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Identifying Banking Crises

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Consequences of banking crises

Consequences are severe, according to Reinhart & Rogoff:

1. Contraction in bank lending
2. Deep, persistent recessions
 - Avg. GDP decline = -9.6%, avg. time to recovery = 7.3 years
 - Avg. unemployment rise = 7 percentage points
 - Across 63 crises in adv. economies
3. Sharp decrease in asset prices
 - Stocks slump 55% and house prices decline 35%
4. Increase in government debt by 86%
 - Mostly due to decreased tax revenues, not from bank recapitalization costs

Previous approaches

1. *Narrative-based* approaches:
 - Bordo et al. (2001)
 - Reinhart & Rogoff (2009)
 - Schularick & Taylor (2012)
2. Approaches based on *policy responses*:
 - Caprio & Klingebiel (2003)
 - Demirguc-Kunt & Detragiache (2005)
 - Laeven & Valencia (2013)

Limitations of previous approaches

1. They disagree with each other

Disagreement about banking crises

Banking crises in Germany

Reinhart Rogoff	Schularick Taylor	Romer Romer	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt & Detragiache
0	1873					
1880	0					
1891	1891			0		
1901	1901			1901		
0	1907			0		
1925	0			0		
1929	1931			1931		
0	0	1974q2	0	0	0	
1977	0	0	0	0	late 1970s	
0	0	2003q1	0		0	
2008	2008	2007q2	2008			

Legend:

YYYY = starting year of banking crisis

0 = "no crisis"

[blank] = outside of sample

Limitations of previous approaches

1. They disagree with each other
2. Limitations of narrative approaches:
 - Biased to pick out most sensationalized and salient crises
 - Can overlook important but forgotten historical events
 - Biased to pick out crises that have the worst macroeconomic outcomes
3. Limitations of policy-based approaches:
 - Sometimes governments don't respond
 - Limited sample period (1970 – present)
4. Romer and Romer (2016)
 - OECD info is subjective and overlooks some major crises (Spain 1977)
 - Limited sample of countries and times (1967 onward for OECD countries)

This paper

We revise the historical chronology of banking crises in 46 countries from 1870 to 2016 using new historical data on **bank equity prices**

1. We refine existing approaches using more objective data
 - Combine “hard” data (bank equity-based measures)
 - With “soft” information (from previous chronologies, plus a wealth of new primary and secondary narrative sources)
2. We develop measures of the severity of banking crises based on the decline in the country’s bank equity index
 - **Objective, real-time, quantitative**
 - **Theoretically motivated**: captures market-perceived **undercapitalization or insolvency of the banking sector**
3. Monthly stock returns data allows us **precisely date turning points** for banks vs. nonfinancials
 - **Modern banking crises**: bank stocks fall **before** nonfinancial stocks
 - **19th century banking crises**: nonfinancial stocks fall first

Practical advantages of bank equity returns

1. Abundance of historical bank equity data in 46 countries
 - Available from ~1870:
 - Developed countries
 - Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Japan, Luxembourg, New Zealand, Spain, Sweden, Switzerland, U.K., U.S.
 - Emerging economies
 - Argentina, Brazil, Chile, Egypt, Greece, Hong Kong, Hungary, India, Mexico, Imperial Russia, South Africa, Ottoman Turkey
 - Available from early 1900s:
 - Colombia, Czechoslovakia, Finland, Norway, Peru, Venezuela

Practical advantages of bank equity returns

1. Abundance of historical bank equity data in 46 countries
2. Natural way of doing things
 - Currency crisis lit defines crisis based on currency price crashes
 - Reinhart and Rogoff (2009) approve:

With regard to banking crises, our analysis stresses events. The main reason we use this approach has to do with the lack of long-range time series data that would allow us to date banking or financial crises quantitatively along the lines of inflation or currency crashes. For example, the relative price of bank stocks (or financial institutions relative to the market) would be a logical indicator to examine. However, doing this is problematic, particularly for the earlier part of our sample and for developing countries, where many domestic banks do not have publicly traded equity.

3. Accurate at picking up many aspects of the crisis
 - Macroeconomic consequences
 - Other dimensions of crisis: panics, bank failures, government intervention, etc.
4. Monthly stock returns data allows us **precisely date turning points** for banks vs. nonfinancials

New historical data sources

Bank- und Creditbank-Actien.

	Div 71	Div 72	Z F	Zins-Termin.	Appoints à		Div 71	Div 72	Z F	Zins-Termin.	Appoints à	
Aechener Bank f. H. u. L. (40% E.)	—	—	4	1/7.	100 ₪	98 bz B.	8 1/2	—	4	1/1.	200 ₪	—
Aechener Disconto-Ges. (40% E.)	—	—	5	do.	200 ₪	107 bz G	—	—	4	1/9.	200 ₪	—
Allg. Depositen-Bank (60% Einz.)	—	—	5	1/1.	1000 u. 200 ₪	84 bz G	7 1/2	—	5	1/1.	200 ₪	121 G
Allg. Deutsche Handelsg. (70% E.)	—	—	5	do.	100 ₪	93 1/2 bz G	7 1/2	—	5	do.	250 ₪	107 1/2 G
Amsterdamer Bank	—	—	4	do.	250 fl. Holl	10 1/2	9 1/2	—	5	do.	200 ₪	124 1/2 B. u. 124
Anglo-Deutsche Bank	—	—	5	do.	100 ₪	132 1/2 G, j. 117 B	11 1/2	—	4	do.	200 ₪	125 1/2 G
Anh.-Dessauische Landes-Bank	12 1/2	—	4	do.	100 ₪	149 B	5 1/2	—	4	1/1 u. 7.	250 ₪	111 1/2 B
do. do. neuo	—	—	4	do.	100 ₪	136 bz	—	—	5	1/1.	200 ₪	95 1/2 B
Antwerpener Central-Bank	—	—	5	do.	500 Frcs	108 bz G	—	—	4	5/9.	100 ₪	90 B
Austro-Italienische Bank (50% E.)	—	—	5	do.	500 Lire	—	—	—	4	1/1.	200 ₪	111 1/2 bz B
Austro-Türk. Cred.-Anst. (40% E.)	—	—	6	1/3 p. Steck.	200 fl. S	—	—	—	5	1/9.	200 ₪	178 G
Badische Bank	5	—	4	1/1.	200 ₪	115 1/2 bz G	—	—	4	2/4 72	200 ₪	98 G
Bank f. Rheinl. u. Westph. (80% E.)	—	—	4	do.	200 ₪	103 1/2 bz	—	—	4	1/8.	200 ₪	104 G
Bank für Sprit u. Prod.-Handel	—	—	5	do.	200 ₪	83 1/2 bz G	11	—	5	1/7.	200 ₪	—
Barmer Bankverein	7 1/2	—	5	do.	200 ₪	122 1/2 G	11	—	4	1/1.	100 ₪	178 G
Gothaer Privat-Bank	—	—	4	1/1.	200 ₪	—	8 1/2	—	4	1/1.	200 ₪	—
Halle'sche Credit-Anst. (40% E.)	—	—	4	do.	200 ₪	—	—	—	4	1/9.	200 ₪	—
Hamburger Commersz-Bank	—	—	5	1/1.	1000 u. 200 ₪	84 bz G	7 1/2	—	5	1/1.	200 ₪	121 G
Hamburger Hyp.-Bank (40% E.)	—	—	5	do.	100 ₪	93 1/2 bz G	7 1/2	—	5	do.	250 ₪	107 1/2 G
Hamburger internation. B. (40%)	—	—	5	do.	250 fl. Holl	10 1/2	9 1/2	—	5	do.	200 ₪	124 1/2 B. u. 124
Hamburger Vereins-B. (20% E.)	—	—	4	do.	100 ₪	132 1/2 G, j. 117 B	11 1/2	—	4	do.	200 ₪	125 1/2 G
Hannoversche Bank	—	—	4	1/1 u. 7.	100 ₪	149 B	5 1/2	—	4	1/1 u. 7.	250 ₪	111 1/2 B
Hannov. Disconto-Bank (60% E.)	—	—	5	1/1.	100 ₪	136 bz	—	—	5	1/1.	200 ₪	95 1/2 B
Hessische Bank	—	—	4	5/9.	500 Frcs	108 bz G	—	—	4	5/9.	100 ₪	90 B
Internat. Handelsges. (40% E.)	—	—	4	1/1.	500 Lire	—	—	—	4	1/1.	200 ₪	111 1/2 bz B
Kieler Bank (40% Einz.)	—	—	5	1/9.	200 fl. S	—	—	—	5	1/9.	200 ₪	178 G
Kölnische Wechsel-Bank	—	—	4	2/4 72	200 ₪	115 1/2 bz G	—	—	4	2/4 72	200 ₪	98 G
Königsberger Vereins-Bank	—	—	4	1/8.	200 ₪	103 1/2 bz	11	—	4	1/8.	200 ₪	104 G
Landw. u. Industrieb. Kwiecki	—	—	5	1/7.	200 ₪	83 1/2 bz G	—	—	5	1/7.	200 ₪	—
Leipziger Credit-Anstalt	—	—	4	1/1.	200 ₪	122 1/2 G	11	—	4	1/1.	100 ₪	178 G

