

# Loose Monetary Policy and Financial Instability

Maximilian Grimm<sup>1</sup>

Òscar Jordà<sup>2</sup>

Mortiz Schularick<sup>3</sup>

Alan M. Taylor<sup>4</sup>

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**1** University of Bonn

**2** Federal Reserve Bank of San Francisco; University of California, Davis; and CEPR

**3** Kiel Institute; Sciences Po Paris; and CEPR

**4** Columbia University; University of California, Davis; NBER; and CEPR

The views expressed herein do not necessarily represent those of any of the institutions in the Federal Reserve System

# INTRODUCTION

## Research question

Does a persistently **loose stance of monetary policy** increase the risk of financial instability?

And if so, why?

Loose stance of monetary policy:  $r < r^*$

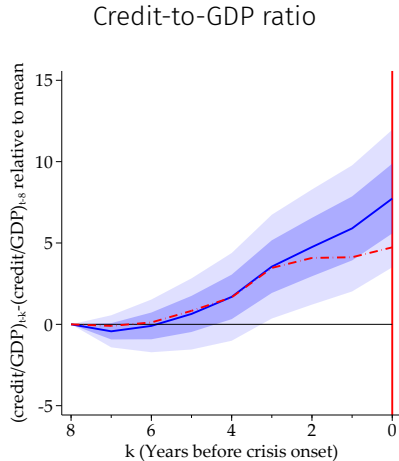
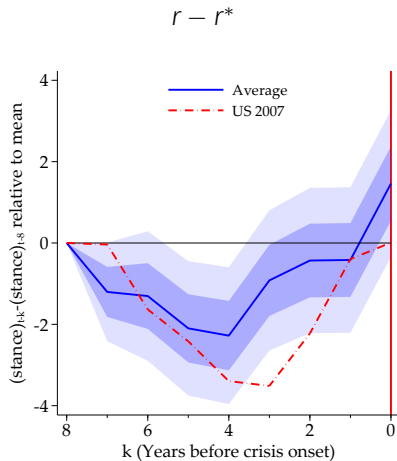
# Motivation

- Loose MP was blamed for the pre-2008 boom-bust...  
Geithner (2009), Taylor (2011)
- ...and stressed again in the 2010s as a potential source of instability  
Bernanke (2013), Stein (2013)
- **Theory:** loose MP incentivizes higher **risk taking** and **leverage** ...  
Rajan (2005); Dell’Ariccia et al. (2014); Hanson and Stein (2015); Martinez-Miera and Repullo (2017); Drechsler et al. (2018); Lian et al. (2019); Heider and Leonello (2021); Campbell and Sigalov (2022); Kekre and Lenel (2022)
- ...and increases **financial crisis risk**  
Boissay et al. (2022)

## Motivation (ctd.)

- **Micro-level evidence:** loose MP  $\Rightarrow$  higher **risk taking** of banks...  
Maddaloni and Peydró (2011); Jiménez et al. (2014); Altunbas et al. (2014); Ioannidou et al. (2015); Hanson and Stein (2015); Paligorova and Santos (2017); Dell’Ariccia et al. (2017)
- ...and other financial market participants  
Chodorow-Reich (2014); Hau and Lai (2016); Di Maggio and Kacperczyk (2017); Choi and Kronlund (2018)
- But no empirical study analyzes the link between the **stance of MP and macro-level financial stability**  
Boyarchenko et al. (2022)

# The stance & credit growth before financial crises



Notes: Shaded areas indicate 95% (light) and 68% (dark) confidence intervals.

# Main findings

- Loose MP related to medium-term **risk of financial instability**
- Loose MP related to **credit market overheating**
- IV estimates uncover **causal** relationships
  - Unconditional three-year crisis probability: 10.5%
  - Stance of MP 1 pp looser  $\Rightarrow$  crisis probability  $\sim$  10 pps higher

## CALCULATING THE STANCE OF MONETARY POLICY



# Data

- Macrohistory Database: <https://www.macrohistory.net/database/>  
Jordà, Schularick and Taylor (2017)
  - Macro-financial data + banking crisis chronology
  - 18 advanced economies, 1870-2020
- Bank equity crashes & alternative crisis chronologies  
Baron, Verner, and Xiong (2021); Reinhart and Rogoff (2009)
- The missing element: estimates of  $r^*$

# Definition of the stance of monetary policy

- **Natural rate of interest**  $r^*$ : “equilibrium real rate of return in the case of fully flexible prices”

(Woodford 2003, p. 248)

- Monetary policy affects the real economy through nominal rigidities

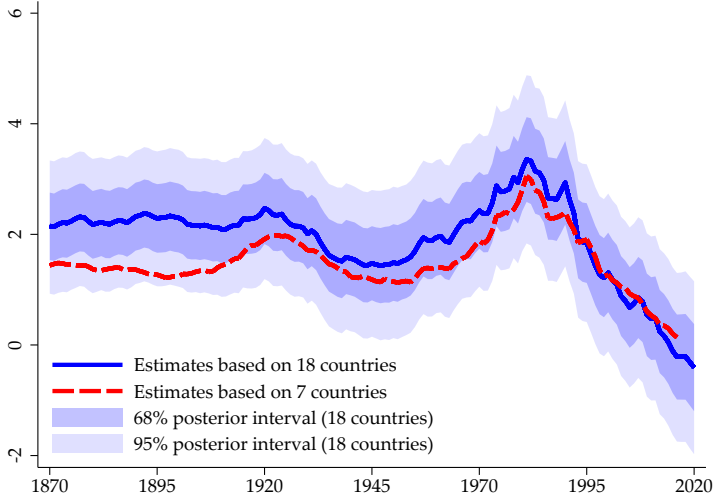
⇒ Real rate  $r$  **below**  $r^*$ : MP **expansionary**

- Def. of the stance of MP:  $\overline{\text{stance}}_{i,t} \equiv \frac{1}{5} \sum_{k=0}^4 (r_{i,t-k} - r_{i,t-k}^*)$

- **Identification** of  $r^*$ :

Extension of Del Negro, Giannone, Giannoni, Tambalotti (2019)

# World trends of the real interest rate



# STATISTICAL DESIGN

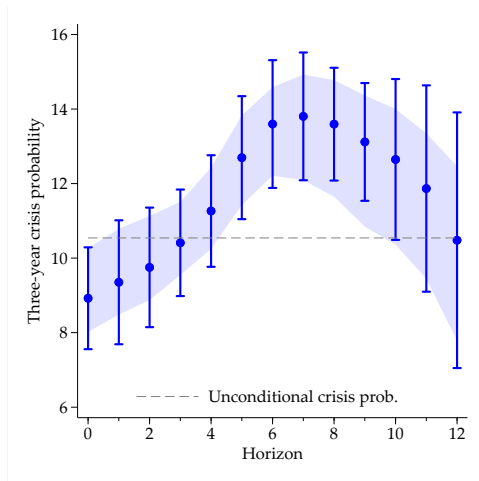
# Econometric model

$$B_{i,t+h} = \underbrace{\alpha_i^h}_{\text{F. E.}} + \beta^h \times \overline{\text{stance}}_{i,t} + \sum_{k=1}^5 \delta_k^h b_{i,t-k} + \mathbf{\Gamma}^h \mathbf{X}_{i,t} + u_{i,t+h}$$

- $B_{i,t} = 1$  if JST financial crisis in  $t$ ,  $t + 1$ , or  $t + 2$ ; 0 else
- $b_{i,t} = 1$ : if crisis in year  $t$ , 0 else
- $\mathbf{X}_{i,t}$ : local and global control variables Controls
- Following figures: estimates of  $\{-100\beta^h\}_{h=0}^{12}$ 
  - 95% CIs based on Dricoll-Kraay (1998) SEs with *ceiling*( $1.5 \times h$ ) lags
  - Verification with bootstrap-based CIs Bootstrap procedure

## RESULTS

# Loose monetary policy predicts financial crises



Notes: The shaded area denotes 95% bootstrap CIs.

