The Effect of Monetary Policy on Systemic Bank Funding Stability

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Monetary and Financial History: Lessons for the 21st Century

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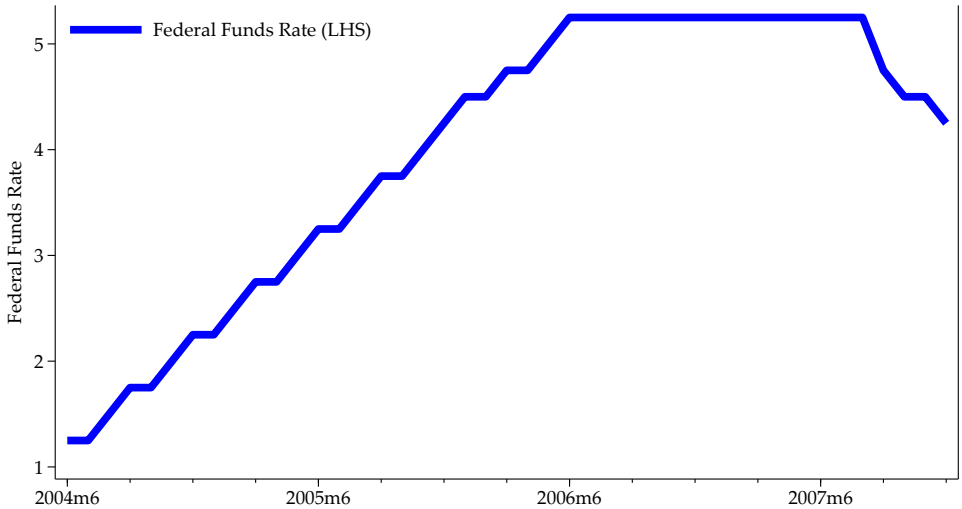
Motivation: The U.S. Financial Crisis



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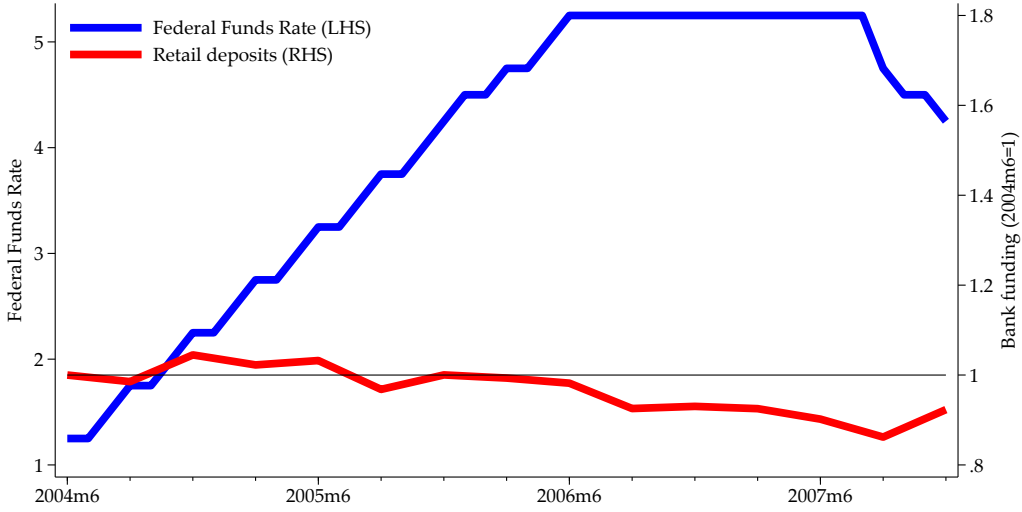

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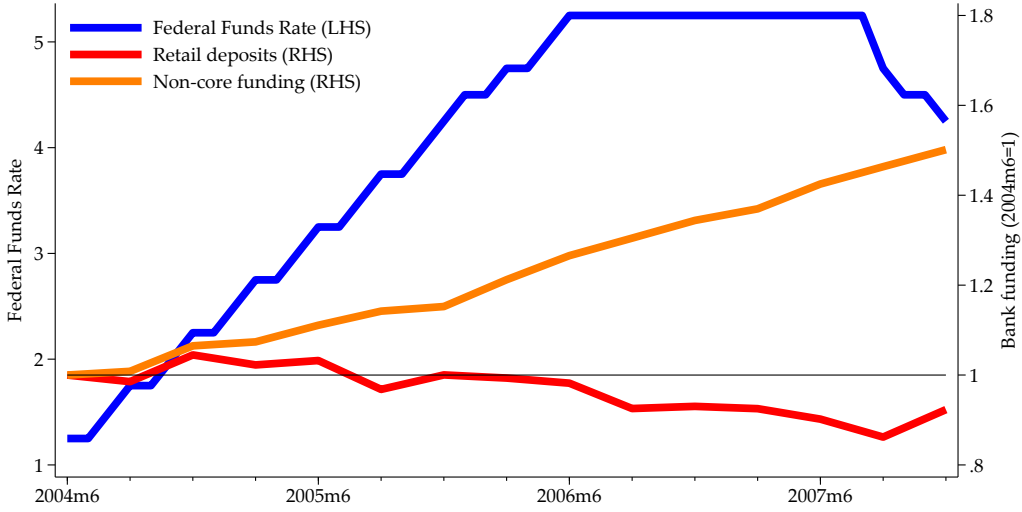

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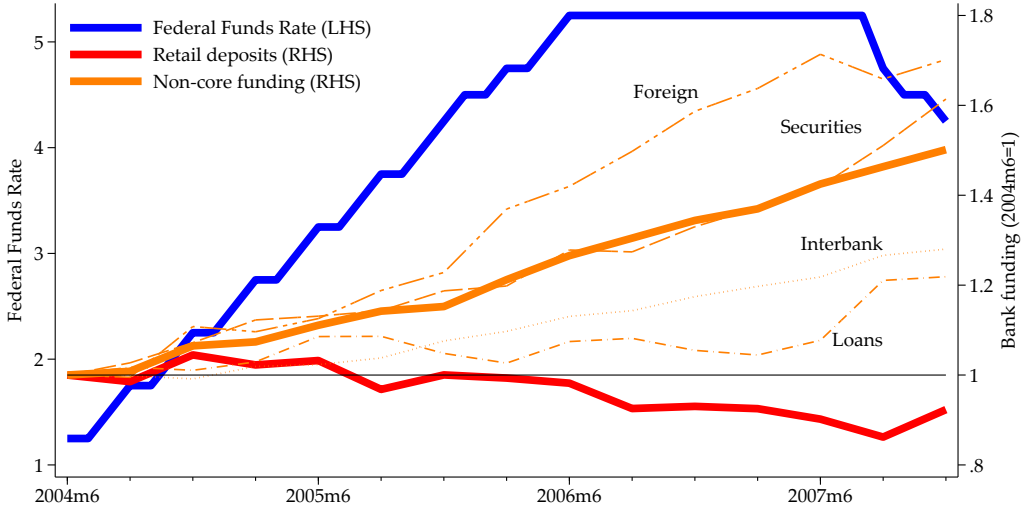

Research Questions

I. What is the effect of **monetary policy** on banking systems' **non-core funding shares**?

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Non-core funding: *all funding sources other than equity, traditional customer deposits, and those provided by the government and central bank*

II. Do increasing non-core shares, induced by monetary tightening, create **systemic risk**?

Systemic risk: *systemic banking panics, financial crises*
Baron et al. (2021) Laeven and Valencia (2020)