BORSE ITALIANE.
Corse di chiusura del 23 dicembre 1904.

Valori	Roma	Milano	Genova	Firenze
Rend. It. 5 6/10 perc.	105 3/8	105 23/32	105 32 1/8	105 27
do. 4 m.	105 30	105 28	105 37 1/8	105 22 1/2
5 1/2 6/10 p.c.	103 42 1/2	—	—	103 25
do. 4 m.	103 25	103 37 1/8	103 37 1/8	103 20
Az. Banca d'It.	1132	1134 50	1133 50	—
• Banca Comm.	629	628 50	628	—
• Credito Ital.	611	611	612	—
• Meridionali	726	726	728	—
• Mediterranee	—	459	459	460 50
• Rubattino	—	458 50	470	—
• Terzi	—	1948	1949	—
• Elba	—	—	—	—
• Savona	—	—	—	—
• Molini Alta It.	—	—	—	—
• Fribadia	—	—	—	—
• Carouso Rom.	—	—	—	—

	V.K.	L.N.	H.K.
Amst. Liq.-Kas. dito...	115	—	—
Buit. Bankv. A-U. dito	64	—	—
Cent. Bankv. L. & N. dito	—	—	—
Cent. Cred.-Bank S. 41	92 1/4	—	—
Cent. Werkz. Ris.-B. O. 41	100 1/4	100 1/4	—
Credit-Vereen. A.	101 1/2	—	—
Disc. en Eff. b. 1 & 2 ser. do.	112	—	—
Disc.-Mij te Rotterd. do.	—	—	—
Fin. Mij v. Zuid-Afr. do.	25	—	—
Gold. Creditvereenig.	165	—	—
Gemeente-Cred. Obl. 4	101 1/2	—	—
do. dito dito 3 1/2	96 1/2	96 1/2	—
do. dito dito 3	85 1/4	85 3/8	—
do. dito dito 2 1/2	—	—	—
Holl. Belegg. Cie. dito 4	98	—	—
Holl. Voorsch. Bk. S. 1/2	100	—	—
Incasso-Bank Aand. ...	116 1/2	—	—
Ind. Bnk. te Haarl. di 3	—	—	—
Kas Vereeniging Aand.	142	142 1/2	—

Annual/Monthly, 46 countries, 1870-2016

1. Bank equity declines (peak-to-trough)
 - a) **Real bank total returns**
 - b) Abnormal returns = (bank returns - nonfin returns)
 - c) Bank market-cap returns =
(bank real price returns + bank new equity issuance)

2. Macroeconomic variables
 - Real GDP growth, unemployment, credit contraction, etc.

3. Database of crisis symptoms and policy responses
 - Depositor runs? NPLs? Major bank failures? Liquidity support? Nationalizations? etc.
 - Backed up by 400+ pages of detailed narrative documentation

4. Other financial variables
 - Nonfinancial equity returns, credit spreads, etc.

Roadmap

1. The informativeness of bank equity returns
 - a. Evidence on forecasting long-run output gaps

2. Turning points of banking crises
 - a. Timing of bank vs. nonfinancial crashes

3. A revised chronology of banking crises
 - a. Revisiting the global Great Depression
 - b. New estimates of the average severity of crises



1. THE INFORMATIVENESS OF BANK EQUITY RETURNS



The “joint list” of bank crises

Banking crises in Germany

Reinhart Rogoff	Schularick Taylor	Romer Romer	Laeven Valencia	Bordo	Caprio Klingebiel	Demirguc-Kunt & Detragiache	JOINT LIST
0	1873						1873
1880	0						1880
1891	1891			0			1891
1901	1901			1901			1901
0	1907			0			1907
1925	0			0			1925
1929	1931			1931			1929
0	0	1974q2	0	0	0		1974
1977	0	0	0	0	late 1970s		1977
0	0	2003q1	0		0		2003
2008	2008	2007q2	2008		0		2007

Methodology

$$y_{i,t} = \alpha_i + \beta r_{i,t} + \gamma 1_t^{postwar} + \varepsilon_{i,t}$$

- $y_{i,t}$ =
1. Symptoms of banking crises (**panics, bank failures, interventions**)
 2. Macroeconomic outcomes (**real GDP peak-to-tr. decline**, etc.)

$r_{i,t}$ = 3 measures of bank equity declines (peak-to-tr.)

