

The Safety Net: Central Bank Balance Sheets and Financial Crises

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Dubrovnik, 31 May 2026

Motivation

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 - Cf. Thornton (1802), Bagehot (1873)
- **This paper** looks into history of central bank balance sheets to systematically study the (causal) effects of CB balance sheet expansions during financial crises on macroeconomic outcomes

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- 2 We study the historical evolution of CB balance sheets and policy drivers
- 3 We trace the history of thought (*Hankey-Bagehot debate, liquidationists, real bills, etc.*) behind beliefs of central bank governors wrt the advisability of emergency lending
- 4 We show that governors' ideological predispositions predict actual policy, offering an instrument to causally estimate effects of liquidity support on macroeconomic outcomes

Literature

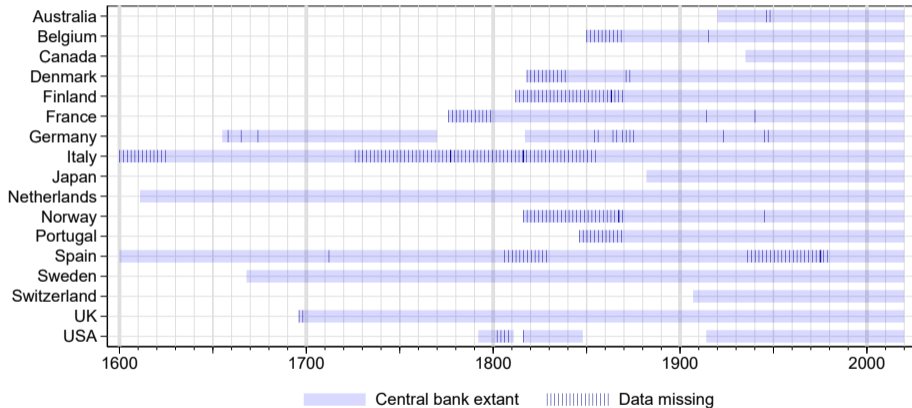
- **Central bank balance sheets and emergency lending:** Bordo et al. (2001); Honohan and Klingebiel (2003); Drechsler et al. (2016); Calomiris, Flandreau and Laeven (2016); Del Negro, Eggertsson, Ferrero and Kiyotaki (2017); Behr and Wang (2020)
- **Financial crises and their effects:** Reinhart and Rogoff (2009); Schularick and Taylor (2012); Jordá, Taylor and Schularick (2013); Baron, Verner and Xiong (2021); Metrick and Schmelzing (2024), Jamilov et al. (2024)
- **Role of policy makers' beliefs:** Kuttner and Posen (2010); Malmendier, Nagel and Yan (2021); van Ommeren and Piccillo (2021); Bordo and Istrefi (2023); Hack, Istrefi and Meier (2023)

The Evolution of Central Bank Balance Sheets

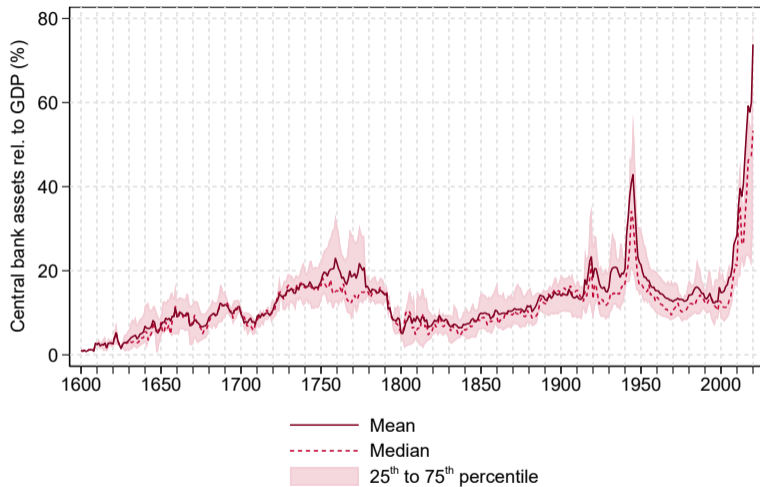
Data

- Annual central bank balance sheet data (aggregate and composition)
 - unbalanced panel for 17 countries starting in the 1600s
- Additional macroeconomic data and crisis chronologies (JST, BVX)
 - All data will be available at www.macrohistory.net/database
- Historical sources (primary, secondary) to classify ideological predispositions of 112 central bank governors prior to financial crises

Data coverage

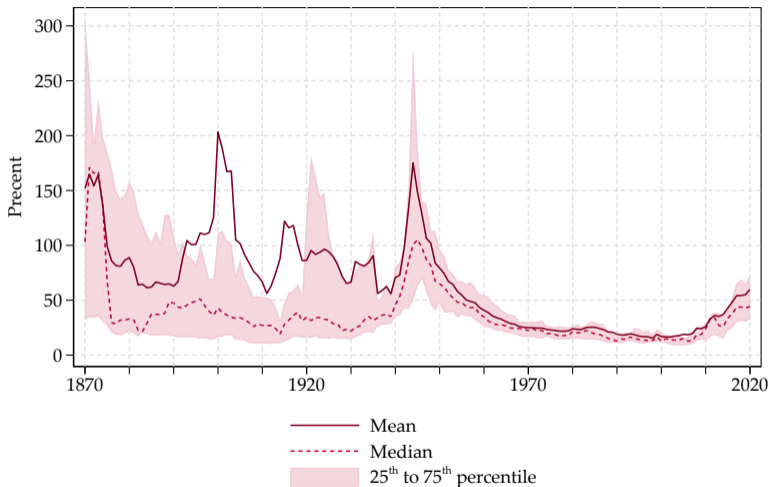


Central bank total assets relative to GDP



Notes: Central bank total assets relative to GDP; year-specific mean and quantiles across countries.

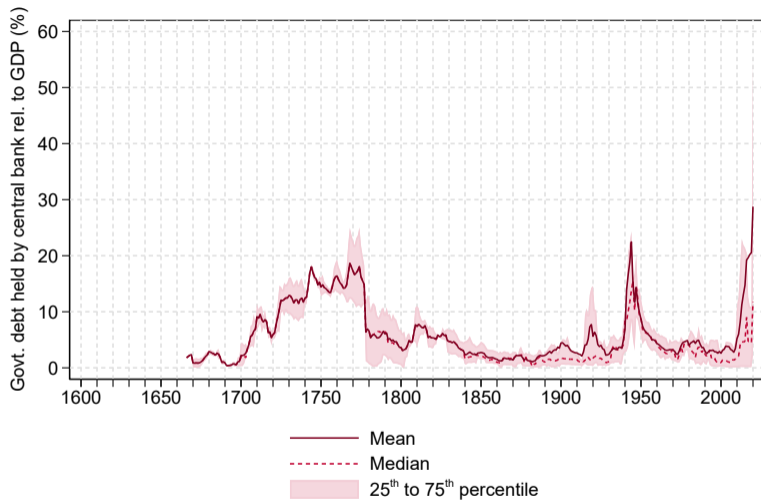
Central bank balance sheets relative to assets of financial sector



Notes: Central bank total assets relative to commercial bank lending to the private sector; year-specific mean and quantiles across countries.

► Disaggregate

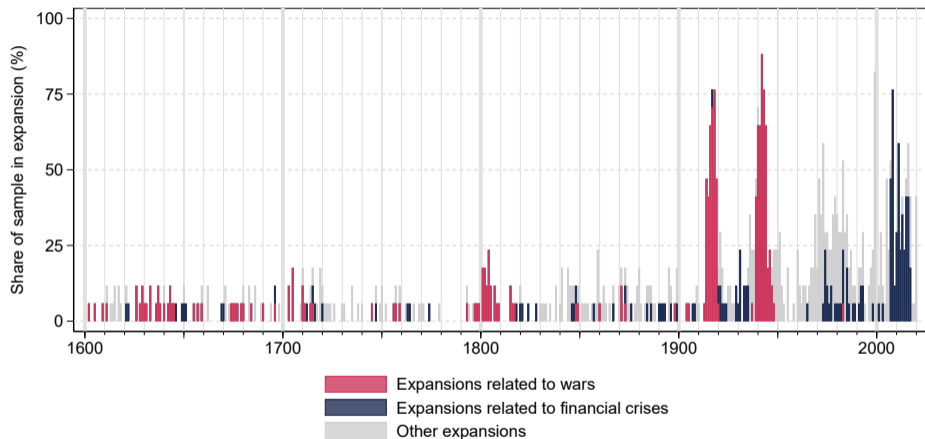
Central bank holding of government debt relative to GDP



Notes: Central bank holding of government debt, relative to GDP outstanding; year-specific mean and quantiles across countries.

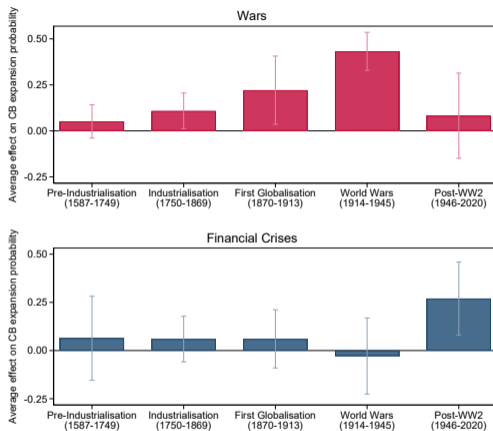
► Disaggregate

Expansions by event type



Note: Central bank balance sheet expansion defined as 15% annual asset growth or more.

Central bank sensitivity to crisis events



Notes: Probability of a central bank balance sheet expansion of +15% or more during the current or the next year. Probit model with episode-specific coefficients and country fixed effects. Whiskers mark 95% confidence interval.