# Robustness & Extensions

- ▶ The role of the horizon
- ▶ Crisis windows
- ▶ The (insignificant) role of the hegemon
- ▶ Ending the sample in 2006
- ▶ Financial and normal recessions
- ▶ Adding time fixed effects
- ▶ Alternative financial stability indicators
- ▶ Why focusing on the stance of MP?
- ▶ Logistic model
- ▶  $r^*$  based on the Holston, Laubach Williams (2017) approach



## INSPECTING THE MECHANISM

# Credit market overheating

- Why does excessively loose MP trigger financial instability?
- Important **short-term predictors of financial crises**:
  - credit booms  
Schularick and Taylor (2012); Jordà, Schularick and Taylor (2016)
  - house price booms  
Jordà, Schularick and Taylor (2015)
  - and their interaction (**red-zones**)  
Jordà, Schularick and Taylor (2015b), Greenwood et al. (2022)
- We go one step back and ask:

**Does a loose stance of monetary policy trigger these dynamics?**

# Predicting Red-zones

Greenwood et al. (2022)

- Same model but modifying the binary outcome variable  $B_{i,t}$
- Entering an R-zone in year t:

$$\text{High-Debt-Growth}_{i,t} = \mathbf{1}\{\Delta_3 (\text{Debt}/\text{GDP})_{i,t} > 80^{\text{th}} \text{percentile}\}$$

$$\text{High-Price-Growth}_{i,t} = \mathbf{1}\{\Delta_3 (\log \text{Price})_{i,t} > 66.7^{\text{th}} \text{percentile}\}$$

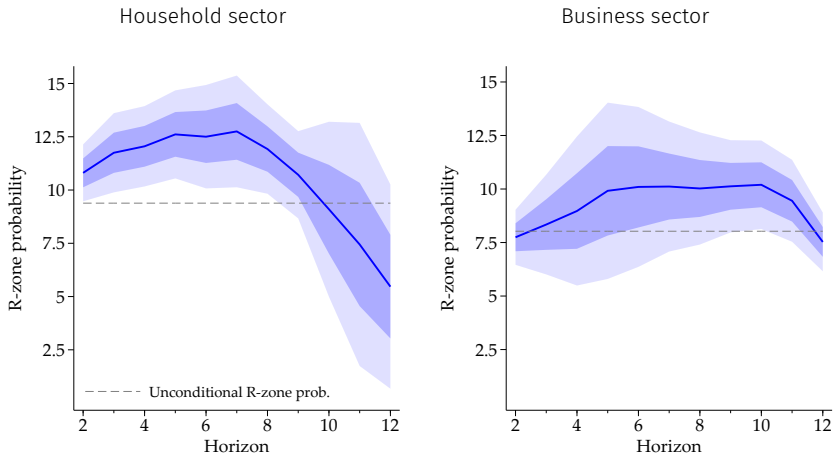
$$\text{R-zone}_{i,t} = \text{High-Debt-Growth}_{i,t} \times \text{High-Price-Growth}_{i,t}$$

- Household-sector R-zone: household credit and real house prices
- Business-sector R-zone: business credit and real stock prices
- Next slide: for post-WWII period as in Greenwood et al. (2022)

Relevant percentiles

# Predicting Red-zones

## Results



Notes: Shaded areas indicate 95% (light) and 68% (dark) confidence intervals.

# Predicting Red-zones

## Robustness & Extensions

- ▶ Results based on full sample
- ▶ Housing finance
- ▶ High-Debt-Growth
- ▶ High-Price-Growth
- ▶ Adding decade fixed effects
- ▶ Money growth and inflation
- ▶ Logistic model

## CAUSALITY: THE TRILEMMA IV

# Instrumenting *stance*

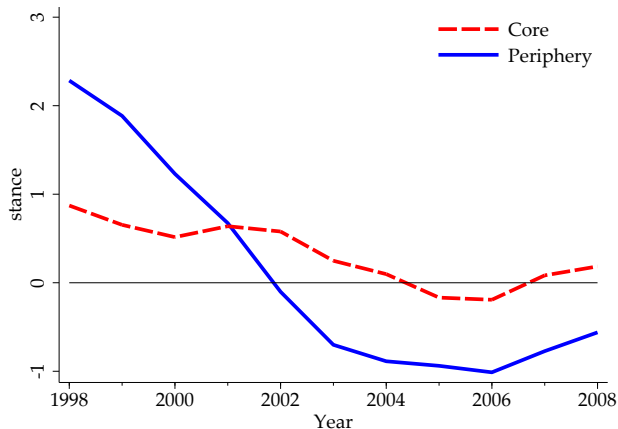
## Trilemma IV

- Idea: series of expansionary shocks  $\Rightarrow$  looser stance of MP  
 $\rightarrow$  **Instrument *stance* with past MP shocks**
- Building on the **trilemma of international finance**  
Obstfeld and Taylor (2004); Jordà, Schularick, and Taylor (2020)
- Absence of international arbitrage  $\Rightarrow$  pegging country has to adjust its policy rates in tandem with the base country
- Identification assumption: base country's interest rate decisions do not take economic conditions of the pegging country into account

Construction of the instrument

# Instrumenting $\overline{stance}$

The stance in the pre-2008 eurozone

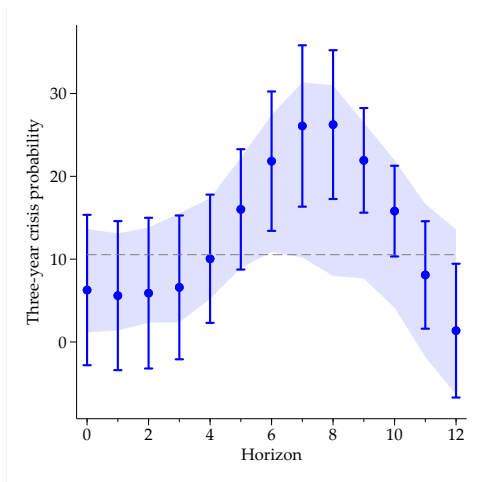


Notes: The Figure shows the unweighted average of  $\overline{stance}$  for the **core** (Belgium, Denmark, France, Germany, Netherlands) and **periphery** (Ireland, Italy, Portugal, Spain) of the eurozone.



# Instrumenting *stance*

## Crisis risk: IV estimates



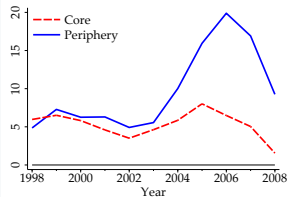
Notes: We re-estimate our baseline model by 2SLS with the same controls as before. The points show IV estimates of  $\{10.5 - 100\beta^h\}_{h=0}^{12}$ . Overlines indicate 95% CIs of  $\{-100\beta^h\}_{h=0}^{12}$  based on country-based cluster-robust SEs.

First stage

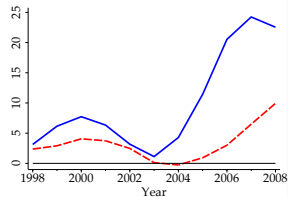
# Instrumenting *stance*

R-zones: pre-2008 dynamics in the eurozone

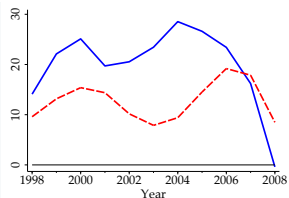
Household credit



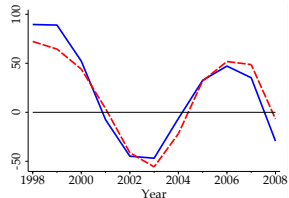
Business credit



House prices



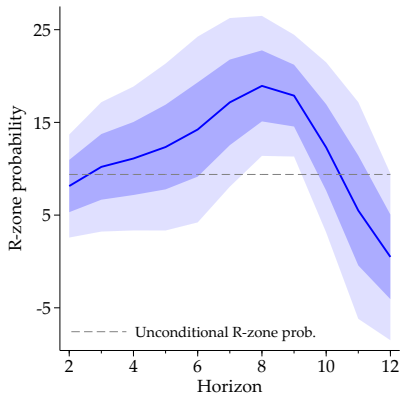
Stock prices



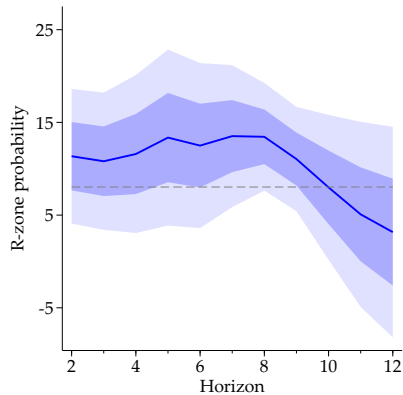
# Instrumenting *stance*

R-zones: post-WWII IV estimates

Household sector



Business sector



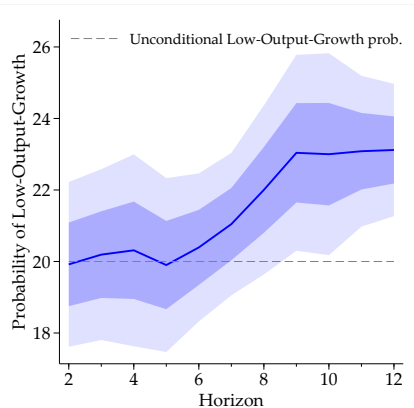
## GROWTH-RISK TRADEOFF

# Framework

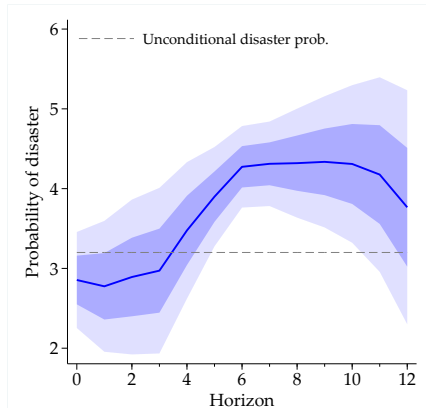
- **Loose financial conditions** may not be a bad thing *per se*
- But: **short-run boost** comes at **negative medium-term effects**  
Mian, Sufi, Verner (2017); Adrian et al. (2019, 2022)
- **Low-Output-Growth** $_{i,t} = \mathbf{1}\{\Delta_3(\log Y_{i,t}) < 20^{\text{th}} \text{ percentile}\}$
- Barro and Ursúa (2008) **economic disasters**:  
peak-to-trough falls in real GDP p.c. of at least 10%
- New dependent variable: **Low-Output-Growth** or **economic disasters**