This paper

- Constructs a novel macro-financial dataset at monthly frequency covering
  - the liability structure of banking systems and policy rates
  - developed and developing economies
  - the post-1950s

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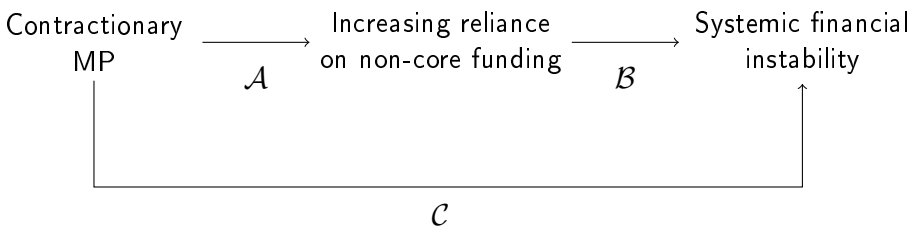
- Explore, within an IV setting, the relationship



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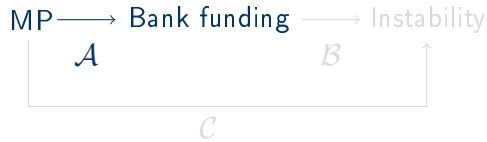
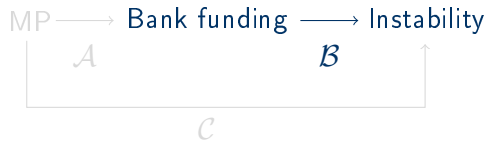


II. Dynamics before systemic instability:
Rising non-core funding shares



Three main empirical findings

I. Effects of contractionary MP shocks:
Rising non-core funding shares

II. Dynamics before systemic instability:
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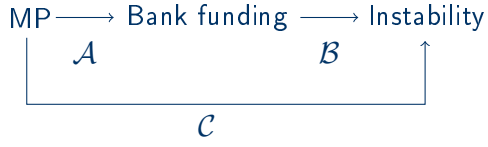
III. *Direct* link between monetary policy, bank funding, and stability risk



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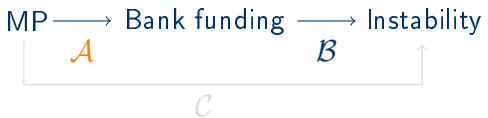

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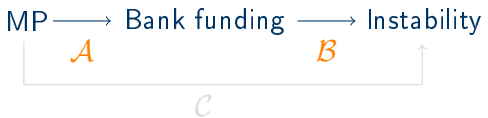

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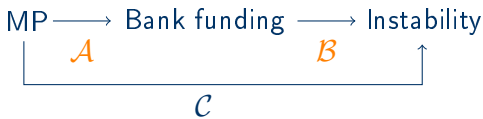

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  - I show that banking systems' non-core reliance predicts financial instability
- Evidence on the role of MP in this relationship is lacking
  - I find evidence for a direct chain linking MP, bank funding, and instability
  - I provide an explanation for the 'reduced-form effect' of MP on instability
    Schularick et al. (2021); Jiménez et al. (2023)

Creating a new macro-financial dataset

- Basis: IMF's **International Financial Statistics (IFS)**
  - Published monthly since January 1948 covering 'the world'
  - Only small portion included in the IMF online database
  - Credit and deposit data for some countries is already digitized
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- **This dataset:**
  - Aggregate bank balance sheet positions & basic macro variables
  - Complemented with novel data on policy rates
  - 1950s–today, unbalanced panel
  - Developed and developing economies, monthly frequency

Availability of bank balance sheet positions

Asset	Countries	Obs.	Liability	Countries	Obs.
Private Credit	190	105,038	Demand Deposits	189	105,305
Public Corporations	178	72,446	Time Deposits	185	102,760
Foreign	188	102,526	Foreign	188	102,174
CB (Reserves)	189	105,590	CB	183	98,227
CB (Other)	174	47,894			
Government	190	104,482	Government	184	97,872
Other Fin. Institutions	175	64,487	Other Fin. Institutions	175	52,476
			Securities	178	69,451
			Loans	172	38,203
			Derivatives	172	37,940
			ITRs	172	37,907
			Capital	187	98,069
			Other Liabilities (Net)		

Illustration of data coverage Comparison with other datasets Other variables

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Illustration of data coverage | Comparison with other datasets | Other variables | Non-core funding

Identifying monetary policy shocks: Trilemma IV

- Building on the **trilemma of international finance**
  Obstfeld and Taylor (2004); di Giovanni et al. (2009); Jordà et al. (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

Formal construction of the instrument

Exploit 3 features of the new dataset to refine the instrument

I. **Monthly frequency** narrows time window between action and reaction
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III. **Policy rates** serve as a better proxy for MP than short-term market rates
   - Short-term market rates in EMEs are influenced by time-varying risk premia
     De Leo et al. (2022)

First stage

Dep. var.: $\Delta R^{policy}_{i,t}$	(1)
$z_{i,t}$	0.268***
	(0.058)
Controls	✗
Country FEs	✓
Time FEs	✗
KP weak IV	21.47
Countries	157
Observations	46184

Notes: OLS estimates of γ with country-based cluster-robust SEs of $\Delta R^{policy}_{i,t} = \alpha_i + \gamma z_{i,t} + \sum_{k=1}^{12} \delta^k \Delta R^{policy}_{i,t-k} + \mathbf{\Gamma} \boldsymbol{X}_{i,t} + e_{i,t}$. *KP weak IV* refers to the Kleibergen-Paap (2006) Wald rk F-statistic.

AEs and non-AEs Floaters maintain independence

First stage

Dep. var.: $\Delta R^{policy}_{i,t}$	(1)	(2)	(3)	(4)
$z_{i,t}$	0.268***	0.397***	0.360***	0.319***
	(0.058)	(0.065)	(0.062)	(0.075)
Controls	✗	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	Year	Year × Month
KP weak IV	21.47	36.77	33.19	18.37
Countries	157	154	154	154
Observations	46184	36894	36894	36894

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Does monetary tightening cause rising non-core shares?

Local projection:

Jordà (2005)

$$\Delta_{h+1} y_{i,t+h} = \alpha_i^h + \beta^h \Delta R_{i,t}^{policy} + \sum_{k=1}^{12} \gamma_k^h \Delta R_{i,t-k}^{policy} + \sum_{k=1}^{12} \delta_k^h \Delta y_{i,t-k} + \mathbf{\Gamma}^h \boldsymbol{X}_{i,t} + e_{i,t+h}$$

- α: country fixed effects
- $\boldsymbol{X}$: lags 0 to 12 of monthly changes in
  - log exchange rate vis-à-vis USD
  - log CPI
  - log real private credit
- R^{policy}: monetary policy rate, instrumented with z

Monetary policy shifts bank funding: 12-month horizon

	Non-core Demand Dep.
$\Delta R_{i,t}^{policy}$	14.506***
	(4.093)
Controls	✓
Country FEs	✓
Time FEs	✗
KP weak IV	46.04
Countries	151
Observations	31748

Notes: LP-IV estimates of β^{12} with country-based cluster-robust SEs. ΔR_t^{policy} is instrumented with z_t. The response variables are log-transformed. *KP weak IV* refers to the Kleibergen-Paap (2006) Wald rk F-statistic.