▶ Balance sheet expansions

▶ Recessions

▶ Influence of currency pegs

The Causal Effects of Central Bank Liquidity Support

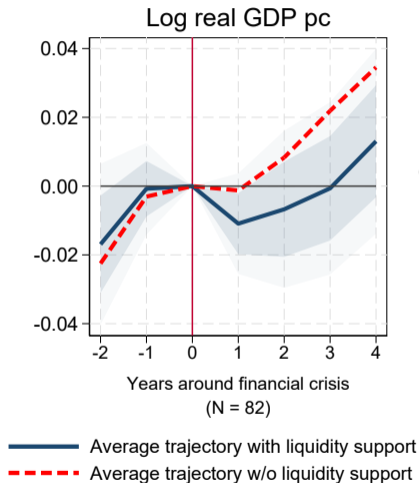
Liquidity support and financial crisis outcomes

- Central bank liabilities are the economy's most liquid asset
- Supply/volume is given by central bank balance sheet size

Crisis liquidity support

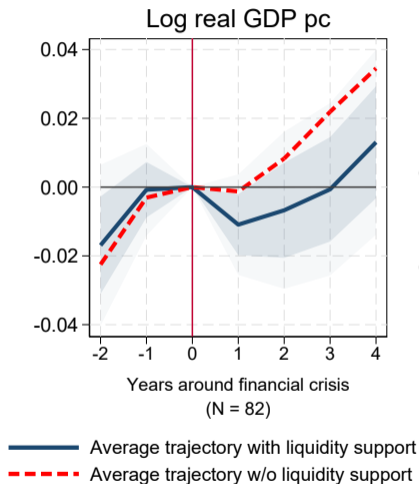
Annual central bank balance sheet growth $\geq 15\%$ during first or second crisis year

Baseline OLS event study



- Liquidity support predicts *worse* crises
(Bordo et al., 2001, Honohan, Klingebiel, 2003)

Baseline OLS event study



- Liquidity support predicts *worse* crises
(Bordo et al., 2001, Honohan, Klingebiel, 2003)
- But worse crises may warrant more support...

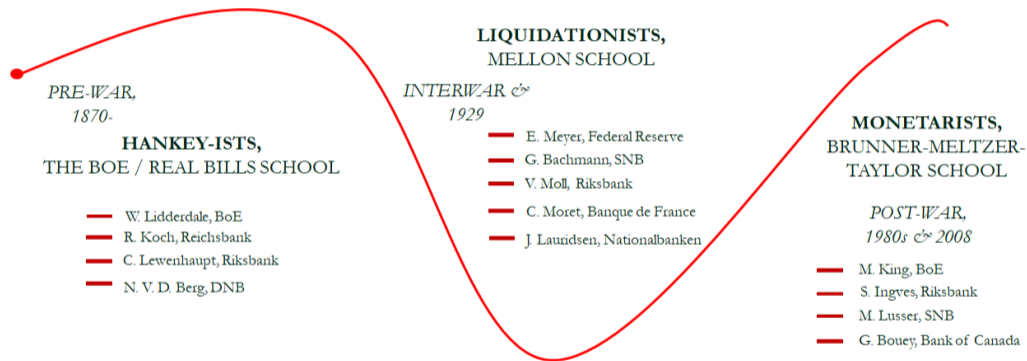
Identification strategy to address potential reverse causality

- Variation in liquidity support *exogenous to crisis severity*
 - Intellectual traditions emphasizing risks of discretionary liquidity support
 - Central bank governors influenced by these views are less likely to intervene
- ⇒ **Instrumental variable:** Ex-ante beliefs of the governore about desirability of liquidity support

Example

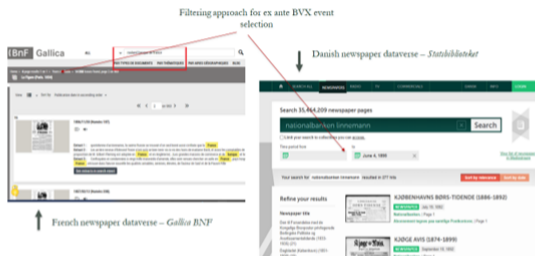
- Governor Richard Koch (Reichsbank, 1890-1908) stood in intellectual tradition of non-interventionist Liquidationists – "fierce defender of non-intervention" (Börsen-Zeitung, 1903).
- In the 1907 crisis, he refused to intervene despite pressure to do so – intent on "cleansing the Reichsbank balance sheet of all non-trade bills".
- "We refuse...to let the Reichsbank be a cheap source of liquidity for commerce...with it being imperative to keep the Imperial currency and stability untouched" (speech at the Prussian Upper Chamber, January 22, 1906).

The arc of intellectual history

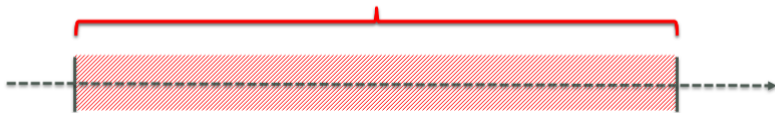


Central bank governor beliefs before banking crises: Step 1

- We parse ex ante crisis period systematically for governor primary sources, exploiting database advances, revealing preference ranking.



$t=1$ to $t=2$ – search and parsing focus in *ex ante* dataverse (e.g. Gallica BNF)



$t=1$ Governor
appointment date: 1890

$t=2$ BVX crisis date: 1907

Central bank governor beliefs at the start of banking crises: Step 2

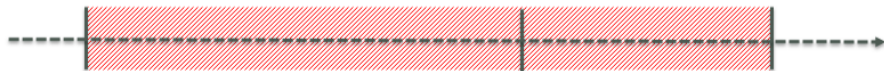
- Particular attention is put on statements revealing moral hazard concerns.

“President Koch is the fierce defender of the gold standard...loathed by the bimetallists...”

“who cleanses the Reichsbank balance sheet of items unrelated to trade...”



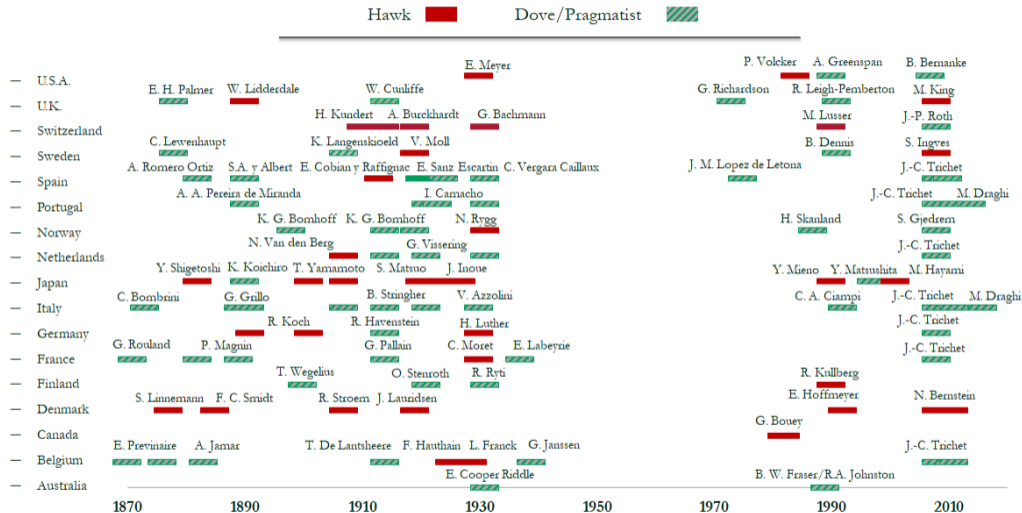
October 31, 1903



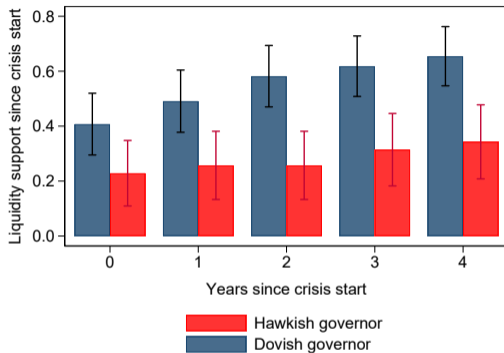
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Central bank governor beliefs at the start of banking crises



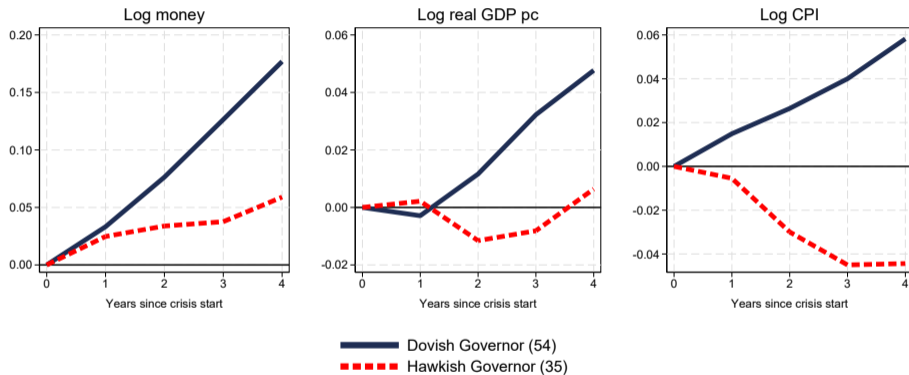
Hawks and doves: crisis response



Notes: Share of observations with one or more balance sheet expansions exceeding 15% annually since the start year of a financial crisis, by horizons and governor classification. Data from 89 crises dated by Baron, Verner and Xiong (2021) occurring between 1870 and 2020 in our sample of 17 advanced economies with an operating central bank, excluding 1914-1918, 1939-1945, the German hyperinflation and the Spanish civil war. Whiskers mark 90% confidence intervals.