# Results

## Low-Output-Growth



## Barro and Ursúa (2008) disasters



Response of mean growth to a loose stance

CONCLUSION

- **First evidence** that the stance of MP has implications for the stability of the financial system
- Loose MP has a positive effect on the likelihood of **financial crises**
- Evidence for **credit market overheating** as an intermediating channel
- Potential **short-run gains** vs. adverse **medium-term consequences**



ADDITIONAL SLIDES

# Del Negro et al. (2019)

## Notation

- $R_{i,t}$ ,  $R_{i,t}^L$ ,  $\pi_{i,t}$ : observed ST nominal rate, LT nominal rate, and inflation for country  $i$
- $\bar{r}_t^w$ ,  $\bar{\pi}_t^w$ ,  $\bar{ts}_t^w$ : world trends in ST real rate,  $\pi$ , and term spread
- $\bar{r}_t^i$ ,  $\bar{\pi}_t^i$ ,  $\bar{ts}_t^i$ : idiosyncratic trends of these variables for country  $i$
- $\tilde{R}_{i,t}$ ,  $\tilde{R}_{i,t}^L$ ,  $\tilde{\pi}_{i,t}$ : stationary components of these variables

$$\bar{y}_t = \left[ \bar{r}_t^w \quad \bar{\pi}_t^w \quad \bar{ts}_t^w \quad \bar{r}_t^1 \quad \bar{\pi}_t^1 \quad \bar{ts}_t^1 \quad \dots \quad \bar{r}_t^{18} \quad \bar{\pi}_t^{18} \quad \bar{ts}_t^{18} \right]' \quad (\text{trend})$$

$$\tilde{y}_t = \left[ \tilde{R}_{1,t} \quad \tilde{R}_{1,t}^L \quad \tilde{\pi}_{1,t} \quad \dots \quad \tilde{R}_{18,t} \quad \tilde{R}_{18,t}^L \quad \tilde{\pi}_{18,t} \right]' \quad (\text{stat. component})$$

$$y_t = \left[ R_{1,t} \quad R_{1,t}^L \quad \pi_{1,t} \quad \dots \quad R_{18,t} \quad R_{18,t}^L \quad \pi_{18,t} \right]' \quad (\text{observables})$$

# Del Negro et al. (2019)

## State equation

$$\begin{cases} \bar{y}_t &= \bar{y}_{t-1} + e_t \\ \tilde{y}_t &= \phi \tilde{y}_{t-1} + \epsilon_t, \end{cases} \quad \text{with } \begin{bmatrix} e_t \\ \epsilon_t \end{bmatrix} \sim \mathcal{N} \left( \begin{pmatrix} \mathbf{0} \\ \mathbf{0} \end{pmatrix}, \begin{pmatrix} \Sigma_e & \mathbf{0} \\ \mathbf{0} & \Sigma_\epsilon \end{pmatrix} \right)$$

► Back (measurement equation)

# Adjustment of priors

- State Equation:

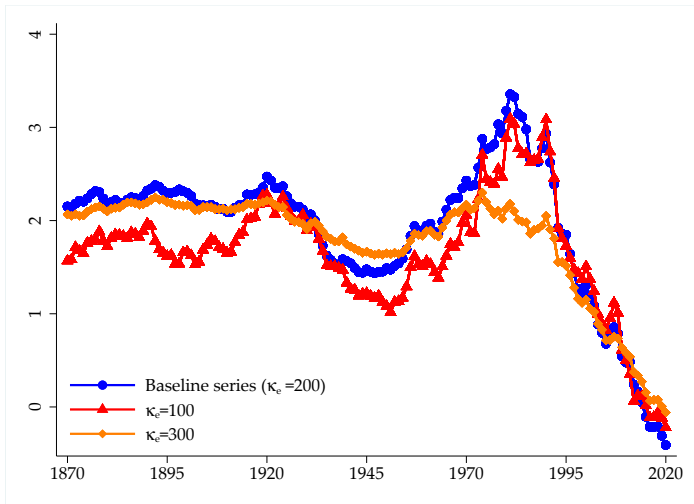
$$\begin{cases} \bar{y}_t = \bar{y}_{t-1} + e_t \\ \tilde{y}_t = \phi \tilde{y}_{t-1} + \epsilon_t \end{cases} \quad \text{with} \quad \begin{bmatrix} e_t \\ \epsilon_t \end{bmatrix} \sim \mathcal{N} \left( \begin{pmatrix} \mathbf{0} \\ \mathbf{0} \end{pmatrix}, \begin{pmatrix} \Sigma_e & \mathbf{0} \\ \mathbf{0} & \Sigma_\epsilon \end{pmatrix} \right)$$

- Prior for  $\Sigma_e$ : Inverse-Wishart distribution

- $\kappa_e = 100$  200 degrees of freedom
- Set the diagonal elements of  $\Sigma_e$  to have a mode equal to
  - $\theta \cdot 0.007$  for interest rate trends
  - $\theta \cdot 0.014$  for inflation trends

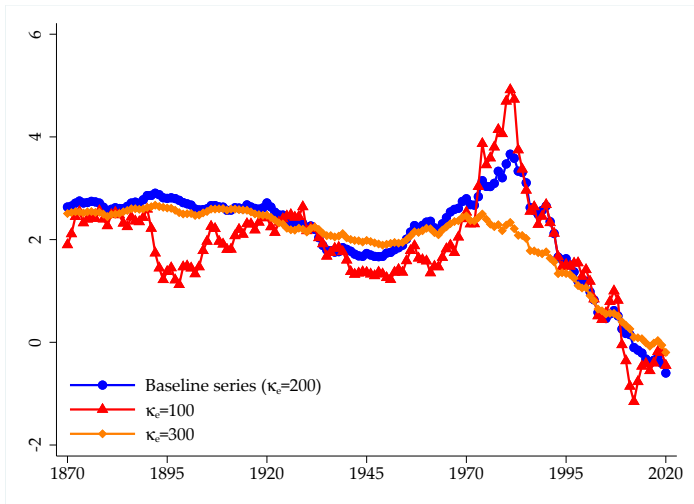
# Comparison with looser and tighter priors

Comparison of world trends

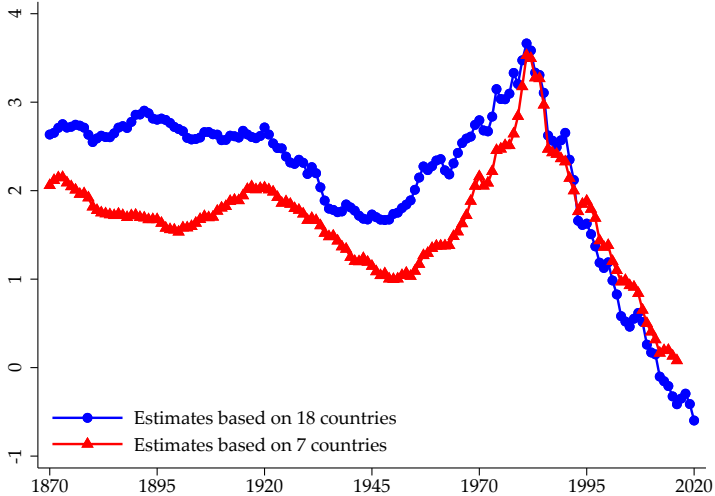


# Comparison with looser and tighter priors (ctd.)

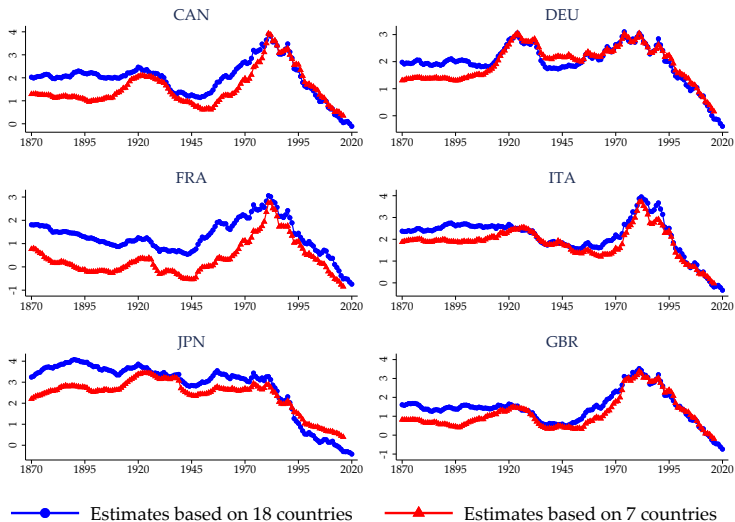
Comparison of US trends



# Comparison of $r^*$ for the US

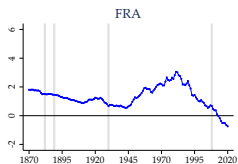
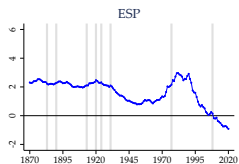
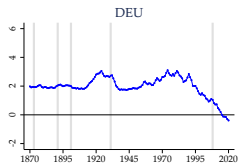
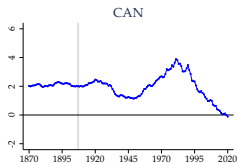
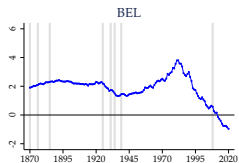
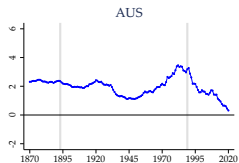