1. **Bank real total returns**
2. Abnormal returns = (bank returns - nonfin returns)
3. Bank market cap returns =
(bank real price returns + new bank equity issuance)

Symptoms of banking crises

	Major or systemic crisis (1)	Significant liability guarantees (2)	Significant Liquidity Support (3)	Peak liquidity support (4)	Significant bank closures (5)	Deposit runs (6)	Change in deposits (pre-war only) (7)
Bank equity decline	-1.575*** [-5.867]	-0.357 [-1.438]	-0.768*** [-3.504]	0.395* [1.967]	-0.199 [-1.352]	-0.683*** [-3.774]	0.273** [2.480]
Post-1945 dummy	✓	✓	✓	✓	✓	✓	✓
Adj. R ² (within)	0.287	0.111	0.151	0.074	0.062	0.106	0.089
N	87	127	136	37	150	105	54

	Banks nationalized (8)	Govt equity injections (9)	Net cost of recapitaliz. (10)	NPL at peak (11)	Fiscal cost (% of GDP) (12)	Failed banks (% of total bank assets) (13)	Largest bank failing (14)
Bank equity decline	-0.678*** [-2.646]	-1.424*** [-4.893]	-0.201 [-1.510]	-0.166* [-1.914]	-0.135 [-0.827]	-0.457** [-2.422]	-0.432* [-1.715]
Post-1945 dummy	✓	✓	✓	✓	✓	✓	✓
Adj. R ² (within)	0.24	0.32	0.037	0.026	-0.01	0.136	0.013
N	104	88	34	65	34	64	126

$$y_{i,t} = \alpha_i + \beta r_{i,t} + \gamma 1_t^{postwar} + \varepsilon_{i,t}$$

Bank equity decline predicts severity of crisis

Real GDP measures:

	Real GDP (peak-to-trough decline)	Real GDP growth (pctage.-pt. decline, peak-to-trough)	Real GDP growth (max deviation from trend)
	(1)	(2)	(3)
Bank equity decline	0.129*** [5.800]	0.116*** [5.989]	0.085*** [5.203]
Post-1945 dummy	✓	✓	✓
Adj. R ² (within)	0.141	0.145	0.108
N	207	208	209

Other macroeconomic indicators:

	Real consumption per capita	Investm. to GDP	Broad money	(minus) Govt debt to GDP	Total loans	Total mortgages	House prices
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bank equity decline	0.097** [2.355]	0.045* [1.970]	0.268*** [3.541]	0.234** [2.575]	0.202*** [3.351]	0.264*** [3.870]	0.112 [1.346]
Post-1945 dummy	✓	✓	✓	✓	✓	✓	✓
Adj. R ² (within)	0.241	0.047	0.146	0.054	0.161	0.123	0.036
N	123	118	119	152	113	115	100

$$y_{i,t} = \alpha_i + \beta r_{i,t} + \gamma 1_t^{postwar} + \varepsilon_{i,t}$$

Alternative measures of bank equity declines

2. Abnormal returns = (bank returns - nonfin returns)

	Real GDP (peak-to-trough decline)	Real GDP growth (pctage.-pt. decline, peak-to-trough)	Real GDP growth (max deviation from trend)
	(1)	(2)	(3)
Abnormal bank decline	0.056*** [3.738]	0.051*** [3.804]	0.042*** [3.742]
Post-1945 dummy	✓	✓	✓
Adj. R ² (within)	0.069	0.063	0.057
N	199	201	201

3. Bank market cap returns = (real bank price returns + new bank equity issuance)

	Real GDP (peak-to-trough decline)	Real GDP growth (pctage.-pt. decline, peak-to-trough)	Real GDP growth (max deviation from trend)
	(1)	(2)	(3)
Bank market cap decline	0.100*** [4.964]	0.071*** [3.941]	0.071*** [4.610]
Post-1945 dummy	✓	✓	✓
Adj. R ² (within)	0.238	0.223	0.187
N	93	94	94

$$y_{i,t} = \alpha_i + \beta r_{i,t} + \gamma 1_t^{postwar} + \varepsilon_{i,t}$$



BANKING CRISES AND LONG-RUN OUTPUT GAPS



Jorda (2005) local projections

Response conditional
on a banking crisis

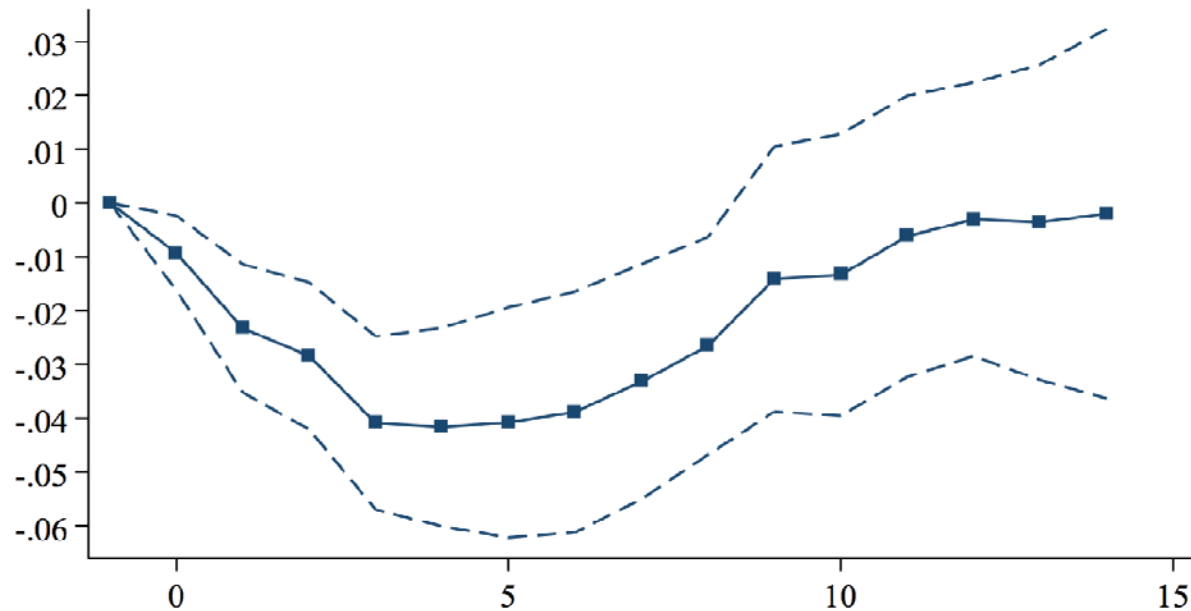
Interacted with **magnitude**
of bank equity decline

$$y_{i,t+h} - y_{i,t-1} = \sum_{j=0} [\beta_{0,j}^h * BC_{i,t-j}] + [\beta_{BE,j}^h * BC_{i,t-j} * r_{it-j}] + \delta_j^h * \Delta y_{t-j-1} \\ + \alpha_i^h + \alpha_t^h + \epsilon_{it}^h$$