► "Silent" expansions

Crisis outcomes by governor type



Notes: Average macro-financial outcomes following financial crises, by governor type. Number of crises in brackets.

▶ Pre-crisis macroeconomic trends

▶ Pre-crisis regulation

Formal empirical test: LP-IV

Crisis intervention

$$m_{i,t+1} = \begin{cases} 1 & \text{annual CB balance sheet growth} \geq 15\% \text{ in } t \text{ or } t + 1 \\ 0 & \text{else} \end{cases}$$

Formal empirical test: LP-IV

Crisis intervention

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	Dove	Hawk
crisis w/o intervention	22	26
crisis w/ intervention	21	9

Formal empirical test: LP-IV

Crisis intervention

$$m_{i,t+1} = \begin{cases} 1 & \text{annual CB balance sheet growth} \geq 15\% \text{ in } t \text{ or } t + 1 \\ 0 & \text{else} \end{cases}$$

First stage:
$$m_{it+1} = a_i + bg_{it+1} + \mathbf{c}\mathbf{x}_{it+1} + e_{it+1}$$

Second stage:
$$y_{it+h} - y_{it+1} = \alpha_{i,h} + \beta_h \hat{m}_{it+1} + \gamma_h \mathbf{x}_{it+1} + \epsilon_{it+h}$$

(i, t) sample of country-years with financial crises

g_{it+1} hawkish governor

y_{it}, \mathbf{x}_{it} macro-financial outcome and control variables [▶ details](#)

$a_{i,h}, \alpha_{i,h}$ country fixed effects

$h = 2, 3, 4$ [▶ Timing](#)

Ex-ante beliefs and balance sheet expansion

$$\text{First stage: } m_{it+1} = a_i + bg_{it+1} + \mathbf{c}\mathbf{x}_{it+1} + e_{it+1}$$

	(1)
	m_{it+1}
Governor holds hawkish beliefs ($h_{i,t+1} = 1$)	-0.363*** (0.083)
Macro controls	Yes
Country FE	Yes
F	18.91
R^2	0.33
Crises	78

Notes: Dependent variable is balance sheet expansion. Macroeconomic controls include contemporaneous and two lags of real GDP growth, inflation and three-year growth in real bank lending to the private sector prior to the financial crisis. Country fixed effects absorbed by within-estimator. Standard errors clustered on countries in parentheses. *** $p < 0.01$.

▶ Additional insittutional controls

▶ Additional biographical controls

The effects of liquidity support

Track path of real GDP, CPI, money over horizons $h = 2, 3, 4$ relative to levels at $h=1$:

Second stage:
$$y_{it+h} - y_{it+1} = \alpha_{i,h} + \beta_h \hat{m}_{it+1} + \gamma_h \mathbf{x}_{it+1} + \epsilon_{it+1+h}$$

Liquidity support and crisis trajectories

Impact of central bank liquidity injection ($m_{it+1} = 1$), with confidence bands:

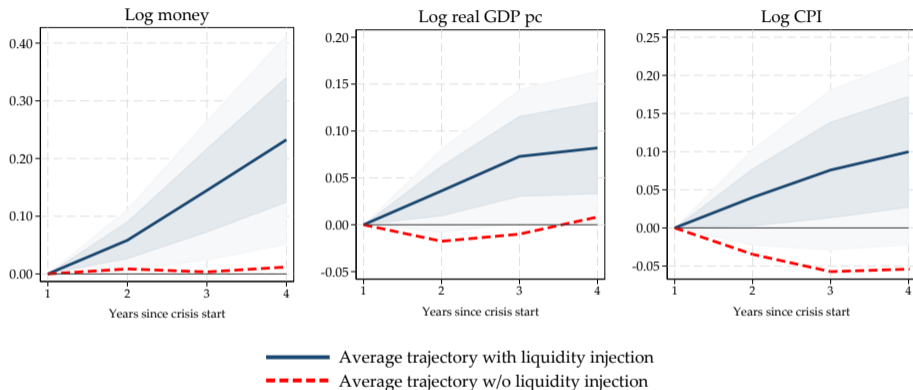
$$\hat{\alpha}_h + \hat{\gamma}_h \bar{\mathbf{x}}_{it+1} + \hat{\beta}_h$$

comparing to average trajectory without liquidity injection:

$$\hat{\alpha}_h + \hat{\gamma}_h \bar{\mathbf{x}}_{it+1}$$

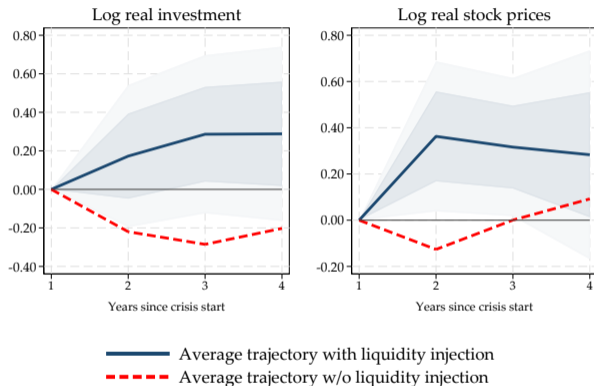
($\hat{\alpha}_h$ denotes the average fixed effect)

Large differences in crisis outcomes



Notes: Plots show the trajectory of macroeconomic aggregates after financial crises depending on central bank liquidity policy. Uncertainty about trajectory of liquidity expansions induced by estimation uncertainty in $\hat{\beta}_h$ is represented by lightly shaded areas marking its 90% confidence interval; \pm one standard error is marked in dark. Country fixed effects and macro-financial controls included. Standard errors clustered on the country level.

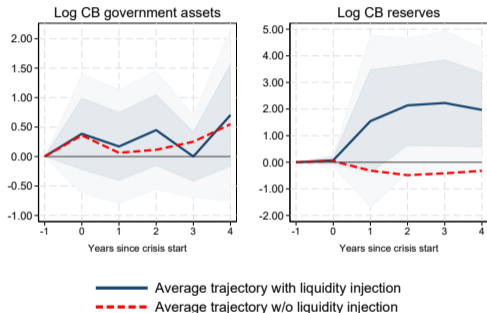
Investment and stock prices recover faster



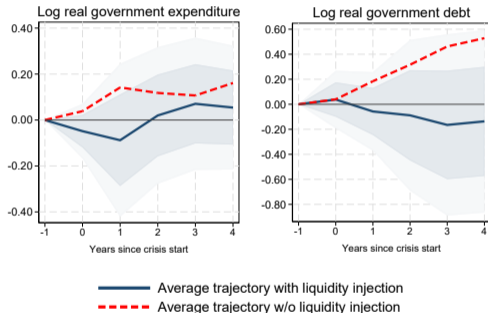
Notes: Lightly shaded areas mark 90% confidence intervals due to uncertainty around $\hat{\beta}_h$. In dark, \pm one standard error. Country fixed effects and dynamic macro-financial controls augmented by real stock and aggregate investment growth in t and $t + 1$. Standard errors clustered on countries.

LLR or fiscal monetisation?

(a) Central bank balance sheet composition



(b) Public finances



Notes: Lightly shaded areas mark 90% confidence intervals due to uncertainty around $\hat{\beta}_h$. In dark, \pm one standard error. Country fixed effects and baseline dynamic macro-financial controls augmented by growth in central bank deposits and government debt holdings at $t-1$ and $t-2$ in the left panel and by growth of real public expenditures and real public debt at $t-1$ and $t-2$ in the right panel. Standard errors clustered on countries.

Robustness checks

Alternative control setups

- ▶ Government expenditure
- ▶ Policy rate changes
- ▶ Extant deposit insurance
- ▶ Bank capital ratios
- ▶ Episode dummies
- ▶ No controls except country FE

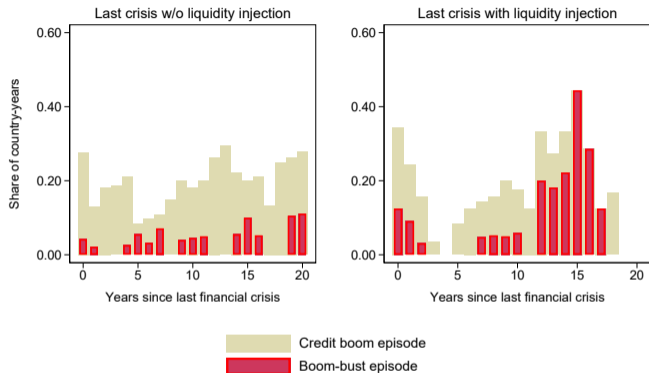
Alternative liquidity measures

- ▶ Injection threshold 10%
- ▶ Injection threshold 20%
- ▶ Continuous injection measure
- ▶ Dependent central banks

Alternative samples

- ▶ JST crisis sample
- ▶ RR crisis sample
- ▶ Dropping post-2007
- ▶ Without Great Depression

Long-term risks



Notes: Share of country-years experiencing a credit boom episode, binned by the number of years since last financial crisis and respective central bank liquidity support ($m_{it+1} = 1$). We define a country-year to belong to a *credit boom episode* if the credit-to-GDP ratio increased beyond +0.10 over the past three years. We label a country-year to be part of a *boom-bust episode* if in addition a financial crisis ensues during any of the three subsequent years.