# Comparison of $r^*$ for the other 6 countries



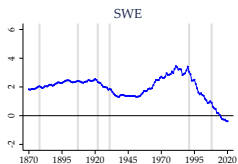
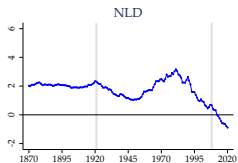
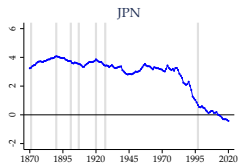
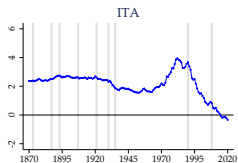


# $r^*$ over time



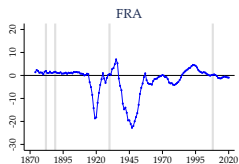
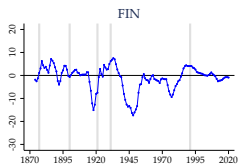
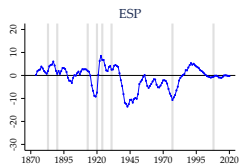
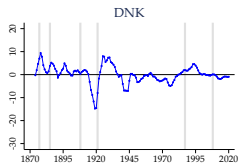
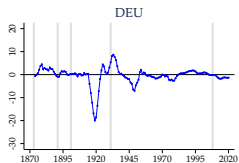
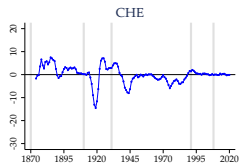
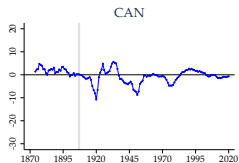
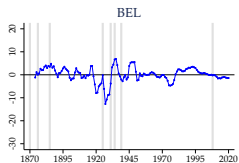
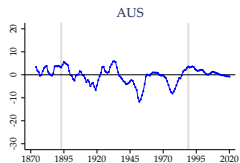
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# $r^*$ over time (ctd.)



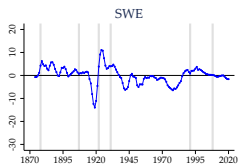
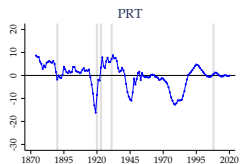
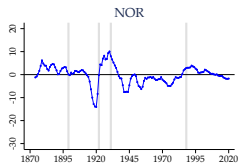
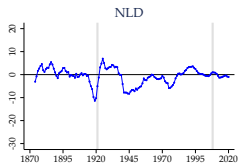
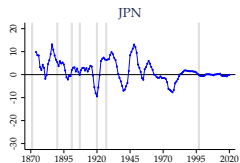
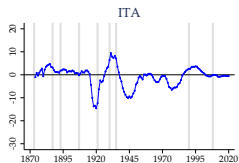
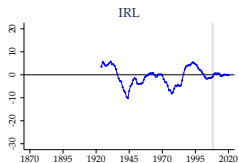
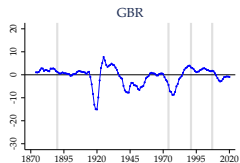
▶ Back

# stance over time



▶ Back

# stance over time (ctd.)



# Control variables

- Annual changes from year  $t - 5$  to  $t$  of log real GDP p.c., log consumer prices, log ER vis-à-vis USD, investment-to-GDP ratio, credit-to-GDP ratio
- $r_t^*$  &  $R_t^L - R_t$
- **Global controls**: debt-to-GDP ratio, bank capital & non-core funding ratios
  - Unweighted averages across countries
  - Parametrically economical way to control for cross-country factors
- **Alternative**: time fixed effects
  - Similar results

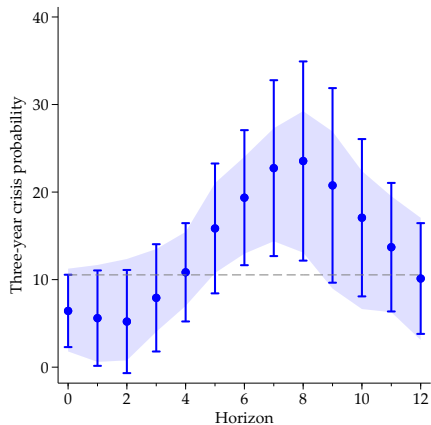
# Bootstrap procedure

- Two-stage estimation procedure
  - (1) Estimate  $r^*$  to create  $\overline{stance}$
  - (2) Use  $\overline{stance}$  as a regressor in the local projections
- Take first-stage uncertainty into account by **extending** panel moving blocks bootstrap method

Gonçalves (2011)

- Resample contiguous rows of data
- Block length of 3 years, 1,000 bootstrap samples
- **Extension:** creating rows by combining data **and a random draw from the 50,000 posterior draws of  $r^*$**

## The lowest quintile of $\overline{stance}$ predicts crises



Notes:  $\overline{stance}_{i,t}$  is replaced by  $\mathbf{1}\{\overline{stance}_{i,t} < 20^{th} \text{percentile}\}$ . Positive estimates indicate a **positive** relation between this dummy and crisis risk.

# The role of the horizon

- Recall:

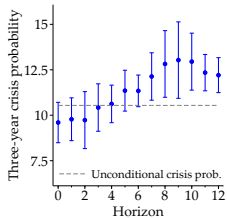
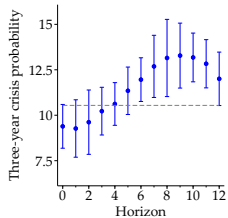
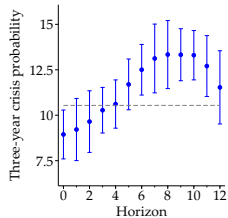
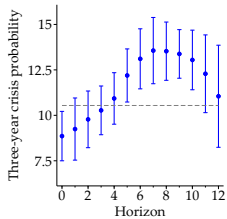
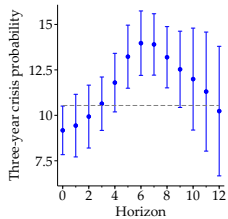
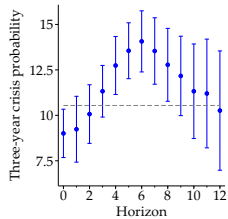
$$B_{i,t+h} = \underset{\text{F. E.}}{\alpha_i^h} + \beta^h \times \overline{\text{stance}}_{i,t} + \sum_{k=1}^5 \delta_k^h b_{i,t-k} + \mathbf{\Gamma}^h \mathbf{X}_{i,t} + u_{i,t+h}$$

- Modify the window over which we average  $(r_{i,t-k} - r_{i,t-k}^*)$ :

$$\overline{\text{stance}}_{i,t} \equiv \frac{1}{T} \sum_{k=0}^{T-1} (r_{i,t-k} - r_{i,t-k}^*)$$

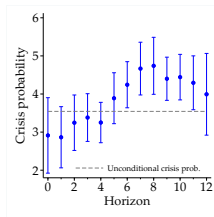
- Following slide: estimates of  $\{-100\beta^h\}_{h=0}^{12}$  for different  $T$



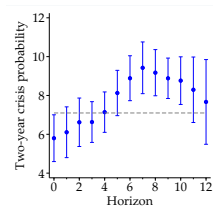
$T = 1$  $T = 2$  $T = 3$  $T = 4$  $T = 6$  $T = 7$ 