IRFs | Other ratios | NIMs | W/ floaters | $\Delta_{12} R^{policy}$ | Spreads | W/ narrative shocks | OLS | W/ GDP | AEs | Time FEs | No controls | Peggers only | Liberalized economies | Indiv. non-core positions | Other positions | W/o EA countries

Monetary policy shifts bank funding: 12-month horizon

	$\frac{\text{Non-core}}{\text{Demand Dep.}}$	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R^{policy}_{i,t}$	14.506***	-7.578***	7.718**
	(4.093)	(2.863)	(3.776)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	46.04	51.60	45.11
Countries	151	152	152
Observations	31748	33444	32024

Notes: LP-IV estimates of β^{12} with country-based cluster-robust SEs. ΔR^{policy}_t is instrumented with z_t. The response variables are log-transformed. *KP weak IV* refers to the Kleibergen-Paap (2006) Wald rk F-statistic.

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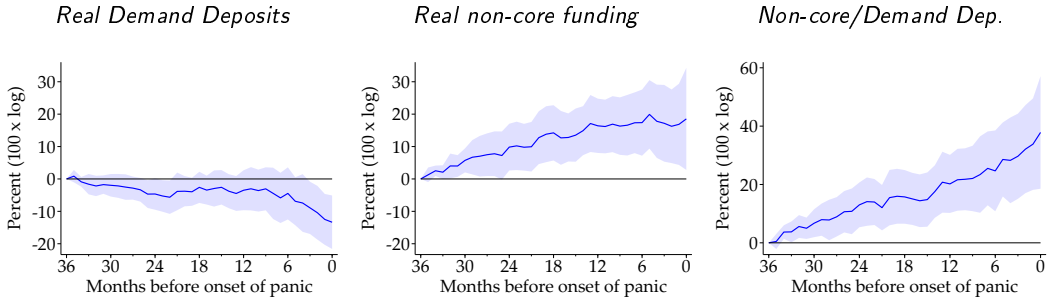
Bank funding shifts before panic: event studies



Notes: Estimates of $\{\beta^h\}_{h=0}^{36}$ with 95% CIs of $y_{i,t-36+h} - y_{i,t-36} = \alpha_i^h + \beta^h \mathbb{1}\{\text{panic}_{i,t} = 1\} + e_{i,t-36+h}$. y is log-transformed for all variables.

Cases Crises Other ratios Non-core items Other items Time FEs DIS Post-panic paths W/o GFC

Extensions

- Rising non-core ratios also systematically *predict* panics and crises
- Paper and Appendix go beyond narratively identified panics and crises
  - Rising non-core ratios predict non-core runs, credit busts, and real disaster...
  - ...but not subsequent variations in retail deposits
- Shifts toward non-core funding are associated with weakening bank fundamentals

Taking stock

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III. Before panics and crises, monetary policy tightens
Schularick et al. (2021); Jiménez et al. (2023)

Taking stock

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$\Rightarrow$ **Remaining question:**

Does MP directly affect financial stability through its effect on non-core funding?

Relative frequency tables

Monetary policy affects stability risk if it shifts bank funding

Dep. var.: Banking panics
$\Delta R^{policy}_{i,t-12}$
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$
Estimation
KP weak IV
Countries
Observations

Notes: $panic_{i,t+1,t+12} = \alpha_i + \boldsymbol{\Lambda}\boldsymbol{W}_{i,t} + \boldsymbol{\Gamma}\boldsymbol{X}_{i,t} + \sum_{k=0}^{12}\gamma^k panic_{i,t-k} + u_{i,t+1}$. Vars. included in $\boldsymbol{W}$: see table.

Monetary policy affects stability risk if it shifts bank funding

Dep. var.: Banking panics	(1)
$\Delta R^{policy}_{i,t-12}$	15.587***
	(5.307)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$	
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$	
Estimation	2SLS
KP weak IV	53.64
Countries	41
Observations	13406

Notes: $panic_{i,t+1,t+12} = \alpha_i + \boldsymbol{\Lambda}\boldsymbol{W}_{i,t} + \boldsymbol{\Gamma}\boldsymbol{X}_{i,t} + \sum_{k=0}^{12}\gamma^k panic_{i,t-k} + u_{i,t+1}$. Vars. included in $\boldsymbol{W}$: see table.
IV in (1): z_{t-12}.

Monetary policy affects stability risk if it shifts bank funding

Dep. var.: Banking panics	(1)	(2)
$\Delta R^{policy}_{i,t-12}$	15.587***	
	(5.307)	
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		1.438*
		(0.756)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		
Estimation	2SLS	OLS
KP weak IV	53.64	
Countries	41	41
Observations	13406	13406

Notes: $panic_{i,t+1,t+12} = \alpha_i + \boldsymbol{\Lambda}\boldsymbol{W}_{i,t} + \boldsymbol{\Gamma}\boldsymbol{X}_{i,t} + \sum_{k=0}^{12}\gamma^k panic_{i,t-k} + u_{i,t+1}$. Vars. included in $\boldsymbol{W}$: see table.
IV in (1): z_{t-12}.

Monetary policy affects stability risk if it shifts bank funding

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	15.587***		5.416
	(5.307)		(3.586)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		1.438*	1.118
		(0.756)	(0.804)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			24.088***
			(9.226)
Estimation	2SLS	OLS	2SLS
KP weak IV	53.64		34.26
Countries	41	41	41
Observations	13406	13406	13406

Notes: $panic_{i,t+1,t+12} = \alpha_i + \boldsymbol{\Lambda}\boldsymbol{W}_{i,t} + \boldsymbol{\Gamma}\boldsymbol{X}_{i,t} + \sum_{k=0}^{12}\gamma^k panic_{i,t-k} + u_{i,t+1}$. Vars. included in $\boldsymbol{W}$: see table.
IV in (1): z_{t-12}. IVs in (3): z_{t-12} and $z_{t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$.

Longer horizon | Crises | Time FEs | W/ GDP | Cont. interaction | Real quantities | Non-core items | Time Deposits

Lessons for the 21st Century

- Identification of a mechanism by which MP influences financial system stability:
  The funding structure of banking systems
- Findings carry policy implications:
  Use macroprudential tools to control growth of non-core liabilities
  Shin (2011); IMF (2011)
- New macro-financial dataset with three characteristics:
  high frequency, long horizon, extensive country coverage

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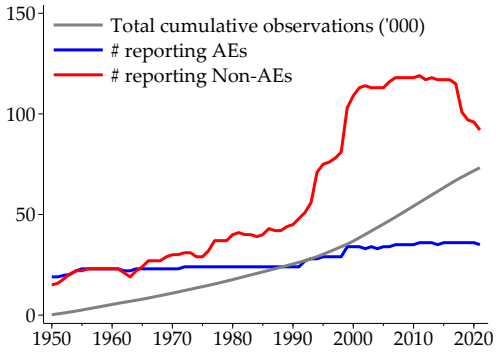
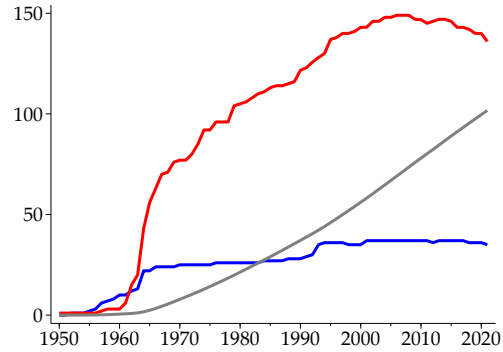
Overview of data availability of unbalanced panel