Liquidity injections predict boom-bust episodes

	(1)	(2)	(3)	(4)
	OLS	OLS	Logit	2SLS
Liquidity injection in last crisis	0.038* (0.022)	0.066** (0.030)	0.082*** (0.024)	0.150** (0.076)
Macro controls		Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
R^2	0.01	0.08		0.03
Pseudo- R^2			0.32	
First-stage F				21.2
N	939	740	592	740

Notes: The table presents estimates from four different models for the probability to experience a boom-bust episode of the form $P(\text{BadBoom}_{i,t} = 1) = f(\alpha_i + \beta \tilde{m}_{i,t} + \gamma_h \mathbf{x}_{i,t})$, where $\text{BadBoom}_{i,t}$ is a binary variable indicating a boom-bust episode; $\tilde{m}_{i,t}$ is a binary variable indicating that during the last financial crisis the central bank responded with a liquidity injection, i.e., a balance sheet expansion of at least +15% during the first or second year of the crisis; α_i denotes country fixed effects and $\mathbf{x}_{i,t+1}$ captures dynamic macroeconomic and financial controls. Controls include the contemporaneous and two lags of real GDP growth, inflation, real stock price index growth as well as real GDP growth and inflation during the first year of last crisis, the two years before and the three-year growth in real bank lending to the private sector before the last crisis. We define a country-year to be in a *boom-bust* episode if the credit-to-GDP ratio increased beyond +0.10 over the past three years and a financial crisis ensues during any of the three subsequent years. Column 3 shows the logit estimate of the average marginal effect on the probability of a fragile credit boom episode. Two-stage-least-squares regression uses the usual instrument of attitude of the governor $h_{i,t}$ during the last financial crisis. We restrict the sample to country-years where the last financial crisis took place at most 20 years ago. Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Net benefits: Back-of-envelope calculation

		Discount rate		
		5%	3%	1%
Trend growth	5%	0.088	0.048	-0.023
	3%	0.152	0.145	0.130
	1%	0.180	0.185	0.190

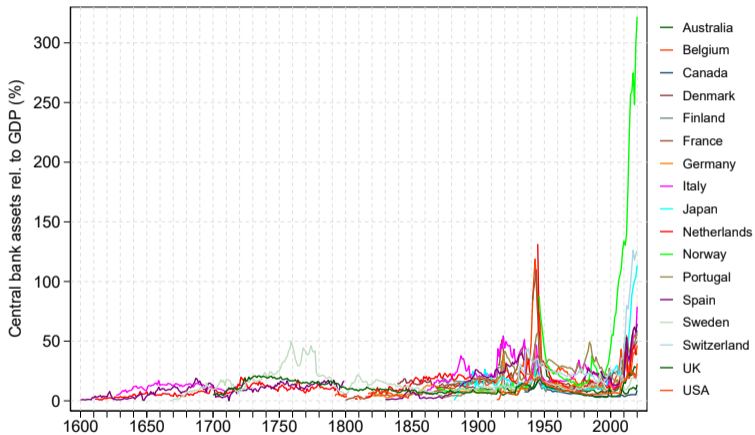
Notes: The net present value of liquidity injections in response to a financial crisis expressed as a share of current GDP under different assumptions for social discount rates and real trend growth. These figures account both for short-run stabilization gains as well as long-run financial instability costs and are computed under the assumption that the central bank would intervene again during potential future crises.

Conclusion

- Shift towards "systemic" financial stabilization after Great Depression
- Large liquidity injections mitigate crises and boost the recovery
- Evidence of elevated boom-bust cycle risk in the long run (moral hazard)

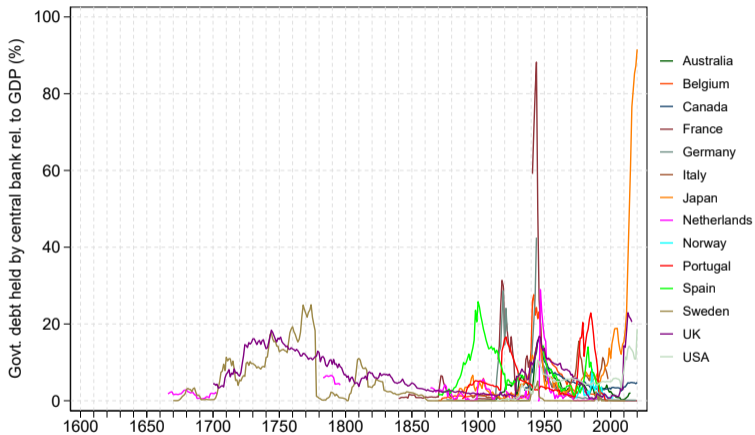
APPENDIX

Central bank total assets relative to GDP, 17 countries



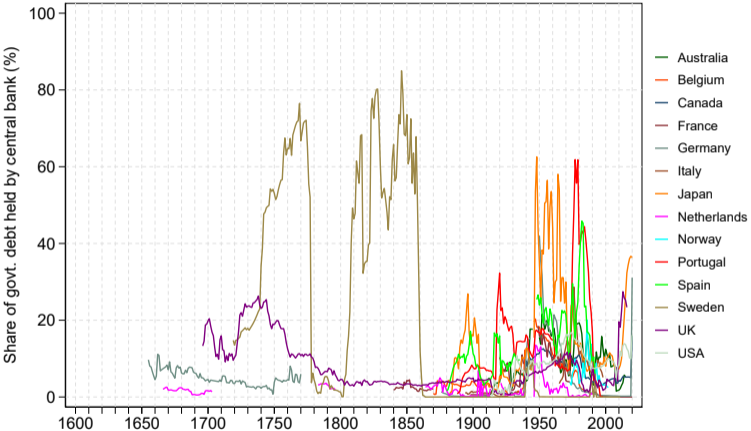
▶ Resume

Central bank holding of government debt relative to GDP



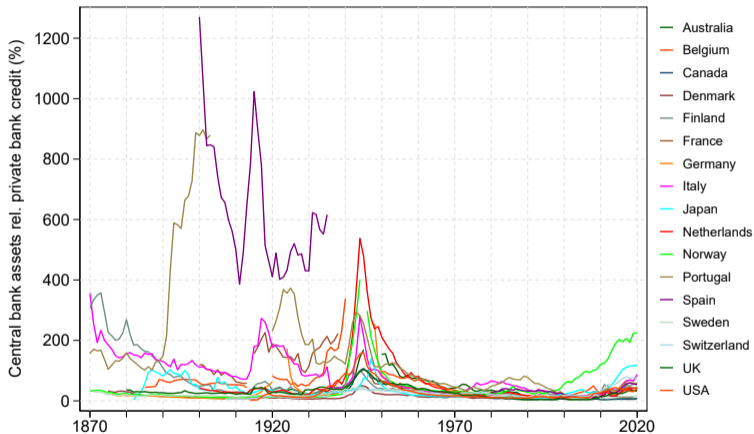
▶ Resume

Central bank holding of government debt, share of outstanding

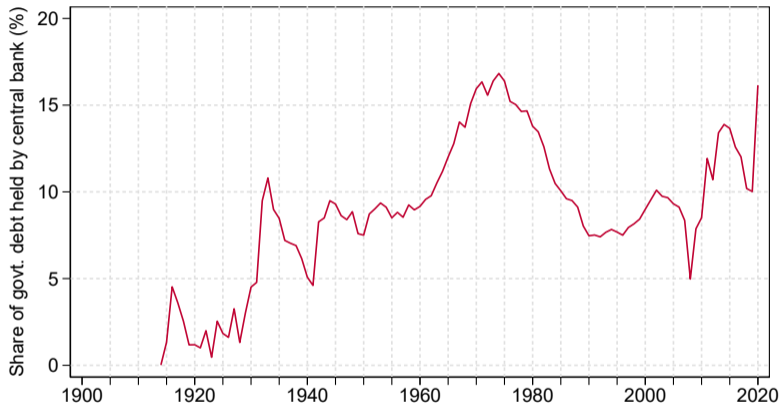


▶ Resume

Central bank balance sheets relative to assets of financial sector



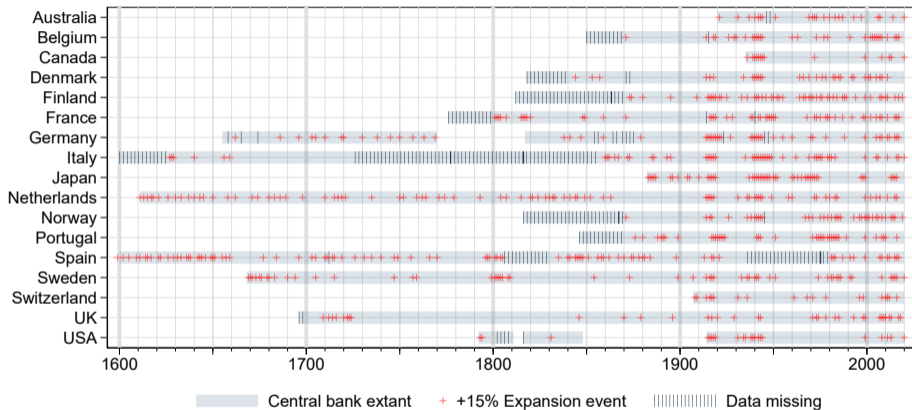
Federal Reserve holding of government debt, share of outstanding



Notes: Central bank holding of government debt, relative to total government debt outstanding; year-specific mean and quantiles across countries.