# Modifying the crisis window

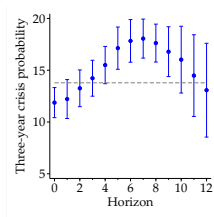
$F = 0$



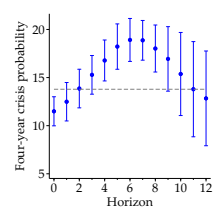
$F = 1$



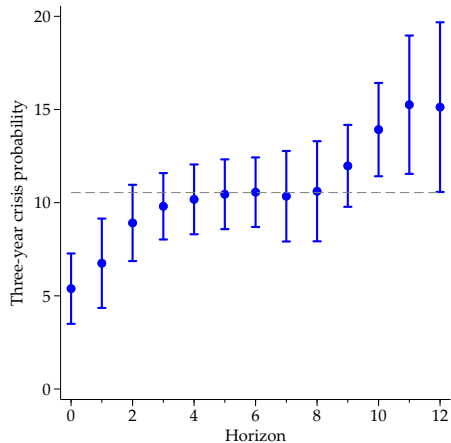
$F = 3$



$F = 4$

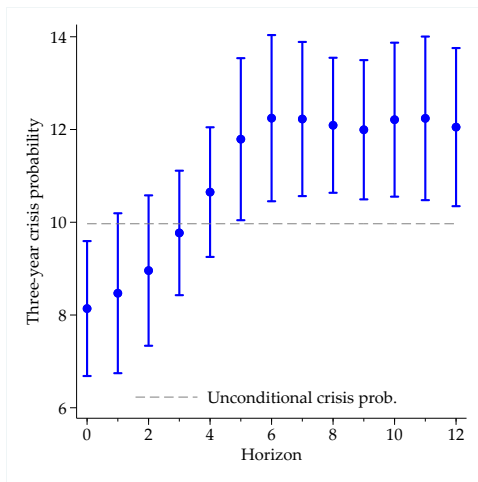


# The (insignificant) role of the hegemon



Notes: We estimate the same model as in the main part but replace the independent variable of interest  $\overline{stance}_{i,t}$  by  $\overline{stance}_{USA,t}$  for all countries.

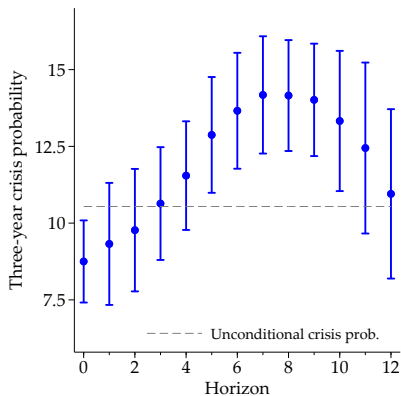
## Ending the sample in 2006



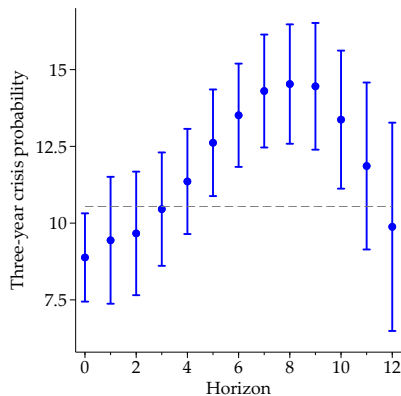
Notes: We estimate the same model as in the main part but ignore the post-2006 period.

# Decade FEs

## Global variables and decade FEs

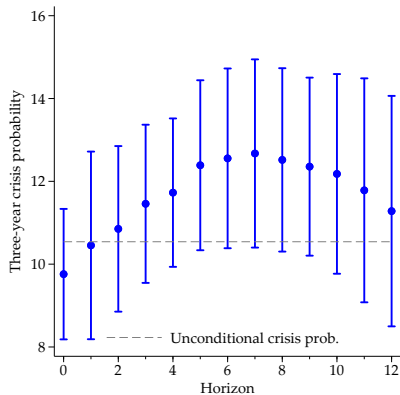


## Only decade FEs



Notes: We estimate the same model as in the main part but add decade FEs (left panel) or replace the global variables with decade FEs (right panel).

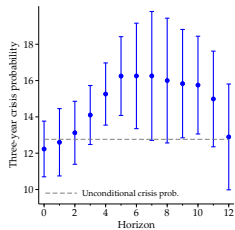
# Year FEs



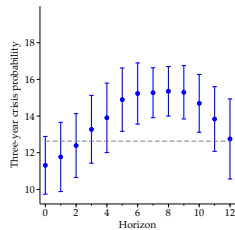
Notes: We estimate the same model as in the main part but replace the global variables with year FEs.

# Alternative financial stability indicators

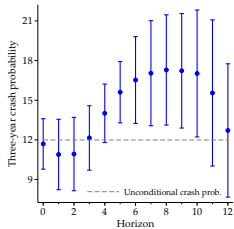
BVX (2021) financial crises



RR (2009) financial crises



BVX(2021) bank eq. crashes



▶ Back

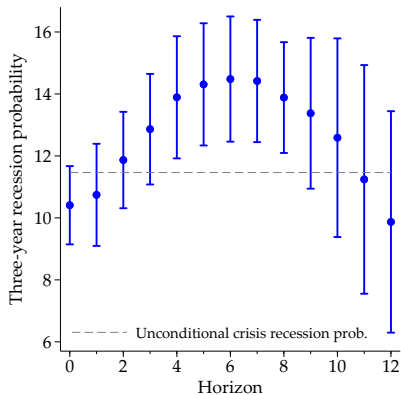
## Fin. crisis recessions v. normal recessions

- When monetary policy is loose, the economy is doing well
  - Do we simply pick up expansions and predict recessions?
  - Do our results simply describe a textbook business cycle?
- No, because
  - we control for (local and global) business cycles
  - and cannot predict **normal recessions**
- Definition of **normal recessions**: as in Jordà, Schularick, and Taylor (2016)
  - Peaks and troughs dated according to Bry-Boschan algorithm
  - **Fin. crisis recession**: fin. crisis within  $\pm 2$ -year window of peak
  - **Normal recession**: no fin. crisis within  $\pm 2$ -year window of peak

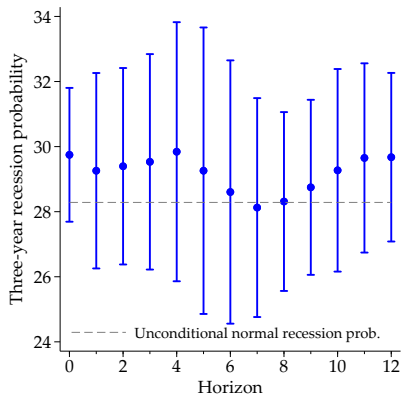


# Fin. crisis recessions v. normal recessions (ctd.)

Financial crisis recessions



Normal recessions



Notes: We estimate the same model as in the main part but replace the financial crisis indicator with indicators for financial crisis recessions (left panel) or normal recessions (right panel).

# Why focusing on the stance of MP?

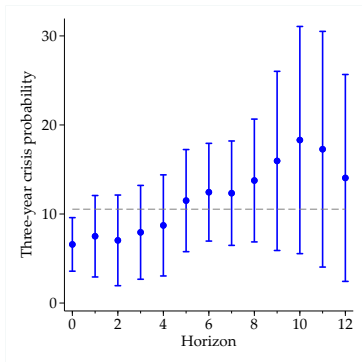
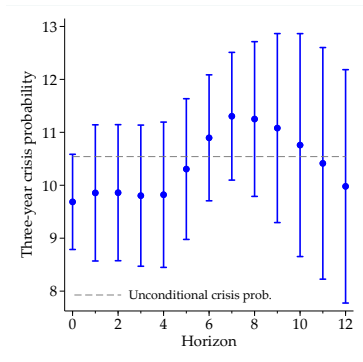
- History-dependent reference returns  
[Lian et al. \(2019\)](#)
- Excess liquidity, “high-pressure economy”
- Investment booms, capital overhang  
[Boissay \(2022\)](#)
- $r^*$  as the return on long-term fixed interest liabilities
- Misallocation of resources
- Literature often confounds monetary policy with secular trends in  $r^*$

# Why focusing on the stance of MP? (ctd.)

Replacing *stance* by ex-post real rates

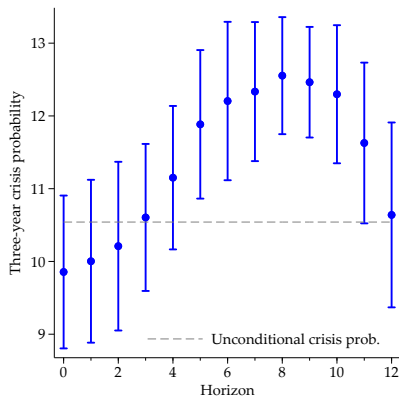
$$\frac{1}{5} \sum_{k=0}^4 r_{i,t-k}$$

$$\mathbf{1}\left\{\frac{1}{5} \sum_{k=0}^4 r_{i,t-k} < 20^{\text{th}} \text{pctl}\right\}$$



Notes: The independent variables of interest is now based on ex-post real rates. The Figure shows estimates of  $\{-100\beta^h\}_{h=0}^{12}$ .

