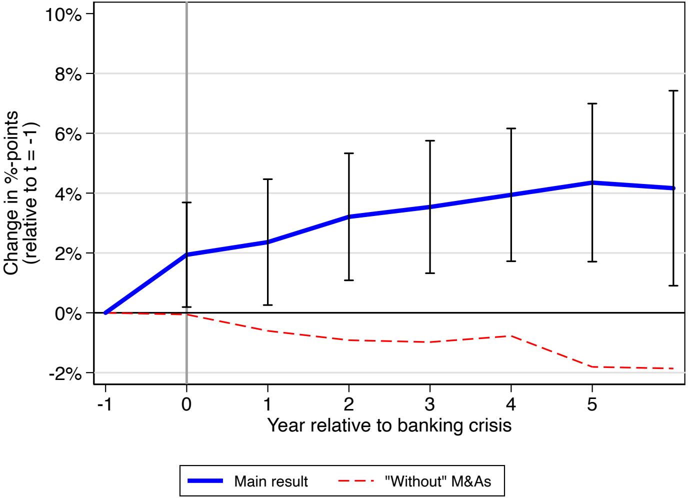
Top-5 banks rarely fail or exit during crises

Failures and exit rates by bank size



Increase in top-5 asset share around banking crises

- Top-5 asset share increases around crises due to M&As



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

$\longrightarrow$ 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

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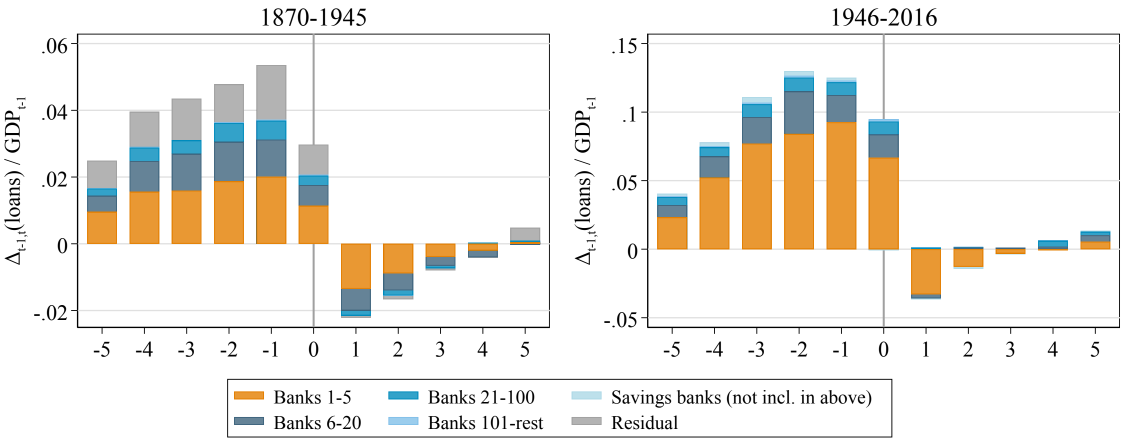
$\longrightarrow$ Worse stock declines and credit contractions

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**

Bank risk measures in the run-up to banking crises

	Loan growth t=-4 to -1	(Equity/assets) Change t=-4 to -1	(Equity/assets) Avg. Level t=-4 to -1	(Noncore/assets) Change t=-4 to -1	(Noncore/assets) Avg. Level t=-4 to -1	(Safe assets /assets) Change t=-4 to -1	(Safe assets /assets) Avg. Level t=-4 to -1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Large	2.81***	-0.19***	-3.06***	1.02***	12.88***	0.19	-2.22***
	-0.69	-0.04	-0.24	-0.15	-0.92	-0.18	-0.71
Constant	8.11***	0.10***	9.23***	0.21***	21.61***	-0.32***	15.89***
	-0.11	-0.01	-0.04	-0.03	-0.15	-0.03	-0.11
Episode FEs	✓	✓	✓	✓	✓	✓	✓
R^2	0.15	0.05	0.29	0.07	0.21	0.05	0.18
Observations	15838	14429	15840	13001	14360	13522	14895