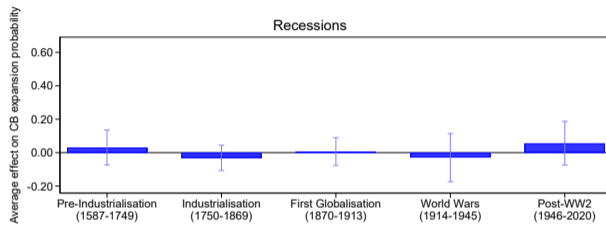
▶ Resume

Major central bank balance sheet expansions



Notes: In total, 742 country-year expansion events are displayed, defined as +15% year-on-year total nominal asset growth or more.

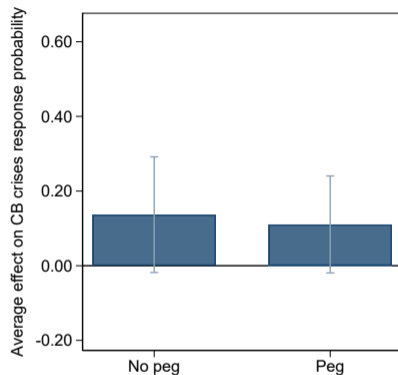
Balance sheet sensitivity towards recessions



Notes: Average effects on the probability of a central bank balance sheet expansion of +15% or more during the current or the next year. Estimates from probit model with episode-specific coefficients for a war, a financial crisis or recession as well as country fixed effects. Whiskers mark the 95% confidence interval.

▶ Resume

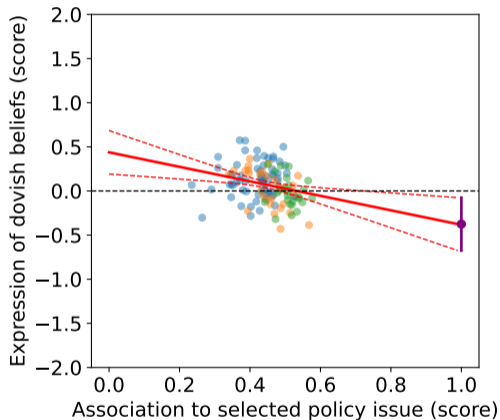
Balance sheet operations under currency pegs



Notes: Average effects on the probability of a central bank balance sheet expansion of +15% or more during the current or the next year. Estimates from probit model with currency-regime-specific coefficients for a financial crisis as well as country fixed effects. Whiskers mark the 95% confidence interval.

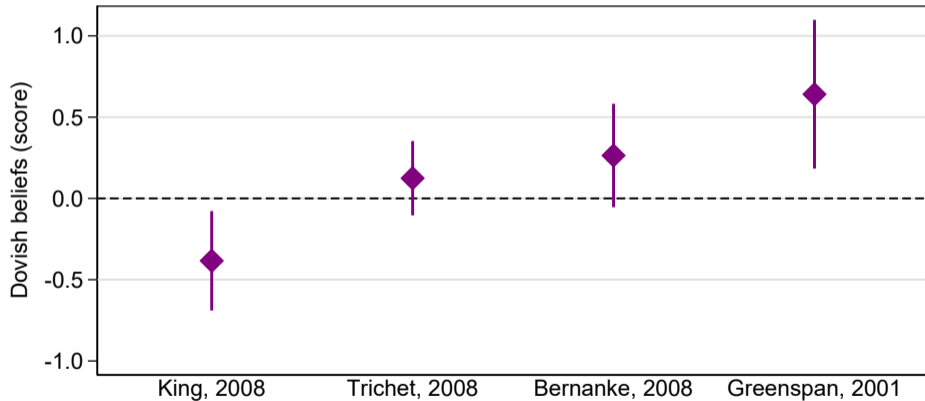
Language model-based classification ▶ Resume

Example: Mervyn King, 2008



Notes: This figure visualizes the LLM methodology for classifying governor policy beliefs. Each dot represents a equally-sized text snippet and is characterized by its association to financial crises (x axis) and location on the dove/hawk scale (y axis). Dots of the same color come from the same source document. The red line represents the linear fit through all text chunks, with dashed lines marking the 95% confidence interval based on robust standard errors. For each given policy domain, we use the purple prediction at $x = 1$ as policy belief classification.

Language model-based classification [▶ Resume](#)

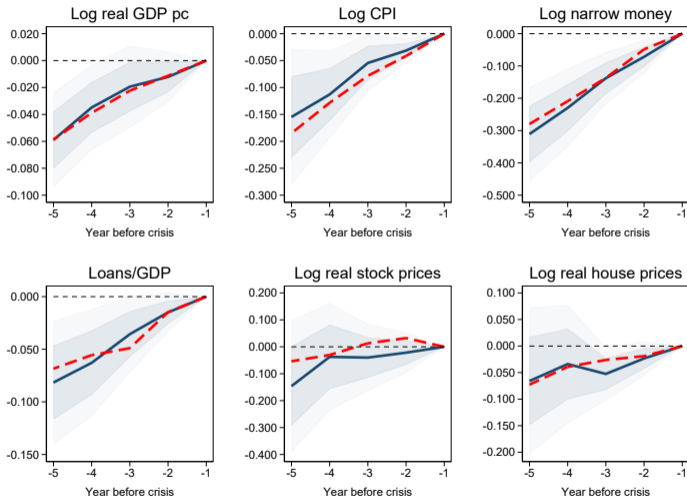


Biographical attributes of CB governors

	Hawks	Doves
Crisis observations	29	47
Age at crisis	58	61.0
Treasury experience (share)	27.6%	40.4%
Political party membership (share)	17.2%	36.2%
Financial sector experience (share)	51.7%	31.9%
Pre-appointment crises	2.22	1.57

Notes: Additional central bank governor attributes prior to appointment or banking crisis. "Party Political Experience" counts either official political offices held prior to appointment (e.g. Senator), or position within a national political party (e.g. press secretary) - but not passive party memberships. "No. of lifetime systemic crises" counts panics on the BVX basis between the birth year and the appointment year for the respective governor. "Average inflation experience" measures the average of the annual change in the CPI index from the respective governor's birth year to the final year prior to the banking crisis outbreak, with the CPI index sourced via the "JST database".

Pretrends before crises, by governor type ▶ Resume

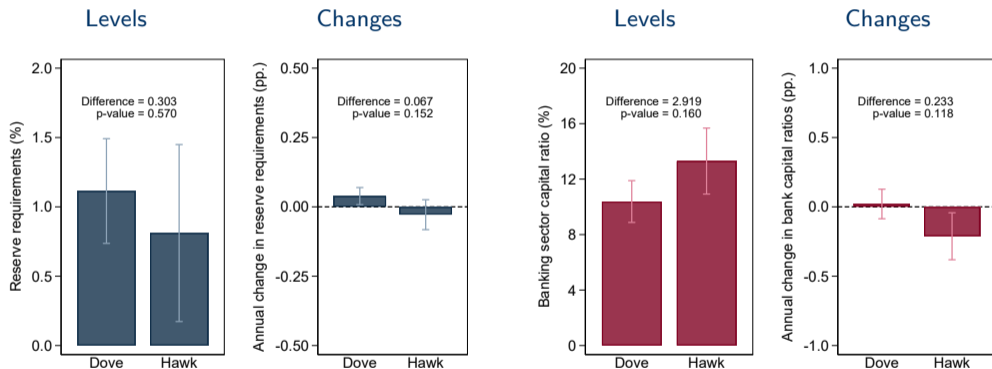


— Dovish governor
- - Hawkish governor

Pre-crisis financial regulation, by governor type ▶ Resume

(a) Reserve Requirements

(b) Capital Ratios

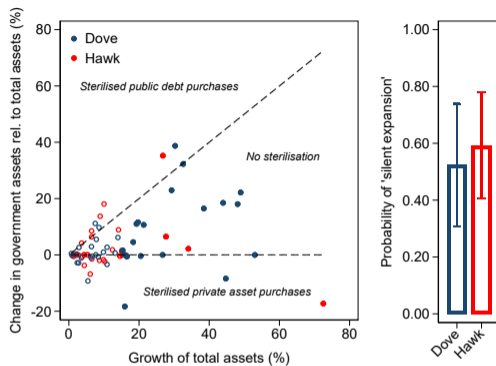


Notes: The figure plots estimates from the sample of country-years outside domestic wars during which a central bank governor holds office who will face a financial crisis later during his term. We estimate regressions $y_{i,t} = \alpha_i + \beta hawk_{i,t} + e_{i,t}$ for four different dependent variables $y_{i,t}$: Legal reserve requirements, annual changes in legal reserve requirements, banking sector capitalization and annual changes in banking sector capitalization. For each regression, we plot the average value for dovish governors (measured by the average of the country fixed effects) and its sum with the hawk coefficient β next to it. Whiskers mark 95% confidence intervals. The printed *difference* is the absolute value of β , with its *p*-value below.