Policy Rates



Demand Deposits



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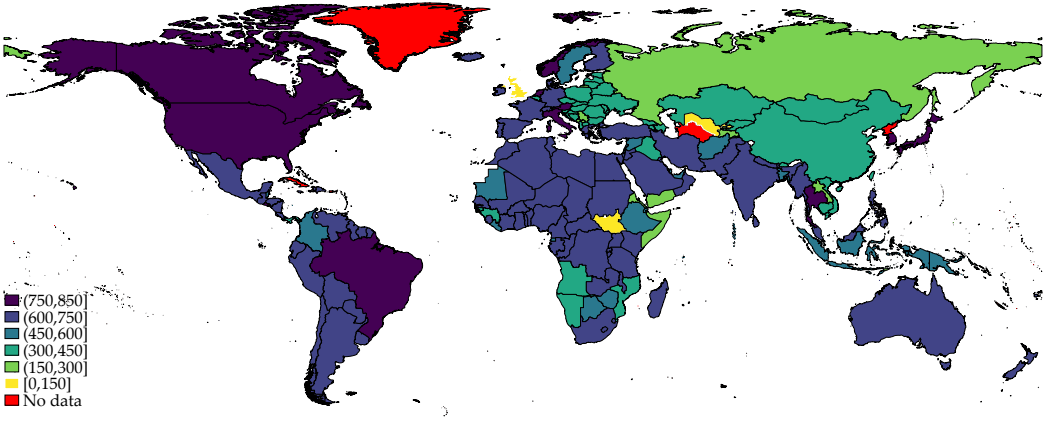
IFS: illustration of data coverage

Number of available data points for demand deposits



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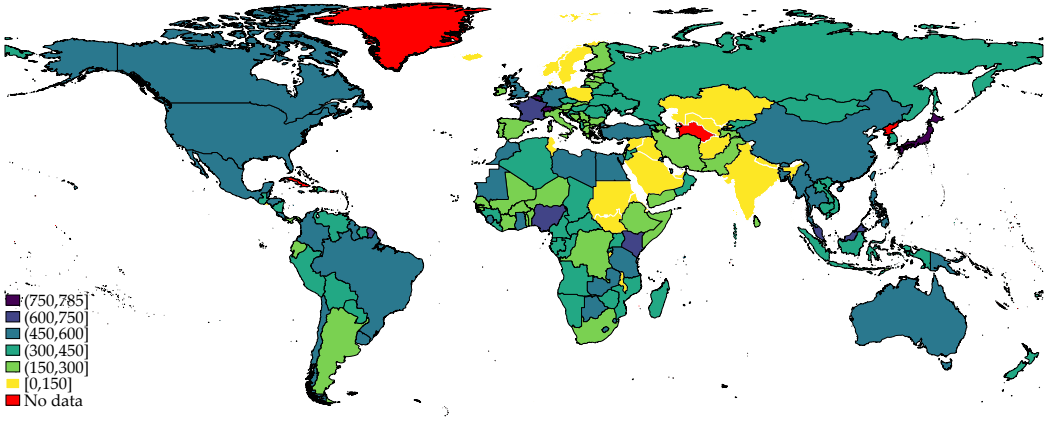
IFS: illustration of data coverage

Number of available data points for deposit rates



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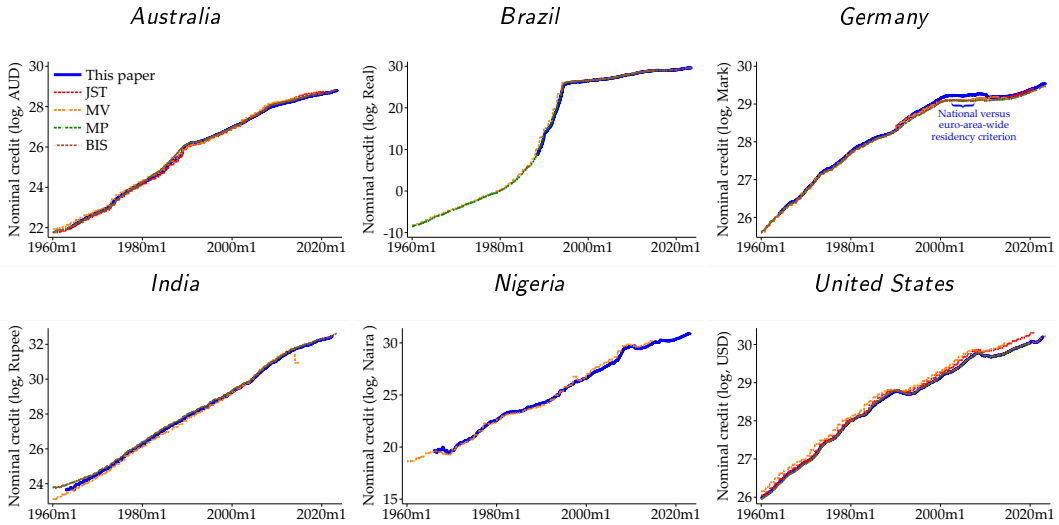
Private credit: comparison with other datasets



Notes: Data from this paper, Jordà et al. (2017), Müller and Verner (2024), Monnet and Puy (2021), and BIS.

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Availability of other variables

Variable	Countries	Obs.	Note
Other IFS variables			
Consumer Price Index	188	103,966	
Exchange Rate	189	136,832	
GDP	107	32,561	Quarterly, linearly interpolated
Policy Rates	166	77,419	Various sources
Financial crisis indicator	162	86,646	Laeven and Valencia (2020)
Banking panic indicator	45	35,597	Baron et al. (2021)
ER regime classification	186	134,057	Ilzetzki et al. (2019, 2022)
Anchor currency classification	184	124,376	Ilzetzki et al. (2019, 2022)
KA openness index	178	99,055	Chinn and Ito (2006) If missing: Quinn et al. (2011)

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Construction of the instrument

- $k_{i,t} \in [0,1]$: *annual* capital mobility indicator (1 if open)
- $q_{i,t} \in \{0,1\}$: ER regime indicator $\underbrace{(1 \text{ if peg in } t, t-1, \ldots, t-23)}_{\text{following Jordà et al. (2020)}}$
- $\Delta R^{policy}_{b(i,t),t}$: policy rate change in i's base country b in month t
- $\Delta \hat{R}^{policy}_{b(i,t),t}$: predicted changes in $\Delta R^{policy}_{b(i,t),t}$
  - Predictors: 12 lags of $\Delta R^{policy}_{b(i,t),t}$, CPI growth, and credit growth
- $z_{i,t} = \begin{cases} k_{i,t}\left(\Delta R^{policy}_{b(i,t),t} - \Delta \hat{R}^{policy}_{b(i,t),t}\right) & , q_{i,t} = 1 \\ 0 & , q_{i,t} = 0 \end{cases}$

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Illustration of peggers' anchor countries