Large banks perform worse during the crisis... but fail less often

	Bank stock total return (t = 0 to 3)	Credit contraction (t = 0 to 3)	Failure rate (t = 0 to 3)
	(1)	(2)	(3)
Large	-3.67*	-2.68***	-2.00*
	-2.1	-0.76	-1.05
Constant	-19.19***	0.65***	3.43***
	-1.28	-0.12	-0.17
Episode FEs	✓	✓	✓
R^2	0.61	0.04	0.02
Observations	954	11561	11561

3. 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

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

Deposit sensitivity to bank stock declines

	Deposit growth$_{0,3}$ (1)	Interbank liab. growth$_{0,3}$ (2)	Cash hold. growth$_{0,3}$ (3)	Failure prob.$_{0,3}$ (4)
Return$_{-30\%,-60\%}$ × Large	0.03	1.00	0.56	-1.40
	(3.85)	(3.48)	(4.29)	(2.83)
× Small	-6.60*	-6.23*	-11.13***	2.18
	(3.87)	(3.52)	(4.16)	(2.36)
Return$_{-60\%,-90\%}$ × Large	-8.31**	-5.32	-8.72**	3.55
	(3.81)	(3.32)	(4.24)	(2.80)
× Small	-16.61***	-15.11***	-17.71***	3.85
	(3.84)	(3.46)	(4.07)	(2.40)
Return$_{-90\%,-100\%}$ × Large	-12.61**	-7.44	-11.80**	1.69
	(5.14)	(4.56)	(5.73)	(3.85)
× Small	-23.99***	-21.69***	-23.74***	8.13***
	(4.20)	(3.70)	(4.46)	(2.78)
Small	-9.58**	-10.49**	-10.15**	3.02
	(4.42)	(4.22)	(4.81)	(2.99)
Constant	8.97***	7.85***	9.58***	-2.75
	(3.17)	(2.97)	(3.30)	(1.72)
Difference (Large minus Small):				
Return$_{-30\%,-60\%}$	-6.63	-7.23	-11.69*	3.58
	(5.58)	(5.19)	(6.13)	(3.80)
Return$_{-60\%,-90\%}$	-8.30	-9.78**	-9.00	0.31
	(5.08)	(4.64)	(5.56)	(3.58)
Return$_{-90\%,-100\%}$	-11.38*	-14.24**	-11.94*	6.44
	(6.26)	(5.71)	(6.85)	(4.44)
Episode FEs	✓	✓	✓	✓
R^2	0.35	0.38	0.30	0.08
# Banks	222	214	224	270

Government interventions: rescuing banks on the verge of failure

- "Verge of Failure" defined as: bank equity decline $\leq$ -90% from peak

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- Example of banks on verge of failure, USA 2008:
  - Citigroup (Rank #1)
    - Nov. 2008: Received a Systemic Risk Exception, $300 billion in troubled asset guarantees, $20 billion equity injection (in addition to $30B already from TARP).
    - TARP Inspector General: "The essential purpose of the deal, as Paulson and Geithner later confirmed... was to assure the world that the Government was not going to let Citigroup fail."
  - Washington Mutual (Rank #6)
    - FDIC receivership on Sept 25, 2008, sold to JPMorgan Chase for a price of $1.9 billion plus most debt assumptions. However, unsecured senior debt obligations of the bank not assumed.

Government interventions: rescuing banks on the verge of failure

- Another example, Netherlands 1921:
  - Rotterdamsche Bankvereeniging (Rank #2):
    - 35 million guilder special emergency overdraft facility from central bank, 25 million equity injection and asset purchases, state guarantee of 60 million in liabilities
    - "The Minister [Colijn] declared that it was in the interest of the nation to avoid a catastrophe, and that he was therefore willing to support the [bank] with a substantial sum."
  - Marx & Co's Bank (Rank #9)
    - 27 million guilders in liquidity support, so that the bank could be liquidated without a formal bankruptcy.

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%

4. Large-bank-dominated systems:

Same crisis probability, but worse macroeconomic outcomes

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.