Measuring LLR via central bank balance sheet expansions

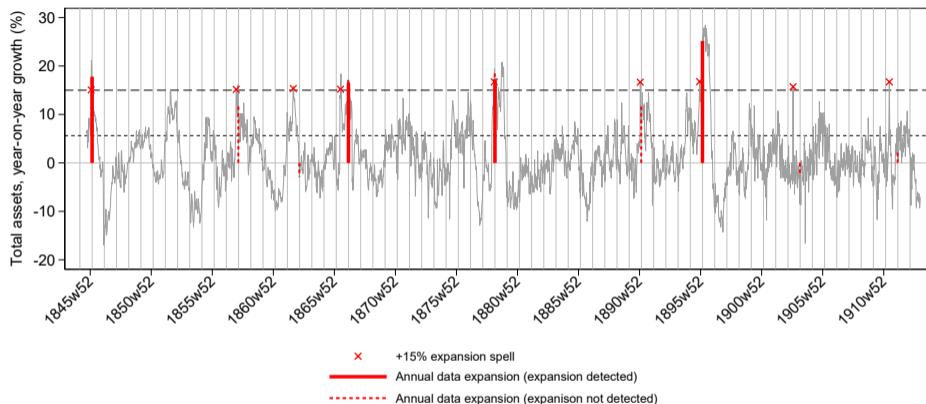
- Not all LLR interventions cause aggregate annual expansions:
 1. Sterilisation [▶ check](#)
 2. Short-lived expansions [▶ check](#)
 3. Announcement impact (effect without actual expansion, c.f., OMT)

Sterilisation of central bank asset purchases



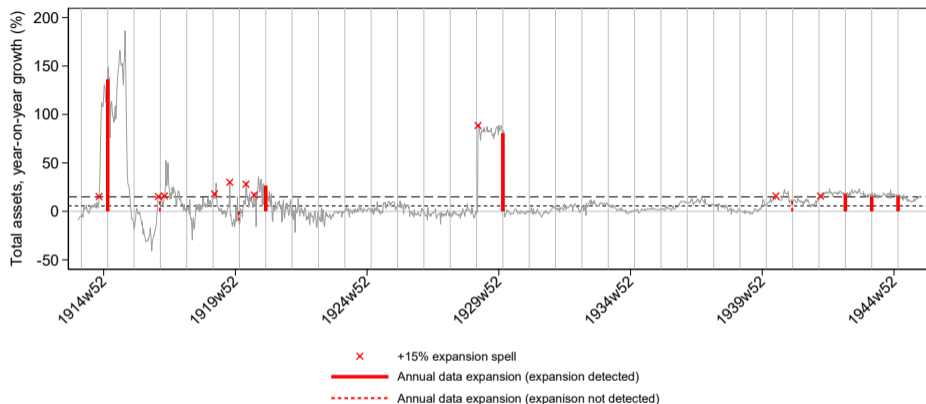
Notes: Left: Country-year observations of central bank balance sheet operations during first and second year of financial crises (Baron, Verner, Xiong, 2021). Hollow circles mark observations with aggregate balance sheet expansion below +15%. Observations outside cone imply increases in either private or public asset sub-aggregate in excess of the overall balance sheet expansion (sterilisation). Right: Share of operations below +15% aggregate expansion involving sterilisation, by governor type.

Weekly balance sheet data from Bank of England (1/4)



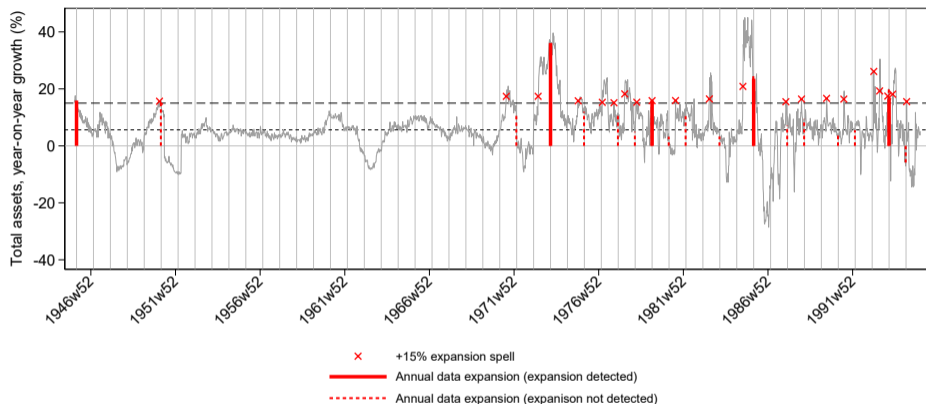
Notes: Bank of England weekly aggregate consolidated balance sheet, year-on-year growth. Within-year expansion events defined as the first time exceeds +15% (marked by long-dashed line) after surpassing the long-term average growth rate (marked by short-dashed line) marked by red crosses. Vertical lines mark dates of annual balance sheet data.

Weekly balance sheet data from Bank of England (2/4)



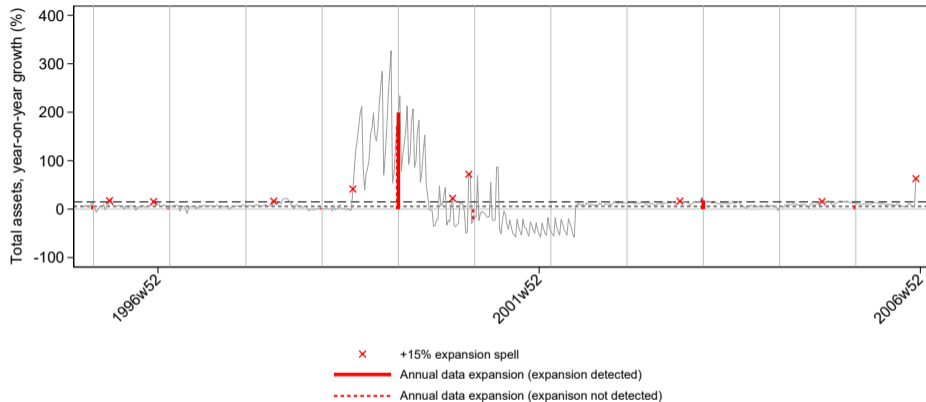
Notes: Bank of England weekly aggregate consolidated balance sheet, year-on-year growth. Within-year expansion events defined as the first time exceeds +15% (marked by long-dashed line) after surpassing the long-term average growth rate (marked by short-dashed line) marked by red crosses. Vertical lines mark dates of annual balance sheet data.

Weekly balance sheet data from Bank of England (3/4)



Notes: Bank of England weekly aggregate consolidated balance sheet, year-on-year growth. Within-year expansion events defined as the first time exceeds +15% (marked by long-dashed line) after surpassing the long-term average growth rate (marked by short-dashed line) marked by red crosses. Vertical lines mark dates of annual balance sheet data.

Weekly balance sheet data from Bank of England (4/4)



Notes: Bank of England weekly aggregate consolidated balance sheet, year-on-year growth. Within-year expansion events defined as the first time exceeds +15% (marked by long-dashed line) after surpassing the long-term average growth rate (marked by short-dashed line) marked by red crosses. Vertical lines mark dates of annual balance sheet data.

Macro-financial outcome and control variables

Outcome variables y_{it}

- log real GDP per capita
- log CPI
- log money

Control vector \mathbf{x}_{it} :

- real GDP per capita growth, contemporaneous ($h = 1$) and two lags
- inflation, contemporaneous ($h = 1$) and two lags
- money growth, contemporaneous ($h = 1$) and two lags
- three-year growth of real private sector bank lending (credit boom size)

Timing

Due to lagged CB reactions and ambiguities in identifying the start of financial crises, we adopt the following timeline:

$h = 0$ financial crisis start year (Baron, Verner, Xiong, 2021).

$h \in \{0, 1\}$ measuring CB balance sheet expansion.

$h \geq 2$ local projections (change relative to $h = 1$).

▶ Resume

Additional institutional controls in first stage

	(1)	(2)	(3)	(4)	(5)
Hawk ($g_{it+1} = 1$)	-0.363*** (0.083)	-0.340*** (0.083)	-0.575** (0.222)	-0.286** (0.128)	-0.396* (0.200)
Deposit insurance		0.079 (0.136)	-0.136 (0.270)		
Hawk \times deposit insurance			0.478 (0.373)		
Central bank not independent				-0.077 (0.143)	-0.222 (0.190)
Hawk \times central bank not independent					0.297 (0.272)
Macro controls	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
F	18.91	16.93	6.72	5.02	3.91
R^2	0.33	0.34	0.38	0.41	0.43
Crises	78	78	78	69	69

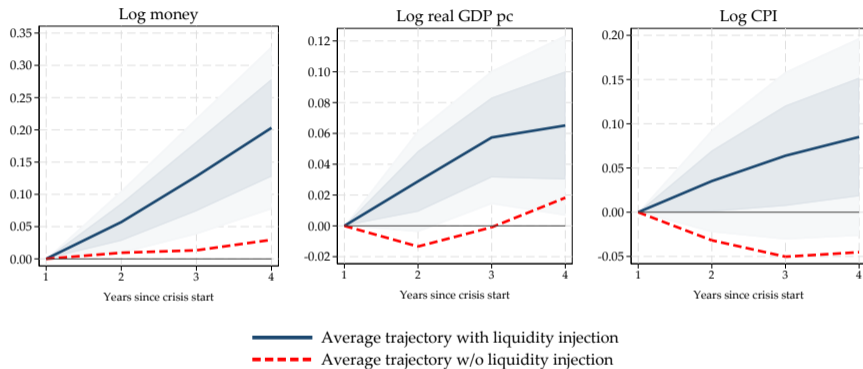
Notes: Macroeconomic controls include contemporaneous and two lags of real GDP growth, inflation and three-year growth in real bank lending to the private sector prior to the financial crisis. Country fixed effects absorbed by within-estimator. Standard errors clustered on countries in parentheses. *** $p < 0.01$.

Additional biographical controls in first stage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hawk ($g_{it+1} = 1$)	-0.363*** (0.083)	-0.339*** (0.081)	-0.321*** (0.086)	-0.333*** (0.082)	-0.320*** (0.087)	-0.340*** (0.088)	-0.331*** (0.079)	-0.329*** (0.097)
Crises		0.009 (0.020)						-0.011 (0.019)
Inflation			0.012** (0.005)					0.013 (0.009)
Financial sector				-0.022 (0.135)				-0.029 (0.147)
Treasury/cabinet					0.151** (0.070)			0.153* (0.083)
Party member						-0.024 (0.141)		-0.103 (0.158)
Age							0.002 (0.008)	-0.005 (0.011)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	18.91	17.68	14.07	16.56	13.69	15.00	17.77	11.45
R^2	0.33	0.39	0.41	0.39	0.41	0.39	0.39	0.42
Crises	78	77	77	77	77	77	77	77

Notes: Variables measure the pre-appointment biographies of governors: number of crises experiences, inflation, positions in the financial sector, treasury or the cabinet, party affiliation and his age. Standard errors clustered on countries in parentheses. *** $p < 0.01$.