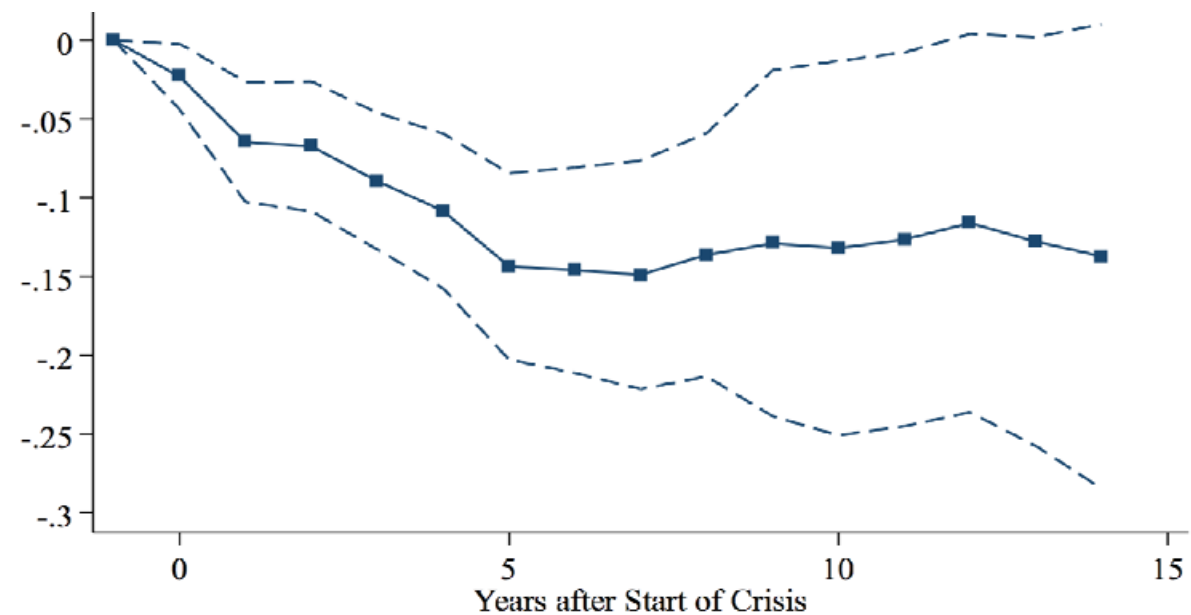
- $y_{i,t}$ = real GDP
- $BC_{i,t}$ = banking crisis indicator
(from the “joint list”)
- $r_{i,t-j}$ = bank equity real total return

Long-run output gaps

Response conditional
on the “average” banking crisis



Interaction term using
magnitude of bank equity
decline





2. TURNING POINTS OF CRISES: BANK VS. NONFINANCIALS

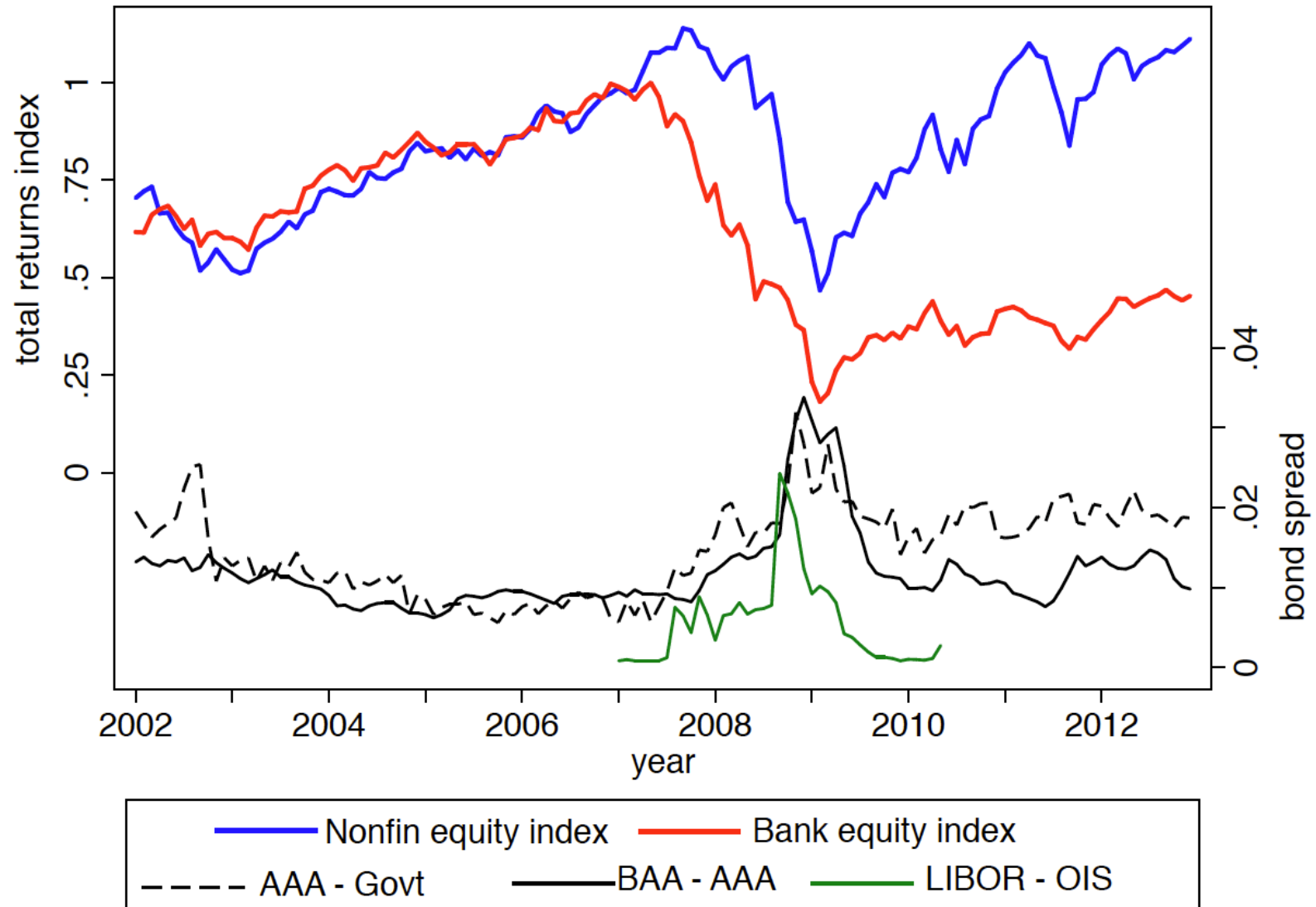


Timing of banking crises

- **Monthly data** was collected around banking crises
 - Countries:
 - 1870-2016: ~16 countries
 - ~1970-2016: the other 30 countries
 - Variables
 - Bank equity total returns
 - Nonfin equity total returns
 - Bank & nonfinancial credit spreads