End-1975

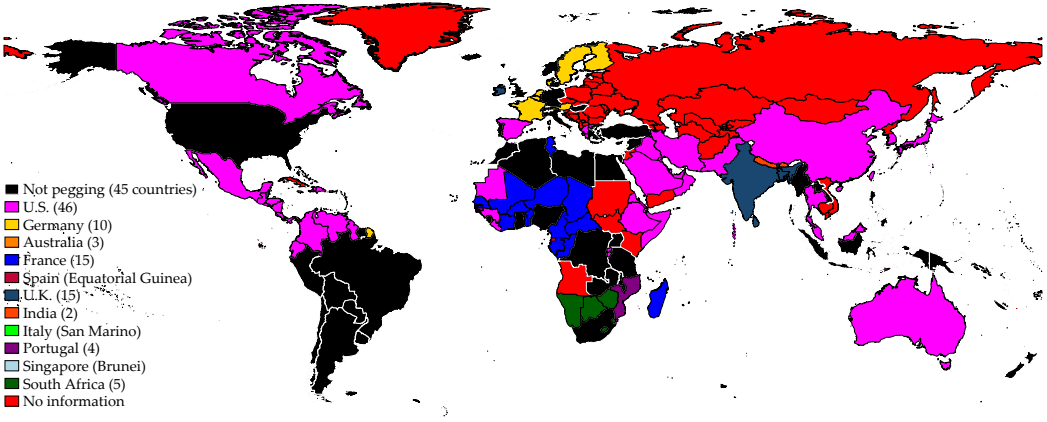

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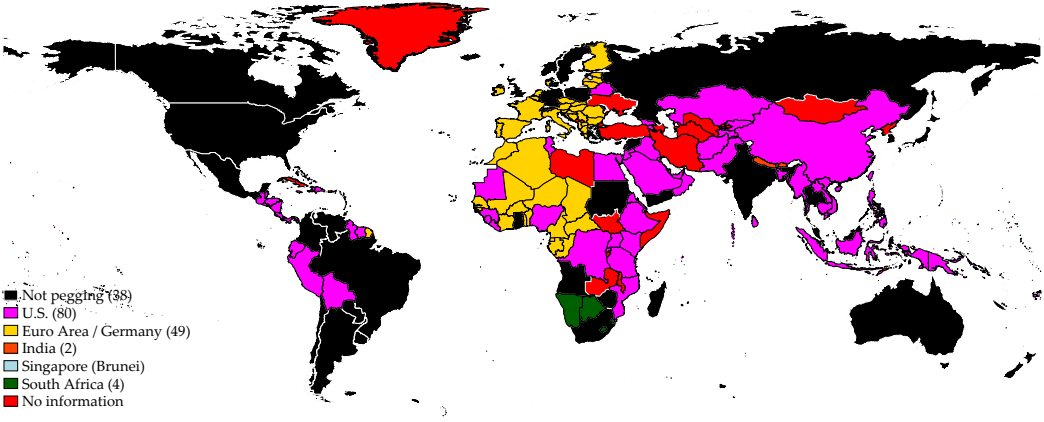
Illustration of peggers' anchor countries (ctd.)

End-2019



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First stage for *advanced* economies

Dep. var.: $\Delta R^{policy}_{i,t}$	(1)	(2)	(3)	(4)
$z_{i,t}$	0.463***	0.630***	0.549***	0.448***
	(0.071)	(0.058)	(0.059)	(0.122)
Controls	✗	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	Year	Year × Month
KP weak IV	42.90	119.10	86.45	13.56
Countries	36	36	36	36
Observations	16026	12685	12685	12685

Back

First stage for *non-advanced* economies

Dep. var.: $\Delta R^{policy}_{i,t}$	(1)	(2)	(3)	(4)
$z_{i,t}$	0.151**	0.251***	0.214**	0.186**
	(0.071)	(0.085)	(0.086)	(0.087)
Controls	✗	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	Year	Year × Month
KP weak IV	4.54	8.72	6.25	4.51
Countries	121	118	118	118
Observations	30158	24209	24209	24209

Back

Floaters and peggers: response of policy rates

Dep. var.: $\Delta R^{policy}_{i,t}$	(1)	(2)	(3)	(4)
$z^{peg}_{i,t}$	0.268***	0.397***	0.364***	0.347***
	(0.058)	(0.066)	(0.064)	(0.078)
$z^{float}_{i,t}$	0.126	0.125	0.101	0.097
	(0.114)	(0.127)	(0.128)	(0.126)
Controls	✗	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	Year	Year × Month
KP weak IV	10.75	19.25	17.06	10.08
Countries	157	154	154	154
Observations	46184	36894	36894	36894

Notes: $\Delta R^{policy}_{i,t} = \alpha_i + \alpha_t + \gamma_1 z^{peg}_{i,t} + \gamma_2 z^{float}_{i,t} + \sum_{k=1}^{12} \delta^k \Delta R^{policy}_{i,t-k} + \sum_{k=0}^{12} \mathbf{\Gamma}^k \boldsymbol{X}_{i,t-k} + e_{i,t}$.

$$z^{peg}_{i,t} = \begin{cases} k_{i,t}\left(\Delta r_{b(i,t),t} - \Delta \hat{r}_{b(i,t),t}\right) & , q_{i,t} = 1 \\ 0 & , q_{i,t} = 0 \end{cases} \text{ and } z^{float}_{i,t} = \begin{cases} k_{i,t}\left(\Delta r_{b(i,t),t} - \Delta \hat{r}_{b(i,t),t}\right) & , q_{i,t} = 0 \\ 0 & , q_{i,t} = 1 \end{cases}.$$

Back

Floaters and peggers: response of exchange rates

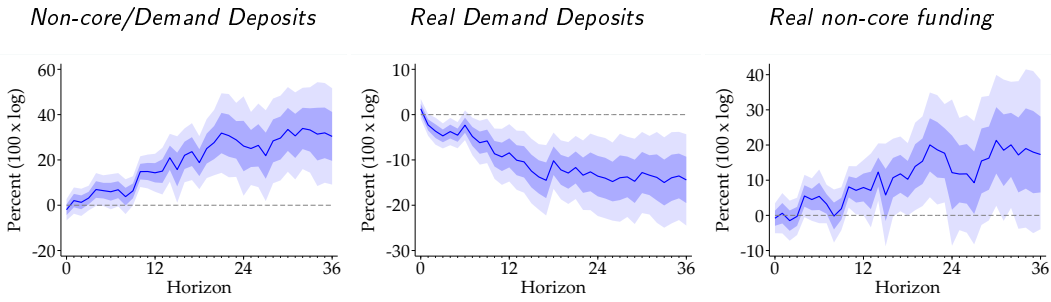
Dep. var.: $\Delta \log ER_{i,t+1}$	(1)	(2)	(3)	(4)
$z_{i,t}^{peg}$	0.039	-0.203	-0.001	0.100
	(0.169)	(0.202)	(0.186)	(0.163)
$z_{i,t}^{float}$	0.493***	0.473***	0.597***	0.573***
	(0.134)	(0.151)	(0.149)	(0.130)
Controls	✗	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	Year	Year × Month
KP weak IV	6.83	5.40	8.30	10.23
Countries	157	154	154	154
Observations	46141	36982	36982	36982

Notes: $\Delta \log ER_{i,t+1} = \alpha_i + \alpha_t + \gamma_1 z_{i,t}^{peg} + \gamma_2 z_{i,t}^{float} + \sum_{k=1}^{12} \delta^k \Delta R_{i,t-k}^{policy} + \sum_{k=0}^{12} \mathbf{\Gamma}^k \boldsymbol{X}_{i,t-k} + e_{i,t}$.

$$z_{i,t}^{peg} = \begin{cases} k_{i,t} \left(\Delta r_{b(i,t),t} - \Delta \hat{r}_{b(i,t),t} \right) & , q_{i,t} = 1 \\ 0 & , q_{i,t} = 0 \end{cases} \text{ and } z_{i,t}^{float} = \begin{cases} k_{i,t} \left(\Delta r_{b(i,t),t} - \Delta \hat{r}_{b(i,t),t} \right) & , q_{i,t} = 0 \\ 0 & , q_{i,t} = 1 \end{cases}.$$

Back

Monetary policy shifts bank funding: IRFs



Notes: LP-IV estimates of $\{\beta^h\}_{h=0}^{36}$. Shaded areas indicate 95% (light) and 68% (dark) confidence intervals based on country-based cluster-robust SEs.