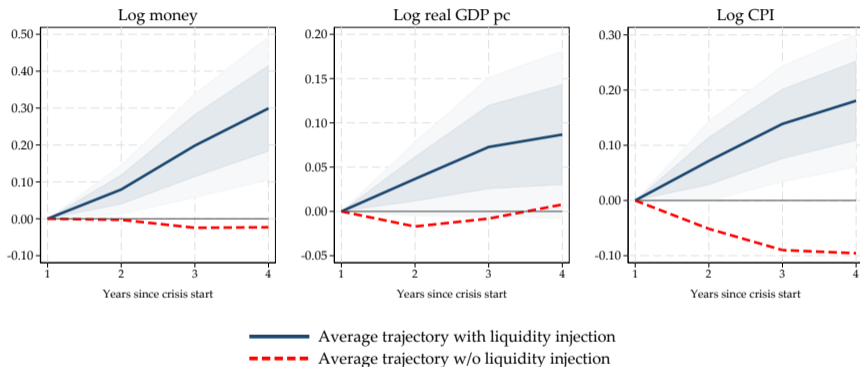
Controlling for government expenditures



Notes: Baseline controls extended by real government expenditure growth with the same lag structure.

▶ Resume

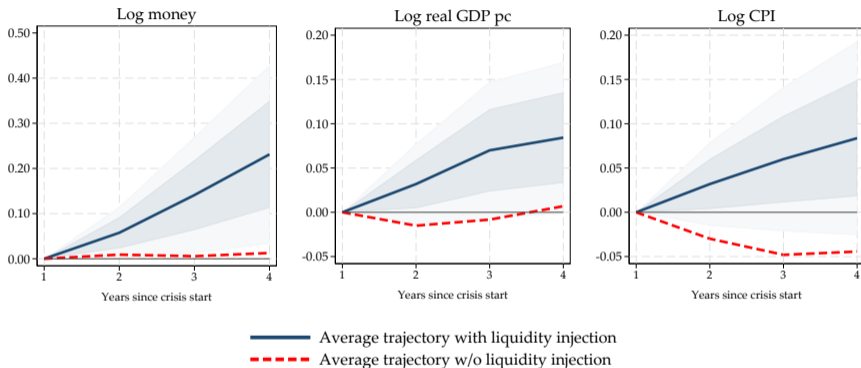
Controlling policy rate changes



Notes: Baseline controls extended by policy rate changes with the same lag structure.

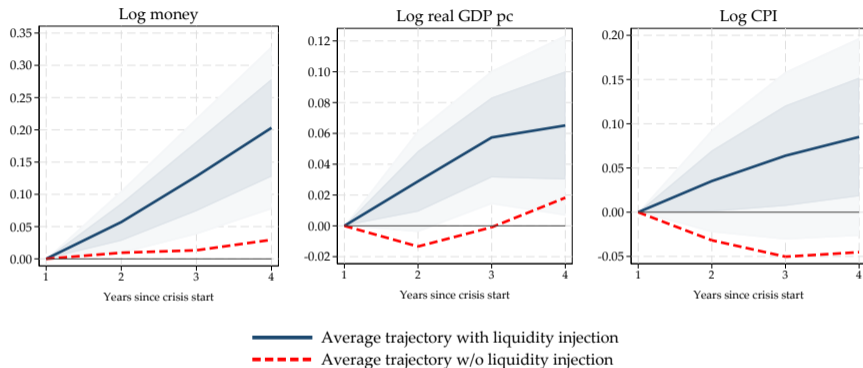
▶ Resume

Controlling for policy rate changes



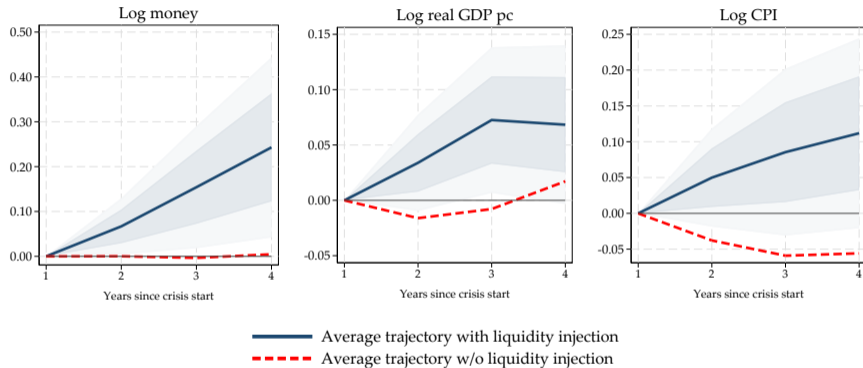
Notes: Adding a binary control indicating the presence of an explicit mandatory deposit insurance (Demirguc-Kunt and Detragiache, 2002).

Controlling for fiscal policy



Notes: Within estimation nets out country FE effects. Controlling for changes in the fiscal expenditure coinciding with our balance sheet expansion measure. Standard errors clustered on countries. Light shaded areas mark 90% CIs, dark shading marks \pm one standard error.

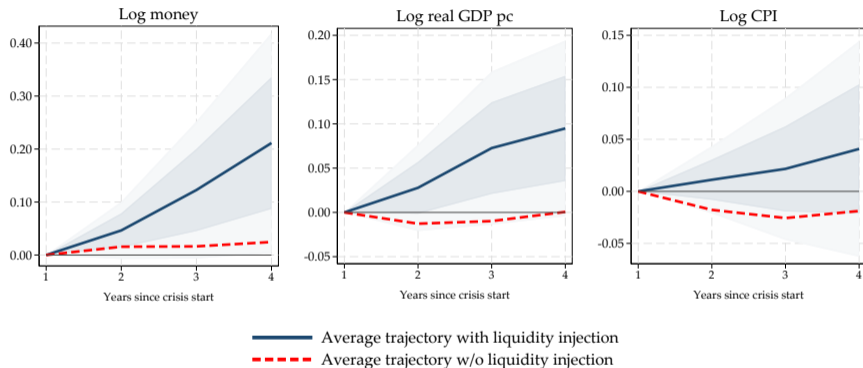
Controlling for bank capitalisation



Notes: Baseline controls extended by measure of bank leverage ratio in year before financial crisis.

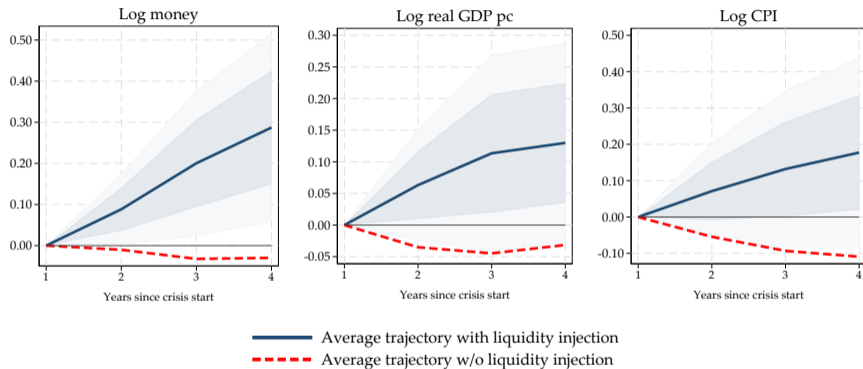
▶ Resume

Adding episode fixed effects



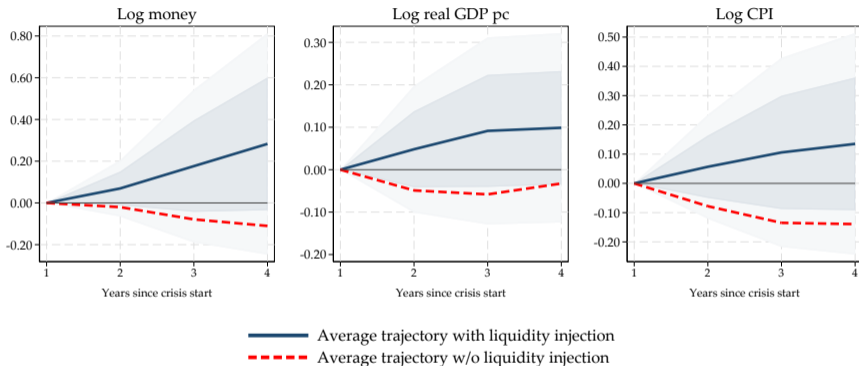
Notes: Baseline controls extended by two time period fixed effects: (i) classical gold standard and (ii) post WW2.

Omitting all controls except country fixed effects



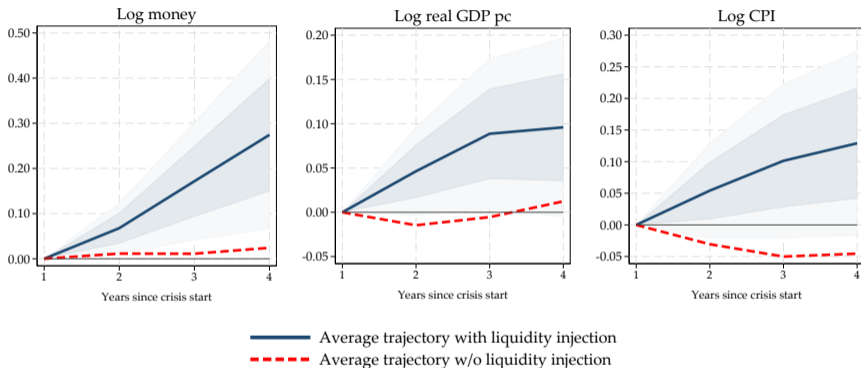
Notes: Baseline controls dropped, except country fixed effects.