A typical financial crisis

The U.S. around the 2007-8 crisis



Dynamics of bank equity returns

1. Bank equity drops substantially more than nonfin equity
 - Even though, unconditional on a crisis, bank equity has a beta of 0.8
2. Bank equity declines are “permanent” (in contrast to nonfinancial equity declines)
 - Presumably reflecting permanent credit losses, not discount rate effect
3. **For modern crises:** bank equity prices pick up the impending crisis *first*
 - Before non-financial equity and credit spreads
 - Bank shareholders take first losses, should be most sensitive
 - Creditors care about tail risk (or may have guarantees), so may not be sensitive to initial information about credit losses
4. However, the bank equity decline tends to unfold gradually over more than a year (no sudden Minsky Moment)

Timing of banking crises

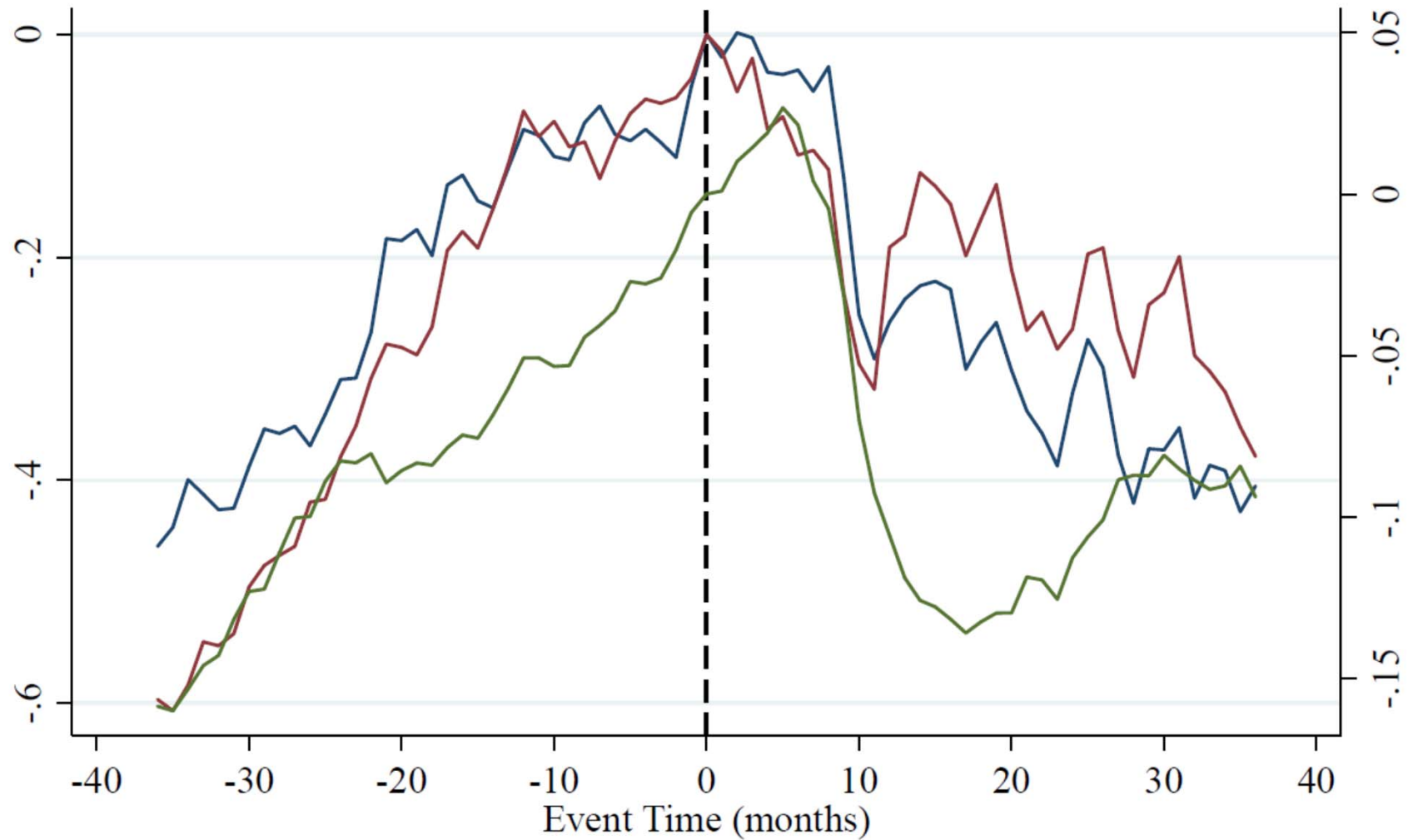
Bank equity declines of -30% pick up the crisis first before...

	Before Joint Crisis List date	Before Reinhart-Rogoff start date	Before Romer-Romer start date	Before non- fin. eq. decline	Before 2% spike in bank credit spread	Before 2% spike in corp credit spread
Avg. (in months, signed)	0.81	2.38***	4.41***	2.78***	6.18***	10***
t-stat	1.39	2.86	4.16	4.43	5.83	5.59
N	84	69	47	77	62	26
Pos	27	29	26	42	46	24
Zero	38	29	13	18	8	0
Neg	19	11	8	17	8	2
Pos / (Pos + Neg)	58.7%*	72.5%***	76.5%***	71.2%***	85.2%***	92.3%***
p-value	0.092	0.001	0.000	0.000	0.000	0.000