# Logistic model



Notes: Point estimates refer to marginal effects of  $\overline{stance}$  evaluated at its sample mean. Positive estimates indicate a **positive** relation between a loose stance of monetary policy and crisis risk. Bars indicate 95% CIs based on robust SEs.

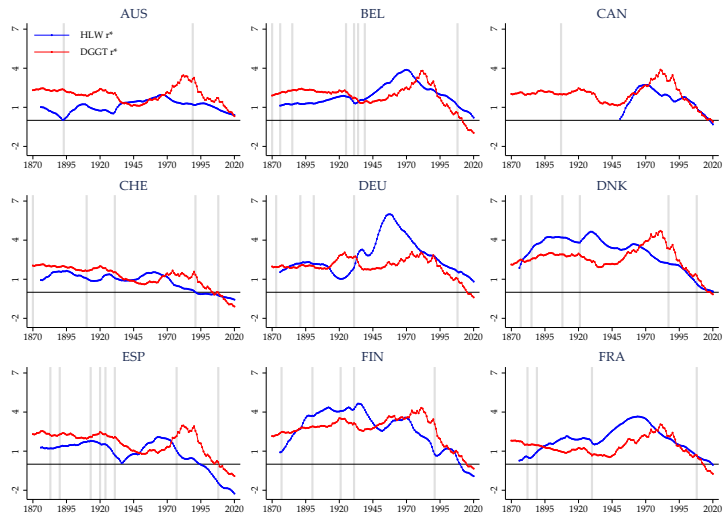
# $r^*$ based on HLW (2017) approach

## Model

- HLW (2017):  $r^*$  derived from **estimation of PC and ISC**
  - **Country-by-country estimation**
  - US, Canada, EA, UK
  - 1961Q1-2016Q3
- **Extension to 18 countries, 1870-2020**, necessitates adjustments
  - Estimation in one step
  - Grid search for  $\lambda_g$  and  $\lambda_z$
  - Lower bounds for  $\lambda$  and variances ensure reasonable variation

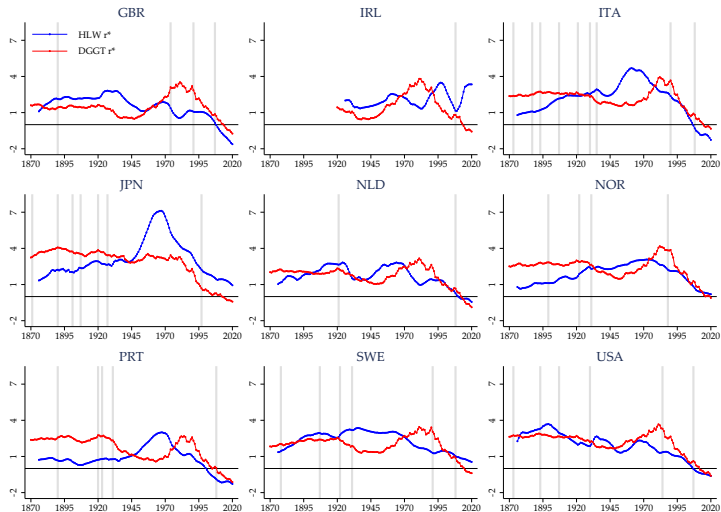
# $r^*$ based on HLW (2017) approach (ctd.)

## Estimated series



# $r^*$ based on HLW (2017) approach (ctd.)

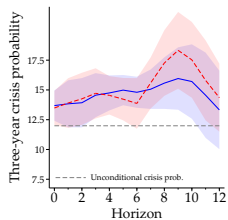
## Estimated series (ctd.)



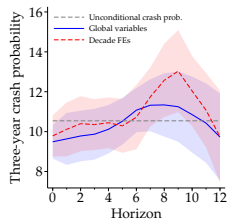
# $r^*$ based on HLW (2017) approach (ctd.)

## Results

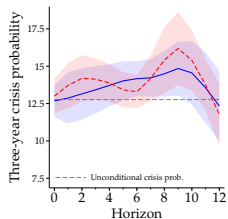
BVX (2021) bank eq.



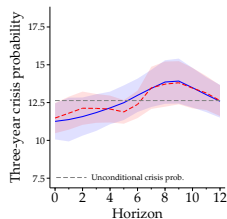
JST fin crises



BVX (2021) fin crises



RR (2009) fin crises

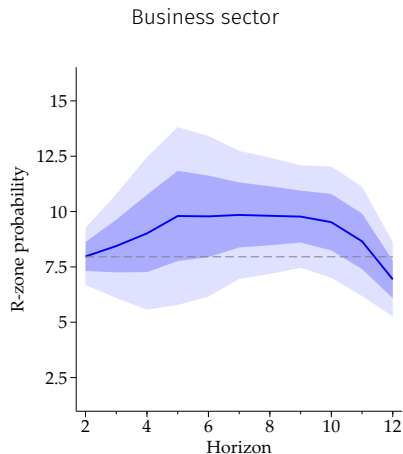
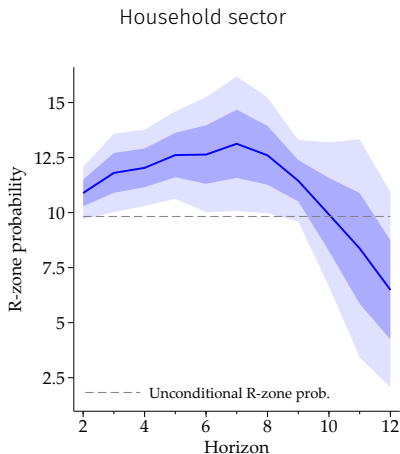




## Relevant percentiles

	Post-1949 sub-sample	Full sample
<i>80<sup>th</sup> perc. of <math>\Delta_3 100</math> (Debt/GDP)</i>		
Household credit	6.23	6.12
Business credit	4.73	4.69
<i>66.7<sup>th</sup> perc. of <math>\Delta_3 100</math> (log Price)</i>		
House prices	12.84	11.33
Stock prices	22.82	22.22

# Results based on full sample

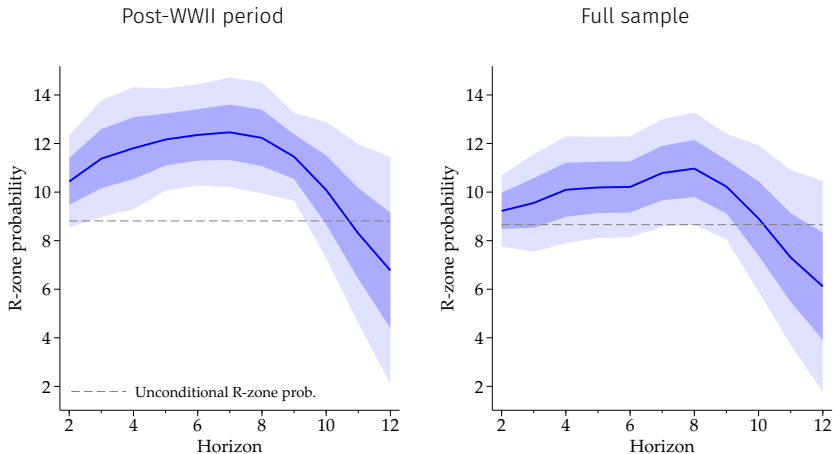


Notes: We re-estimate the same model as in the main part for the full-sample period.

# Housing finance

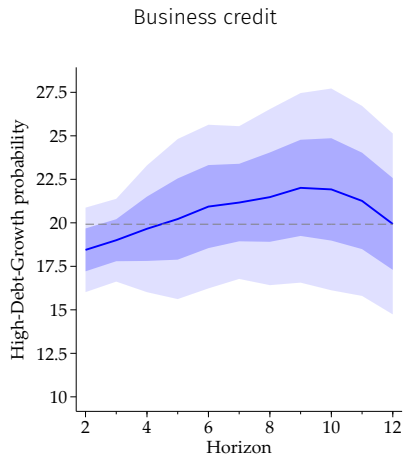
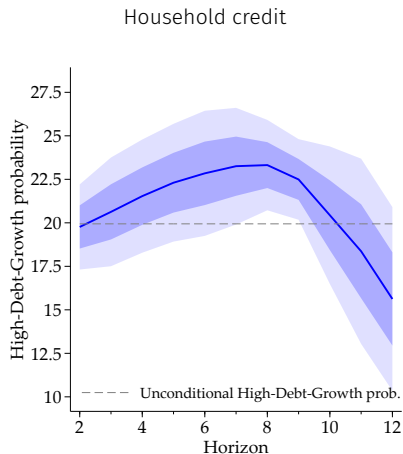
- Constraint: pre-WWII data availability for hh. and bus. credit
  - ~ 400 additional observations for mortgage credit in full sample
  - Important role of mortgage sector for financial stability  
[Jordà, Schularick, and Taylor \(2015\)](#)
- ⇒ **Housing-finance R-zone**: mortgage credit and real house prices

# Housing finance (ctd.)



Notes: We estimate the same model as in the main part but for *housing-finance R-zones*.