Back

Ratios vis-à-vis total assets

	$\frac{\text{Non-core}}{\text{Total Assets}}$	$\frac{\text{Demand Deposits}}{\text{Total Assets}}$	$\frac{\text{Time Deposits}}{\text{Total Assets}}$	$\frac{\text{Total Deposits}}{\text{Total Assets}}$
$\Delta R^{policy}_{i,t}$	1.233**	-1.462***	-0.386	-1.735**
	(0.499)	(0.449)	(0.797)	(0.774)
Controls	✓	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
KP weak IV	46.00	46.08	41.98	45.30
Countries	152	152	149	152
Observations	31727	32416	31524	32045

Back

Ratios vis-à-vis total deposits

	$\frac{\text{Demand Deposits}}{\text{Total Deposits}}$	$\frac{\text{Time Deposits}}{\text{Total Deposits}}$	$\frac{\text{Non-core}}{\text{Total Deposits}}$
$\Delta R_{i,t}^{policy}$	-7.761**	2.658**	7.664**
	(3.225)	(1.288)	(3.764)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	45.60	44.46	45.24
Countries	152	149	151
Observations	32837	32248	31572

Back

OLS results

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	0.425	-0.584***	-0.099
	(0.332)	(0.147)	(0.250)
Estimation	OLS	OLS	OLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
Countries	152	153	153
Observations	31749	33445	32025

Back

Additionally controlling for real activity

	Non-core Demand Dep.	Real Quantities Demand Dep.	Real Quantities Non-core
$\Delta R_{i,t}^{policy}$	11.422***	-5.559	9.167***
	(4.075)	(3.922)	(2.931)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	43.20	58.75	43.28
Countries	91	92	92
Observations	13835	14631	14212

Notes: Monthly growth rates in real GDP from lag 0 to 12 are included as additional control variables.

Back

Additionally controlling for real activity in Taylor rule

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	9.472**	-3.658	7.849***
	(3.856)	(3.244)	(2.549)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	38.77	43.20	38.81
Countries	91	92	92
Observations	14181	15010	14546

Notes: Monthly growth rates in real GDP from lag 0 to 12 are included as additional control variables in (i) the Taylor rule to residualize base country policy rate changes and (ii) the IV regression.

Back

No controls

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	22.050***	-5.241*	7.908**
	(7.695)	(2.909)	(3.636)
Controls	✗	✗	✗
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	12.64	50.84	45.34
Countries	154	152	152
Observations	34847	34577	32687

Back

Including country×decade fixed effects

		Real Quantities	
	Non-core / Demand Dep.	Demand Dep.	Non-core
$\Delta R_{i,t}^{policy}$	11.908***	-4.914*	7.407**
	(3.822)	(2.822)	(3.266)
Controls	✓	✓	✓
Fixed effects	Ctry. × Dec.	Ctry. × Dec.	Ctry. × Dec.
KP weak IV	41.39	47.28	40.54
Countries	152	153	153
Observations	31749	33445	32025

Back

Including year fixed effects

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	11.670**	-5.717**	5.926
	(5.030)	(2.764)	(4.486)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	Year	Year	Year
KP weak IV	41.49	43.80	40.39
Countries	151	152	152
Observations	31748	33444	32024

Back

Including year×month fixed effects

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	19.416**	-8.335*	8.165
	(8.073)	(4.316)	(6.148)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	Y × M	Y × M	Y × M
KP weak IV	15.26	17.35	15.87
Countries	151	152	152
Observations	31748	33444	32024

Back

With narrative shocks

Overview

- Include narratively identified MP shocks for important floaters
  - United States (1946M1–2016M12): Romer and Romer (2023)
  - Canada (1974M1–2015M10): Champagne and Sekkel (2018)
  - United Kingdom (1975M1–2007M12): Cloyne and Hürtgen (2016)

  $\rightarrow$ 566 additional non-zero monetary policy shocks

- Either combine these shocks with the trilemma-identified shocks or consider them separately

Back

With narrative shocks (ctd.)

Combine trilemma-identified shocks with narrative shocks

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	10.964***	-5.535**	5.336**
	(3.546)	(2.232)	(2.264)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	49.63	45.92	60.38
Countries	151	152	152
Observations	31757	33453	32072

Back

With narrative shocks (ctd.)

Only narrative shocks

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	3.970**	-1.339***	3.031*
	(2.000)	(0.016)	(1.634)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	31.01	30.60	73.46
Countries	2	2	3
Observations	1040	1056	1229

Back

Subset of advanced economies

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	14.333***	-7.902***	9.006***
	(3.125)	(2.924)	(3.001)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	83.98	133.68	89.41
Countries	35	35	36
Observations	10528	11377	10916

Notes: Here, the model is re-estimated for the subset of advanced economies. The country classification follows IMF (2023, pp. 119–120).

Back

Subset of Baron et al. (2021) countries

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	12.193***	-5.177**	9.487***
	(3.073)	(2.613)	(2.740)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	51.07	81.17	33.25
Countries	41	42	42
Observations	12360	13515	12735

Notes: Here, the model is re-estimated for the subset of countries for which the Baron et al. (2021) banking panic chronology is available.

Back

Subset of non-advanced economies

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	12.635*	-8.914*	2.726
	(7.661)	(5.394)	(6.902)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	15.55	12.22	15.94
Countries	116	117	116
Observations	21220	22067	21108

Notes: Here, the model is re-estimated for the subset of non-advanced economies. The country classification follows IMF (2023, pp. 119–120).

Back

Subset of pegging countries

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	13.828***	-6.254**	7.824**
	(4.055)	(2.849)	(3.713)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	43.45	55.28	43.00
Countries	99	100	99
Observations	13070	13775	12972

Notes: Here, the model is re-estimated for the subset of countries that peg their currency to a base country according to Ilzetzki et al. (2019, 2022).

Back

Subset of countries with liberalized deposit rates

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	6.153**	-0.741	9.205***
	(3.081)	(2.425)	(2.457)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	33.75	38.66	30.64
Countries	85	86	86
Observations	11192	11871	11517

Notes: Here, the model is re-estimated for the subset of countries that have fully liberalized deposit rates according to Abiad et al. (2008) as revised and updated in Omori (2022).

Back

Response of Net Interest Margins

	Lending Rate-Time Dep. Rate	Lending Rate-Interbank Rate
$\Delta R_{i,t}^{policy}$	-0.688	-2.793***
	(0.919)	(0.962)
Controls	✓	✓
Country FEs	✓	✓
Time FEs	✗	✗
KP weak IV	12.76	16.61
Countries	138	85
Observations	21684	12738

Notes: Here, the dependent variable refers to the difference between lending and time deposit rates (first column) or interbank rates (second column).

Back

Including the subpopulation of floaters

First stage

Dep. var.: $\Delta R_{i,t}^{policy}$	(1)	(2)	(3)	(4)
$z_{i,t}^{peg}$	0.268***	0.397***	0.364***	0.347***
	(0.058)	(0.066)	(0.064)	(0.078)
$z_{i,t}^{float}$	0.126	0.125	0.101	0.097
	(0.114)	(0.127)	(0.128)	(0.126)
Controls	✗	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	Year	Year × Month
KP weak IV	10.75	19.25	17.06	10.08
Countries	157	154	154	154
Observations	46184	36894	36894	36894

Back

Including the subpopulation of floaters (ctd.)