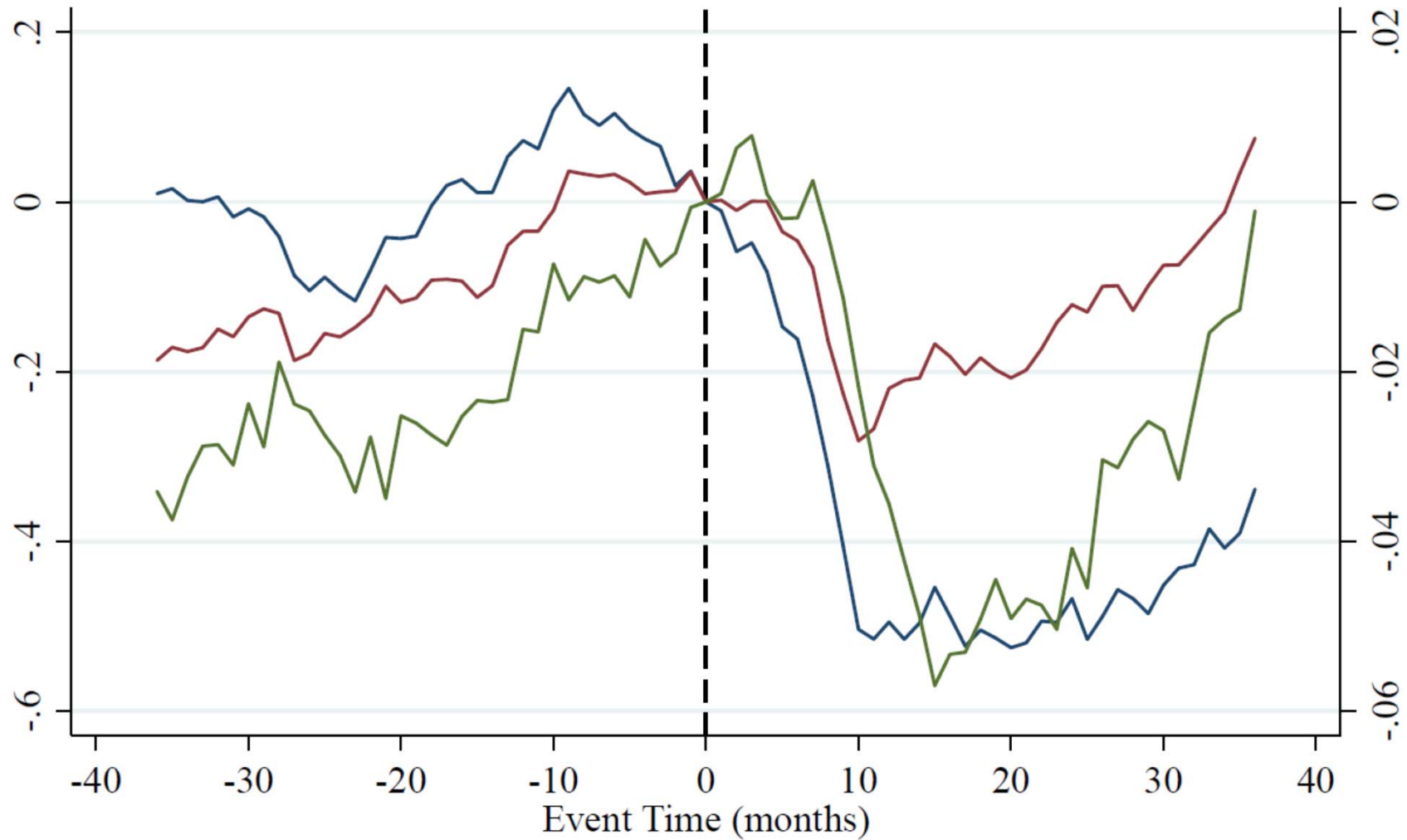
Crisis unfolding through equity prices

	Bank equity peak before nonfin equity peak	Duration of bank equity decline
Avg. (in months, signed)	1.37***	18.82***
t-stat	3.51	20.36
N	70	74
Pos	29	Duration \geq 12 mo. = 62 episodes
Zero	31	
Neg	10	Duration < 12 mo. = 12 episodes
Pos / (Pos + Neg)	74.4%***	% Duration \geq 12 mo. = 83.8%***
p-value	0.001	0.000

Prewar banking crises



Postwar banking crises





3. A REVISED CHRONOLOGY OF BANKING CRISES



Constructing a revised chronology

1. Our approach uncovers newly-identified banking crises
 - We **add** a new banking crisis to our list if:
 1. Bank equity decline $< -30\%$, AND
 2. Overwhelming narrative evidence of *widespread* bank panics or failures

2. Our approach deletes spurious banking crises
 - Typos, historical errors, monetary or currency crises that did not involve bank panics or failures
 - We **delete** a banking crisis from our list if:
 1. Bank equity decline $> -30\%$, AND
 2. Narrative evidence of *lack of widespread* bank panics or failures

3. We finally present a revised chronology of banking crises

Newly-uncovered banking crises

Country	Starting year of crisis	Bank equity return
Austria	2011	-0.509
Belgium	1876	-0.565
	2011	-0.755
Chile	1878	
	1931	-0.356
Colombia	1931	-0.675
Czech	1923	
Denmark	2011	-0.444
Egypt	1914	-0.407
France	2011	-0.512
Germany	1914	
	2011	-0.419
Greece	2010	-0.961
Hong Kong	1891	-0.565
	1965	-0.197
Hungary	1873	-0.518
Iceland	1920	-0.875
	1930	
Ireland	2011	-0.908
Israel	2002	-0.442
Italy	1926	-0.328
	2011	-0.601
Japan	1922	-0.404
	2001	-0.619
Luxembourg	2012	-0.914
Netherlands	1931	-0.418
	2011	-0.523
Peru	1914	-0.612
	1931	-0.373
Portugal	1876	
	2011	-0.725
	2014	-0.799
Spain	2010	-0.411
Switzerland	1914	
Turkey	1914	-0.654
Average		-0.539

Spurious banking crises

Country	Starting year of crisis	Bank equity return	Country	Starting year of crisis	Bank equity return
Argentina	1885	0	India	1908	0
	1985			1929	
Australia	1931	-0.230		1947	
	2008	-0.422	Israel	1977	0
Belgium	1870	-0.031	Italy	1935	
	1925	-0.193		1997	0
Brazil	1897	0	Japan	1871	
	1926	0		1914	-0.232
	1963			1917	-0.239
	1985		Korea	1986	0
Canada	1873	0	Mexico	1992	0
	1905	-0.081	Netherlands	1893	0
	1912	-0.002		1897	0
	2008	-0.401	Norway	1914	
Chile	1890	-0.254		1927	0
Czech	1931	-0.099		1936	-0.209
Denmark	1902	0		2008	-0.651
	1914	-0.296	Portugal	1986	
	1931	-0.102	Singapore	1982	-0.275
Finland	1939	-0.111	South Africa	1877	-0.004
	2008	-0.487		1977	-0.153
France	1871	-0.364		1989	0
	1904	0	Sweden	1897	-0.183
	1907	-0.049	Switzerland	1910	0
	1939	-0.121	Turkey	1991	-0.634
	1991	-0.263	UK	1908	-0.011
Germany	1880	0		1984	0
	1891	-0.230		1991	-0.147
	1907	-0.051		1995	-0.159
	1974	-0.276	US	1914	-0.158
	1977	-0.117		1998	-0.158
			Average		-0.145
			Average (excl. 2008)		-0.118