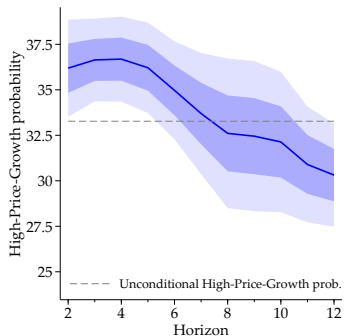
# High-Debt-Growth



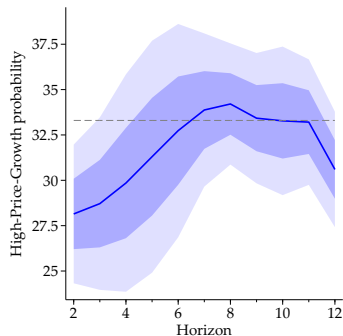
Notes: We estimate the same model as in the main part with the binary outcome variable defined as  $High-Debt-Growth_{i,t} = \mathbf{1}\{\Delta_3 (Debt/GDP)_{i,t} > 80^{th} \text{percentile}\}$ . Debt is either household debt or business debt.

# High-Price-Growth

## House prices

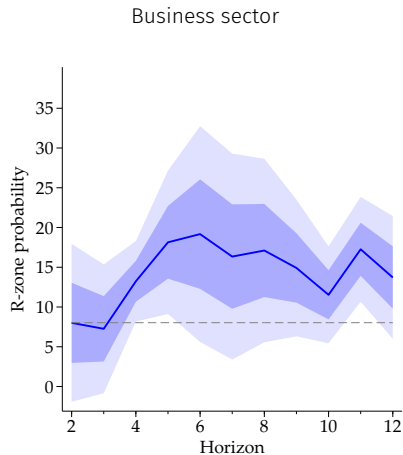
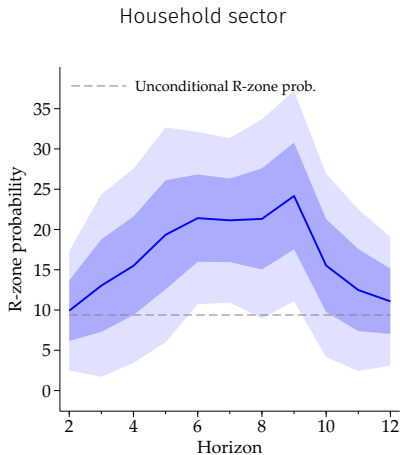


## Stock prices



Notes: We estimate the same model as in the main part with the binary outcome variable defined as  $High-Price-Growth_{i,t} = \mathbf{1}\{\Delta_3(\log Price_{i,t}) > 66.7^{th} \text{percentile}\}$ . Price refers to either house prices or stock prices.

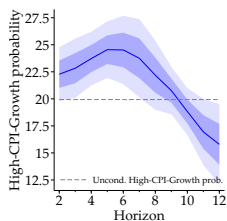
# Very loose MP predicts R-zones



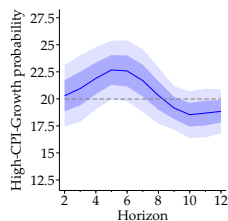
Notes:  $\overline{stance}_{i,t}$  is replaced by  $\mathbf{1}\{\overline{stance}_{i,t} < 20^{th} \text{percentile}\}$ . Positive estimates indicate a **positive** relation between this dummy and the likelihood of entering an R-zone.

# Money growth and inflation

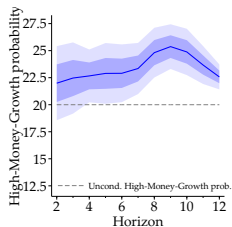
Inflation, post-WWII



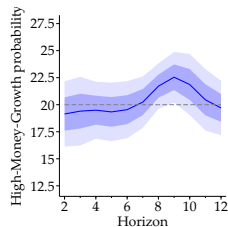
Inflation, full sample



Money growth, post-WWII



Money growth, full sample

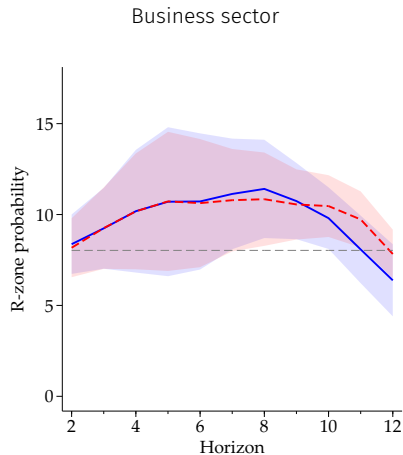
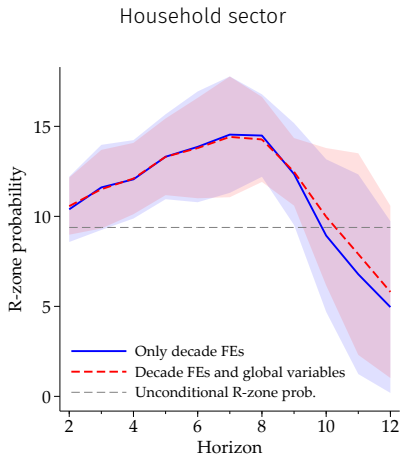


Outcome variables  $1\{\Delta_3(\log CPI) > 80^{th}perc\}$  (top) and  $1\{\Delta_3(Money/GDP) > 80^{th}perc\}$  (bottom).



# Adding decade fixed effects

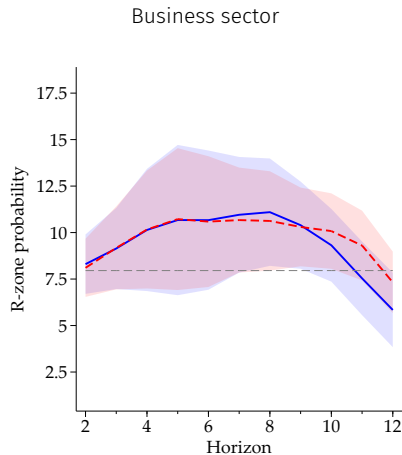
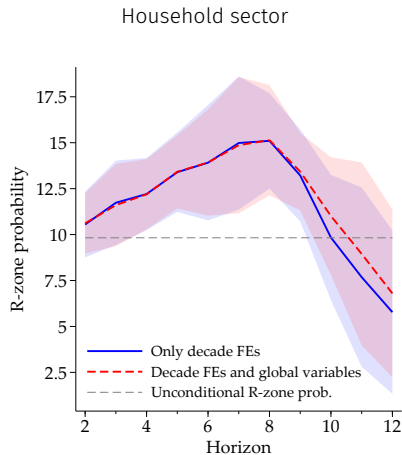
## Post-WWII results



Notes: We add decade FEs to the model of the main part, either in place of global variables (blue) or in addition to global variables (red).

# Adding decade fixed effects (ctd.)

## Full-sample results

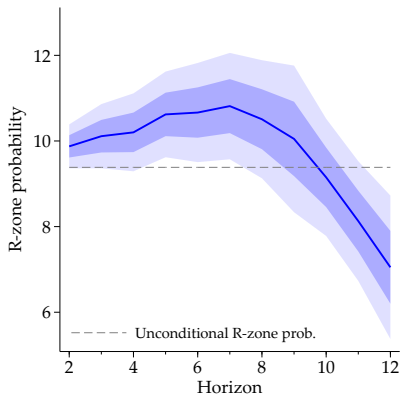


Notes: We add decade FEs to the model of the main part, either in place of global variables (blue) or in addition to global variables (red).

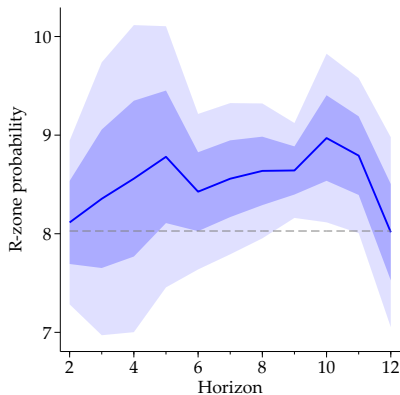
# Logistic model

## Post-WWII results

Household sector



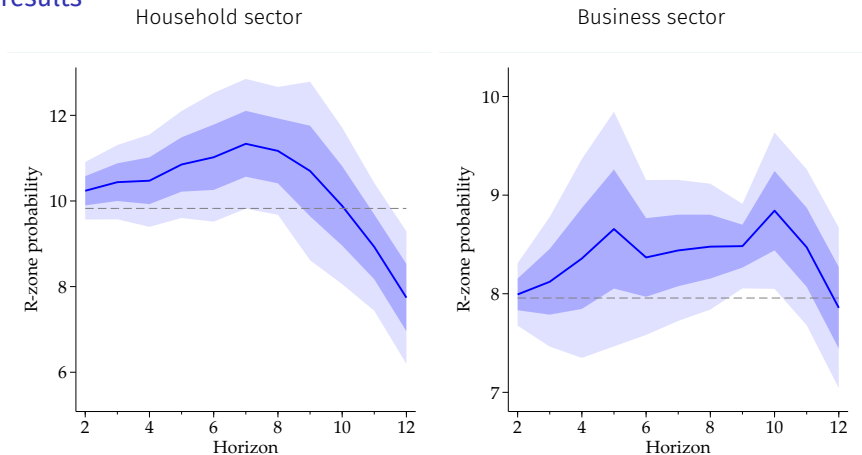
Business sector



Notes: Point estimates refer to marginal effects of  $\overline{\text{stance}}$  evaluated at its sample mean. Positive estimates indicate a **positive** relation between a loose stance of monetary policy and crisis risk. Shaded areas indicate 95% (light) and 68% (dark) CIs based on robust SEs.