Second stage

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	8.104	-6.797**	3.778
	(5.823)	(2.711)	(4.879)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	27.38	27.99	24.25
Countries	151	152	152
Observations	31748	33444	32024

Notes: Here, ΔR_t^{policy} is instrumented with z_t^{peg} *and* z_t^{float}.

Back

Response of Time Deposit & Interbank Spreads

	Time Dep. Rate	Time Dep. Spread	Interbank Rate	Interbank Spread
$\Delta R_{i,t}^{policy}$	2.627**	-0.111	6.110***	-2.333**
	(1.248)	(2.309)	(1.304)	(1.181)
Controls	✓	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
KP weak IV	14.67	18.74	17.74	16.35
Countries	145	144	94	93
Observations	24784	23866	16619	15940

Notes: The dependent variable in column (2) refers to the difference between policy and time deposit rates. The dependent variable in column (4) refers to the difference between policy and interbank rates.

Back

Individual non-core positions—*Foreign*

	Real		Ratio to Demand Deposits	
	All	AEs	All	AEs
$\Delta R_{i,t}^{policy}$	12.386***	6.477**	17.235***	13.900***
	(4.700)	(2.942)	(5.046)	(3.285)
Controls	✓	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
KP weak IV	43.76	93.36	48.85	89.55
Countries	151	36	150	35
Observations	32699	10843	31890	10457

Back

Individual non-core positions—*Interbank*

	Real		Ratio to Demand Deposits	
	All	AEs	All	AEs
$\Delta R_{i,t}^{policy}$	13.837	8.243	13.966	13.247
	(13.049)	(7.874)	(11.928)	(8.129)
Controls	✓	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
KP weak IV	30.68	404.84	28.38	399.45
Countries	137	33	137	33
Observations	20778	5398	20400	5322

Back

Individual non-core positions—*Securities*

	Real		Ratio to Demand Deposits	
	All	AEs	All	AEs
$\Delta R_{i,t}^{policy}$	12.218	17.586**	19.104**	25.016***
	(7.493)	(6.969)	(7.914)	(6.826)
Controls	✓	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
KP weak IV	29.75	67.31	33.44	61.14
Countries	113	32	113	32
Observations	16845	6817	16638	6734

Back

Individual non-core positions—*Other positions*

	Real		Ratio to Demand Deposits	
	All	AEs	All	AEs
$\Delta R_{i,t}^{policy}$	1.487	25.192	10.910	33.599*
	(30.941)	(15.539)	(33.877)	(17.620)
Controls	✓	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
KP weak IV	16.75	158.26	16.92	191.65
Countries	139	34	139	34
Observations	17771	5571	17738	5514

Back

Response of other balance sheet positions

	Real Time Dep.	Real CB Res.	Real CB Liab.	Real Gov. Liab.
$\Delta R_{i,t}^{policy}$	3.711*	-25.193*	-8.376	15.503*
	(2.182)	(13.326)	(31.084)	(9.269)
Controls	✓	✓	✓	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
KP weak IV	44.98	49.11	31.87	47.34
Countries	149	153	143	148
Observations	32488	33926	25878	30748

Back

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta_{12} R^{policy}_{i,t}$	6.814***	-3.190***	4.153**
	(1.954)	(0.901)	(1.881)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	34.99	28.37	34.92
Countries	152	152	152
Observations	28752	30129	29003

Notes: Here, $\Delta_{12} R^{policy}_{i,t}$ is instrumented with $\sum_{k=0}^{11} z_{i,t-k}$.

Back

Without EA countries

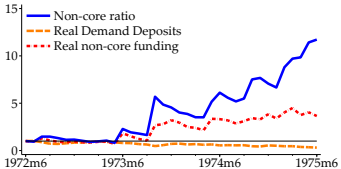
	Non-core Demand Dep.	Real Quantities Demand Dep.	Real Quantities Non-core
$\Delta R_{i,t}^{policy}$	15.672***	-10.736**	5.900
	(5.643)	(4.268)	(4.816)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	26.80	28.49	26.09
Countries	148	149	149
Observations	29663	31034	29939

Notes: Here, countries are excluded from the date onwards when they joined the Euro Area.

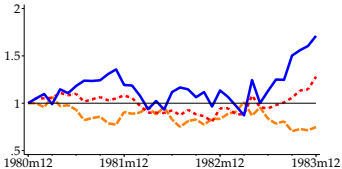
Back

Path of bank funding before specific panics

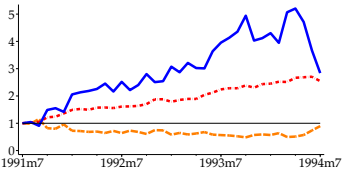
Chile 1975



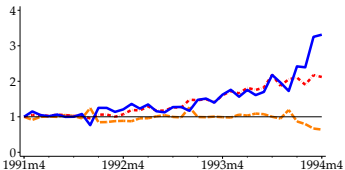
Thailand 1983



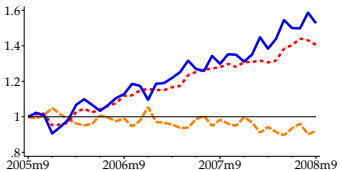
Brazil 1994



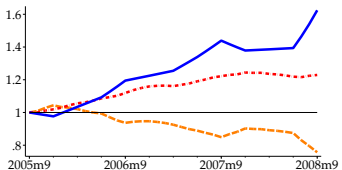
Turkey 1994



Portugal 2008



United States 2008

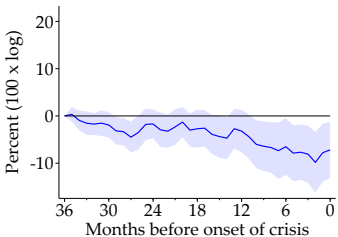


Back

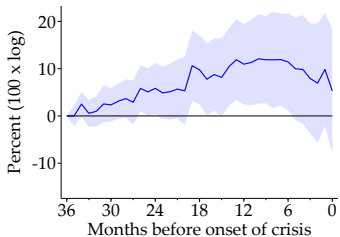
Pre-crisis paths of bank funding

Assumption: crisis starts in January whenever LV do not pin down month

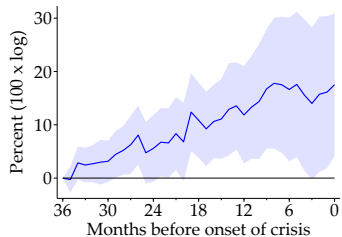
Real Demand Deposits



Real non-core funding



Non-core/Demand Dep.



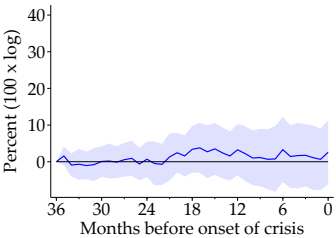
Notes: Estimates of $\{\beta^h\}_{h=0}^{36}$ with 95% CIs of $y_{i,t-36+h} - y_{i,t-36} = \alpha_i^h + \beta^h \mathbb{1}\{\text{crisis}_{i,t} = 1\} + e_{i,t-36+h}$. y is log-transformed for all variables. Bottom-right panel shows estimates of $\{\beta^h\}_{h=0}^{36}$ with 95% CIs of $\widehat{\sum_{k=0}^{h} \Delta R_{i,t-36+k}^{policy}} = \alpha_i^h + \beta^h \mathbb{1}\{\text{crisis}_{i,t} = 1\} + e_{i,t-36+h}$.