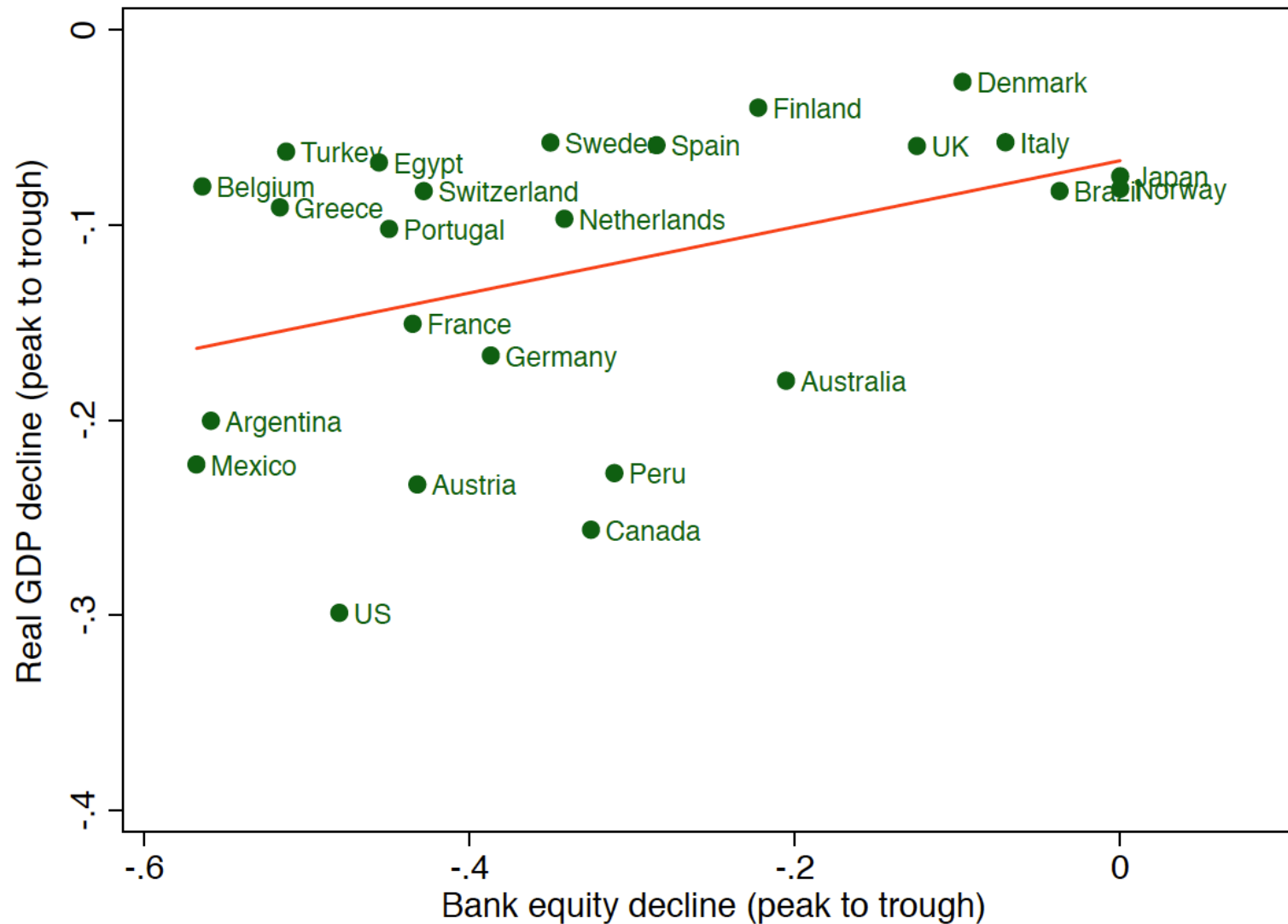
A revised chronology of banking crises

Country	Starting year of crisis	Bank equity return	Country	Starting year of crisis	Bank equity return	Country	Starting year of crisis	Bank equity return	
Argentina	1890	-0.307	Chile (cont.)	1981	-0.837	Germany (cont.)	2011	-0.419	
	1914	-0.473		Colombia	1931		-0.675	Greece	1931
	1931	-0.819			1982	-0.831	1991		-0.391
	1934	-0.563			1998	-0.813	2008		-0.671
	1980		1998		-0.074	2010	-0.961		
	1989		Czech	1923	-0.074	Hong Kong	1891	-0.565	
	1995	-0.305		1991			1965	-0.197	
	2001	-0.656		1996	-0.715		1982	-0.445	
	Australia	1893	-0.469	Denmark	1877	-0.207	Hungary	1998	-0.464
		1989	-0.281		1885	-0.043		1873	-0.518
Austria		1873	-0.715		1908	-0.269			1931
	1924	-0.240	1921		-0.347	1991			-0.398
	1929	-0.566	1987	-0.425	2008	-0.671			
Belgium	2008	-0.673	Egypt	2008	-0.739	Iceland	1920	-0.875	
	2011	-0.509		2011	-0.444		1930		
	1876	-0.565		1907	-0.132		1985		
		1885		0	1914		-0.407	1993	
		1914			1931		-0.608	2007	-0.963
1929		-0.831	1980		1913	-0.249			
Brazil	1939	-0.511	Finland	1990		India	1921	-0.495	
	2008	-0.842		1877			1993	-0.561	
	2011	-0.755		1900			Indonesia	1992	-0.659
	1890	-0.275	1921	-0.569	1997	-0.880			
		1900	0	1931	-0.252	Ireland	2007	-0.918	
		1914	-0.374	1991	-0.814		2011	-0.908	
		1923	-0.131	France	1882	-0.456	Israel	1983	-0.499
1929		-0.038	1889		-0.106	2002		-0.442	
1990			1914		-0.475	Italy	1873	-0.237	
1994		1930	-0.571		1887		-0.348		
Canada	1923	-0.426	1994		-0.246		1891	-0.453	
	1983	-0.164	2008		-0.640		1907	-0.240	
	Chile	1878		2011	-0.512		1914	-0.333	
1898		-0.003	Germany	1873	-0.371	1921	-0.550		
1907				1901	-0.050	1926	-0.328		
1914				1914		1930	-0.073		
1925				1925	-0.420	1990	-0.397		
1931		-0.356		1929	-0.489	2008	-0.575		
1976		0.000		2003	-0.570	2011	-0.601		
				2008	-0.728	Japan	1882		
							1890		

Examples

- Newly-uncovered banking crises (**added**)
 1. Belgium, 1876
 2. Japan, 1922
 3. Portugal, 1876
- Spurious banking crises (**deleted**)
 1. Argentina, 1985
 2. Germany, 1977
 3. Netherlands, 1893 and 1897

Revisiting the global Great Depression



Comparison to Reinhart-Rogoff

Panel B: Comparison of Reinhart and Rogoff episodes with Revised Chronology episodes

	Reinhart Rogoff	Difference with Revised Chronology	Difference with Revised Chronology (Bank equity decline < -30%)
Bank equity decline	-0.288	0.063 [7.05]	0.160 [18.44]
Abnormal bank equity decline	-0.310	0.045 [3.23]	0.129 [8.38]
Bank market cap decline	-0.326	0.104 [5.48]	0.203 [10.59]
Real GDP decline (pk to tr)	-0.045	0.006 [2.05]	0.012 [3.57]
Real GDP growth decline (pk to tr)	-0.080	0.004 [1.56]	0.007 [2.65]
Real GDP growth (max dev from trend)	-0.055	0.004 [1.83]	0.008 [3.03]
Significant liability guarantees	0.504	-0.043 [-1.39]	-0.127 [-3.66]
Significant liquidity support	0.681	-0.069 [-2.55]	-0.136 [-4.51]
Deposit runs	0.868	-0.082 [-4.17]	-0.110 [-4.72]
NPL at peak	0.144	-0.008 [-0.84]	-0.006 [-0.54]
Decline in deposits (pre-war only)	-0.164	0.032 [2.28]	0.035 [2.35]