# Logistic model (ctd.)

## Full-sample results



Notes: Point estimates refer to marginal effects of  $\overline{\text{stance}}$  evaluated at its sample mean. Positive estimates indicate a **positive** relation between a loose stance of monetary policy and crisis risk. Shaded areas indicate 95% (light) and 68% (dark) CIs based on robust SEs.

## Construction of the instrument

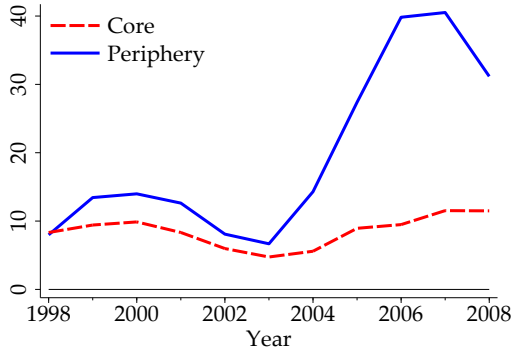
- $k_{i,t} \in [0, 1]$ : Quinn et al. (2011) capital mobility indicator (1 if open)
- $q_{i,t} \in \{0, 1\}$ : exchange rate regime indicator (1 if peg in  $t$  &  $t - 1$ )
- $\Delta r_{b(i,t),t}$ : interest rate change in  $i$ 's base country  $b$  in year  $t$
- $\Delta \hat{r}_{b(i,t),t}$ : predicted changes in  $\Delta r_{b(i,t),t}$  according to Taylor rule
- $$z_{i,t} = \begin{cases} k_{i,t} (\Delta r_{b(i,t),t} - \Delta \hat{r}_{b(i,t),t}) & , q_{i,t} = 1 \\ 0 & , q_{i,t} = 0 \end{cases}$$

# First stage

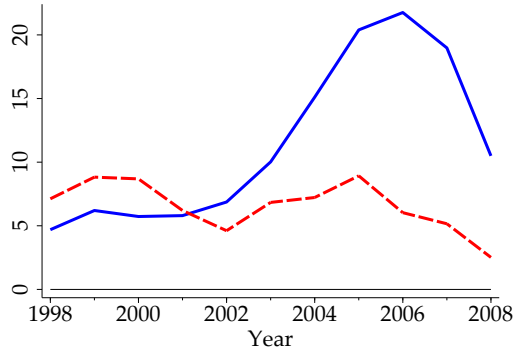
	Dep. var.: $stance_{i,t}$
$z_{i,t-1}$	0.063 (0.073)
$z_{i,t-2}$	0.218*** (0.054)
$z_{i,t-3}$	0.263*** (0.052)
$z_{i,t-4}$	0.326*** (0.049)
$z_{i,t-5}$	0.235*** (0.035)
$z_{i,t-6}$	0.180*** (0.042)
$z_{i,t-7}$	0.164*** (0.048)
$z_{i,t-8}$	0.155*** (0.050)
$z_{i,t-9}$	0.111** (0.045)
$z_{i,t-10}$	0.082* (0.046)
KP weak IV	47.16
Observations	1297

# Mortgage credit

Total credit

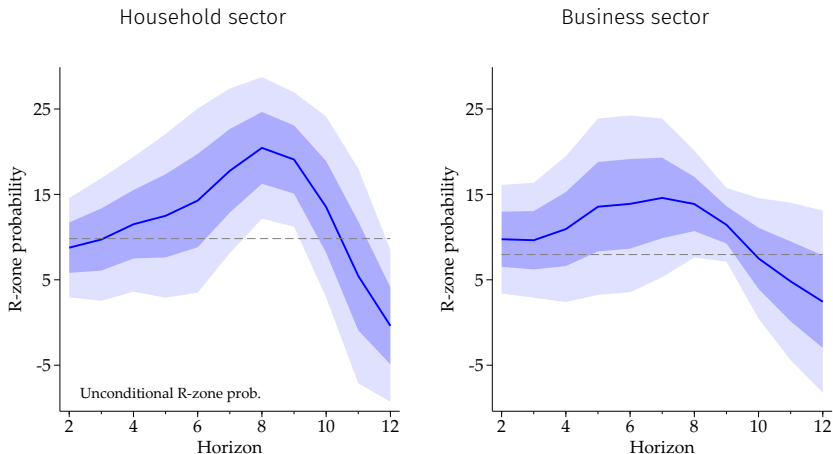


Mortgage credit



▶ Back

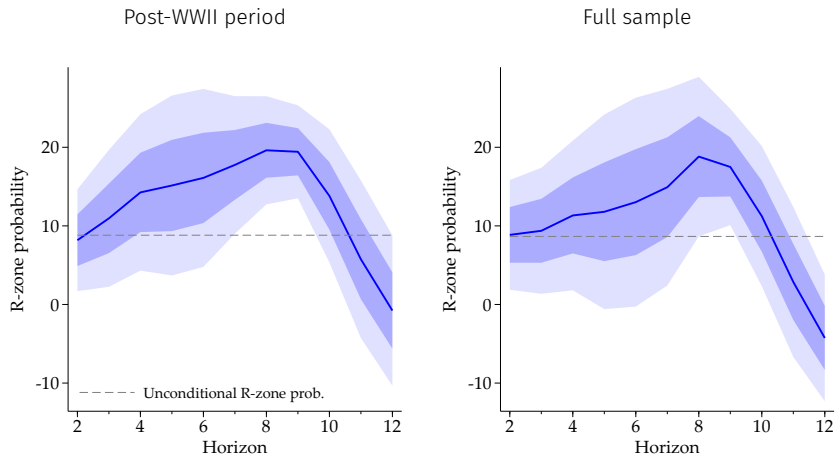
# Full-sample results



Notes: We re-estimate the same model as in the main part for the full-sample period.



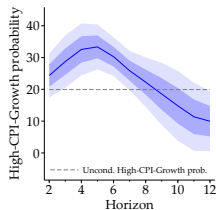
# Housing finance



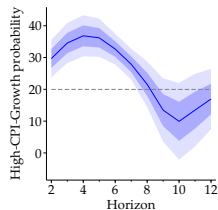
Notes: We estimate the same model as in the main part but for *housing-finance R-zones*.

# Money growth and inflation

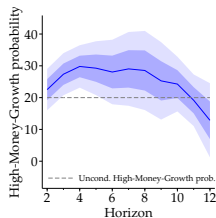
Inflation, post-WWII



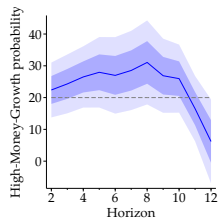
Inflation, full sample



Money growth, post-WWII



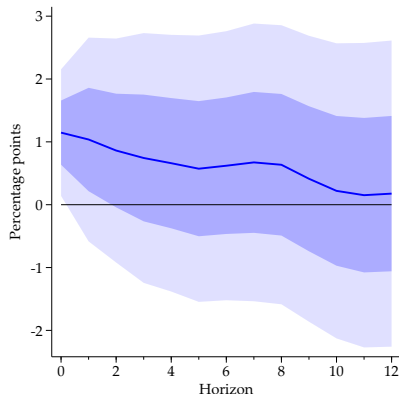
Money growth, full sample



Notes: We estimate the same model as in the main part but with the outcome variables  $1\{\Delta_3(\log CPI) > 80^{th}perc\}$  (top) and

$1\{\Delta_3(Money/GDP) > 80^{th}perc\}$  (bottom).

# Response of mean growth to a loose stance



Notes: The Figure shows estimates of  $\{-\beta^h\}_{h=0}^{12}$  and 95% (light) & 68% (dark) CIs of  $y_{t+h} = \beta^h \overline{stance}_{i,t} + \alpha_i^h + \alpha_t^h + \mathbf{\Gamma}^h X_{i,t} + u_{i,t+h}$  where y denotes log real GDP p.c.