Using +10% expansion threshold



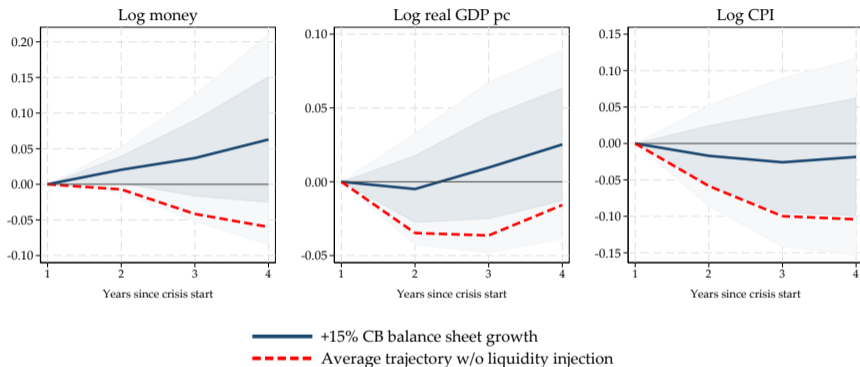
Notes: Central banks are coded to have injected liquidity in response to a financial crisis when they grew their balance sheet by +10% annually or more during the initial or subsequent year of the crisis.

Using +20% expansion threshold



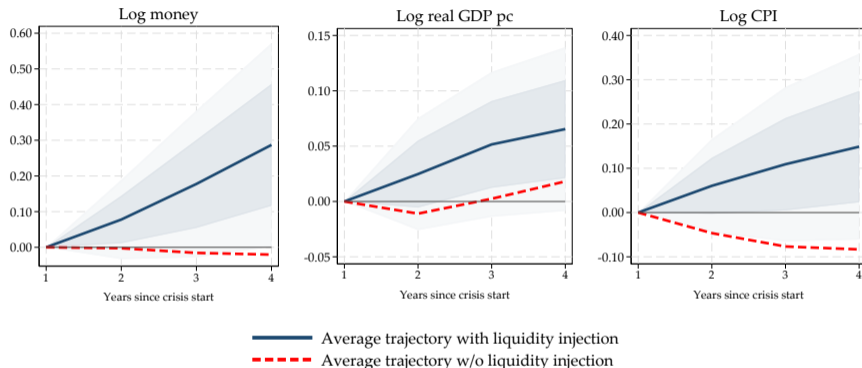
Notes: Central banks are coded to have injected liquidity in response to a financial crisis when they grew their balance sheet by +20% annually or more during the initial or subsequent year of the crisis.

Measuring expansion by 2-year balance sheet growth



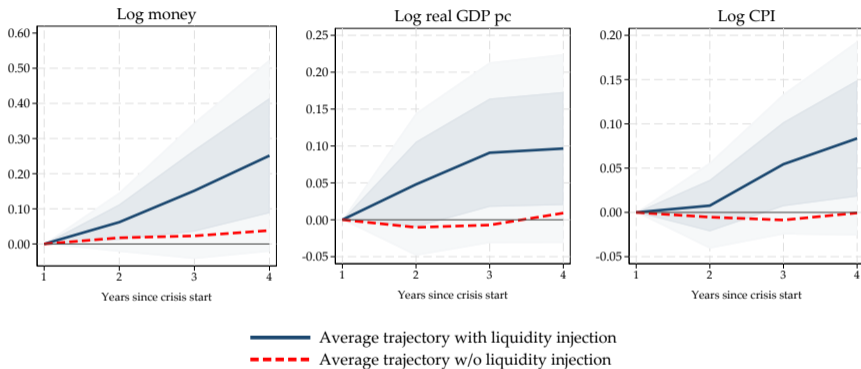
Notes: Central bank expansions are measured by the bi-annual growth of the central bank balance sheet during the first and second year of the crisis

Government ideology for dependent central banks



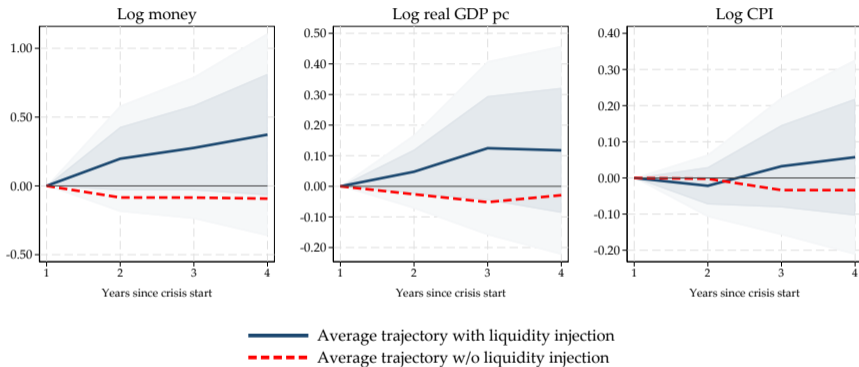
Notes: Replace the governor coding by a coding of government ideology instead for central banks that rank low on indices of central bank independence as measured by Garriga (2016): We impute the government policy stance for all central bank country-years in which the central bank index is recorded as less than 0.5, for our banking crisis years, we count 19 such instances. In these cases, we impute center-right/conservative-led government = hawk; centrist/center-left/left-led government = dove.

Using JST crisis chronology



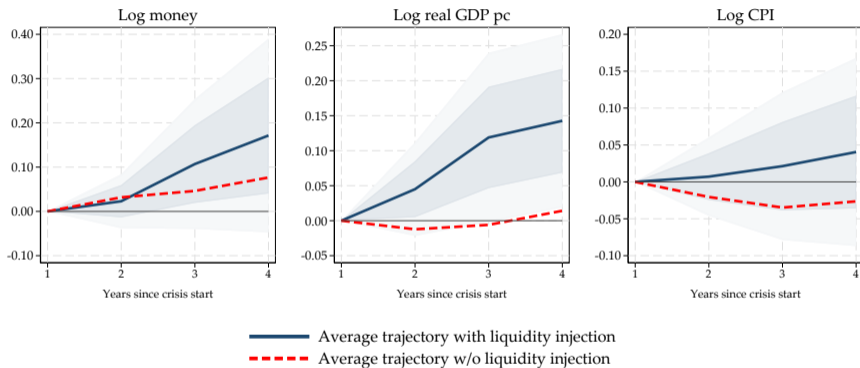
Notes: Dating financial crises using narrative chronology of Jorda et al. (2017).

Using RR crisis chronology



Notes: Dating financial crises using narrative chronology of Reinhart and Rogoff (2009).

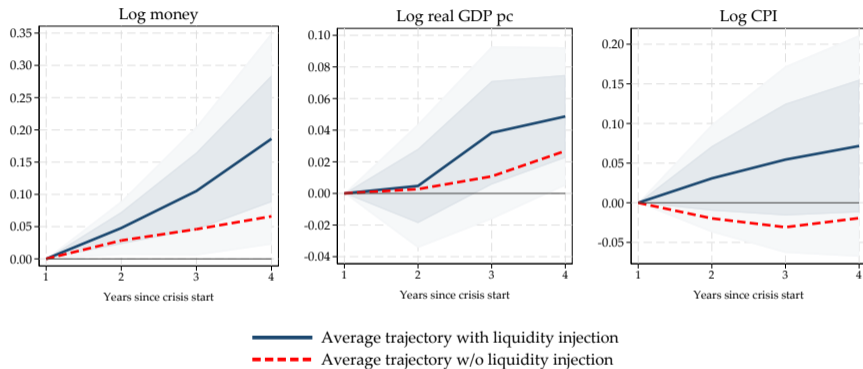
Dropping Great Financial and subsequent crises



Notes: Omitting all banking crises starting 2007 or later.

▶ Resume

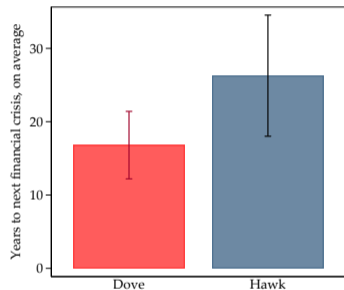
Dropping Great Depression



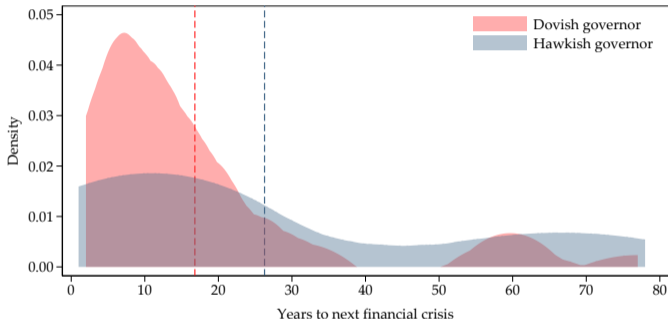
Notes: Omitting all banking crises starting between 1929 and 1933.

Time to next financial crisis

(a) Averages



(b) Full distributions



Notes: The left panel shows average number of years to the next financial crisis across all 70 financial crises for which the next crisis has been observed yet, by attitude of central bank governor during current crisis. Error bars mark the 90% CI. A two-sample one-sided t -test rejects equality at the 5% significance level.