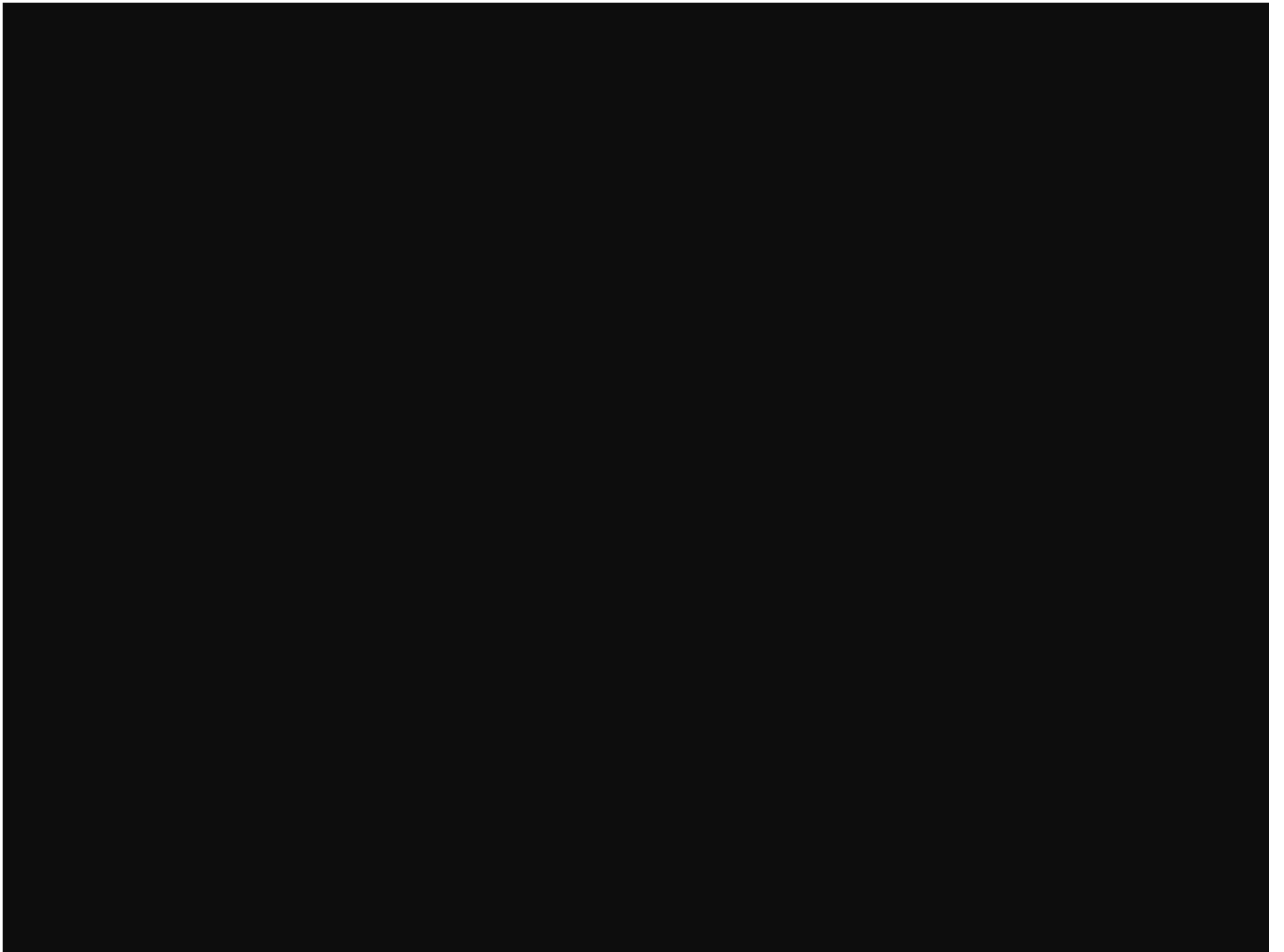
Comparison to Romer-Romer

Panel C: Comparison of Romer and Romer episodes with Revised Chronology episodes

	Romer Romer	Difference with Revised Chronology	Difference with Revised Chronology (Bank equity decline < -30%)
Bank equity decline	-0.417	0.018 [1.38]	0.050 [4.14]
Abnormal bank equity decline	-0.406	0.051 [1.74]	0.080 [2.64]
Bank market cap decline	-0.509	0.033 [1.35]	0.083 [3.46]
Real GDP decline (pk to tr)	-0.035	-0.004 [-1.04]	0.000 [0.01]
Real GDP growth decline (pk to tr)	-0.066	-0.009 [-2.81]	-0.006 [-1.91]
Real GDP growth (max dev from trend)	-0.049	-0.006 [-2.15]	-0.005 [-1.66]
Significant liability guarantees	0.909	0.052 [1.11]	0.004 [0.1]
Significant liquidity support	0.913	0.051 [1.13]	-0.042 [-1.09]
Deposit runs	0.600	-0.400 [-3.92]	-0.400 [-2.94]
NPL at peak	0.088	-0.018 [-1.17]	-0.025 [-1.53]
Decline in deposits (pre-war only)	N/A		

Conclusions

1. Banking crises are characterized by large declines in the bank equity index
2. The severity of the bank equity decline forecasts the extent of the long-run output gap
3. We precisely date the turning points of banking crises
 - **Modern banking crises**: bank stocks fall **before** nonfinancial stocks
 - **19th century banking crises**: nonfinancial stocks fall first
4. We use bank stock prices to create a revised chronology of historical banking crises



New estimates on the avg crisis severity

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

	Added	Deleted	Revised Chronology	Revised Chronology (Bank equity decline < -30%)
Bank equity decline	-0.539	-0.145	-0.351	-0.448
Abnormal bank equity decline	-0.381	-0.159	-0.355	-0.439
Bank market cap decline	-0.516	-0.135	-0.431	-0.529
Real GDP decline (pk to tr)	-0.066	-0.024	-0.051	-0.057
Real GDP growth decline (pk to tr)	-0.079	-0.055	-0.084	-0.087
Real GDP growth (max dev from trend)	-0.065	-0.037	-0.059	-0.062
Significant liability guarantees	1.000	0.367	0.547	0.631
Significant liquidity support	0.750	0.333	0.750	0.817
Deposit runs	1.000	0.556	0.950	0.979
NPL at peak	0.113	0.035	0.152	0.149
Decline in deposits (pre-war only)	-0.143	-0.057	-0.195	-0.199