Back

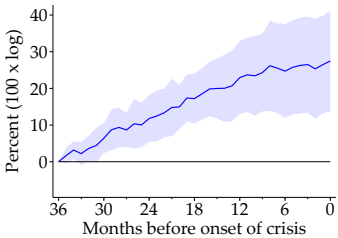
Pre-crisis paths of bank funding (ctd.)

Assumption: crisis does not exist whenever LV do not pin down month

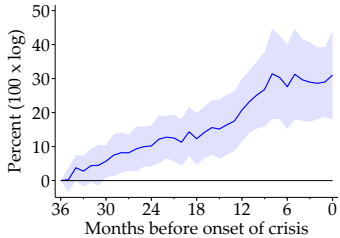
Real Demand Deposits



Real non-core funding



Non-core/Demand Dep.



Notes: Estimates of $\{\beta^h\}_{h=0}^{36}$ with 95% CIs of $y_{i,t-36+h} - y_{i,t-36} = \alpha_i^h + \beta^h \mathbb{1}\{\text{crisis}_{i,t} = 1\} + e_{i,t-36+h}$. y is log-transformed for all variables. Bottom-right panel shows estimates of $\{\beta^h\}_{h=0}^{36}$ with 95% CIs of $\widehat{\sum_{k=0}^{h} \Delta R_{i,t-36+k}^{policy}} = \alpha_i^h + \beta^h \mathbb{1}\{\text{crisis}_{i,t} = 1\} + e_{i,t-36+h}$.

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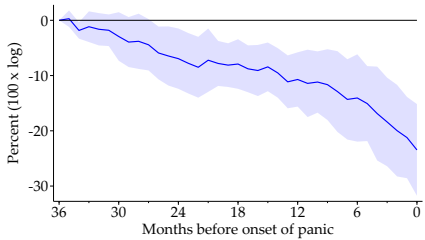
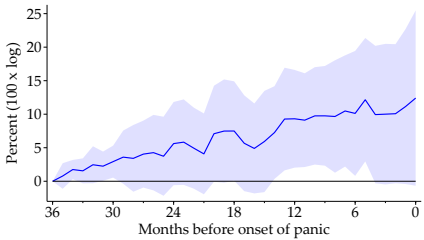
Pre-panic paths relative to total assets

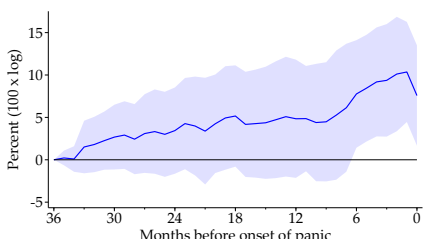
Demand/Total Assets



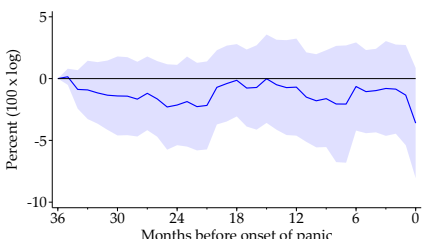
Non-core/Total Assets



Time/Total Assets



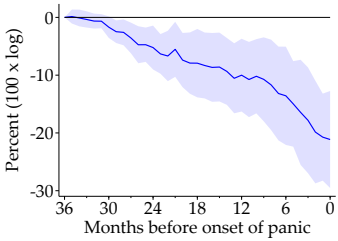
Total Deposits/Total Assets



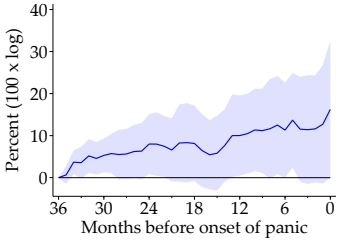
Back

Pre-panic paths relative to total deposits

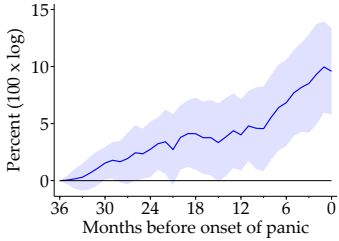
Demand/Total Deposits



Non-core/Total Deposits



Time/Total Deposits



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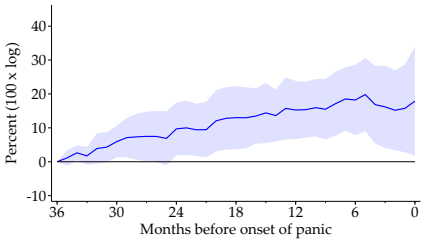
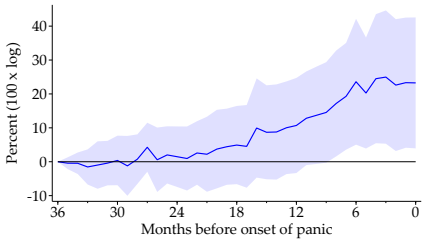
Pre-panic paths of non-core components

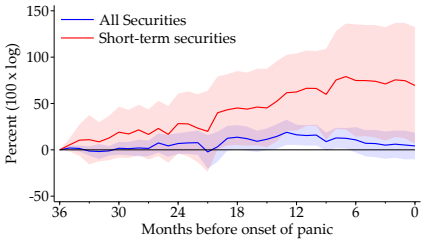
Real Foreign



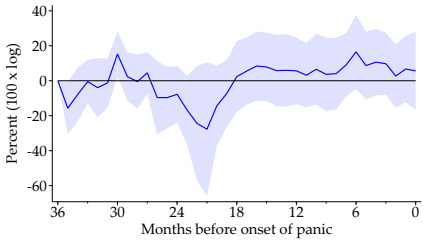
Real Interbank



Real Securities



Real Other Non-core



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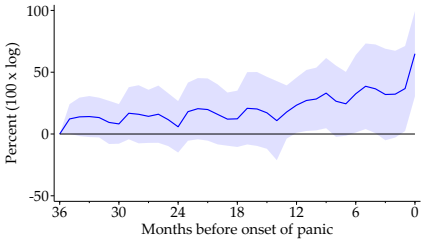
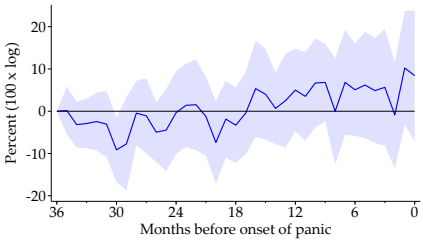
Pre-panic paths of other balance sheet positions

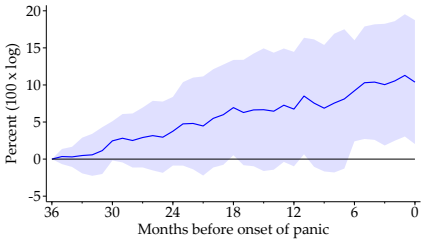
Liabilities to CB



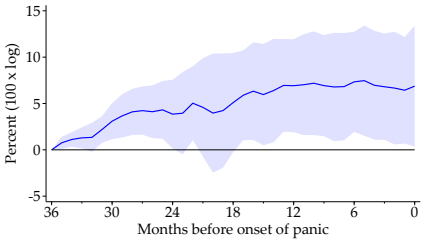
Liabilities to Government



Time Deposits



Claims on Private Sector



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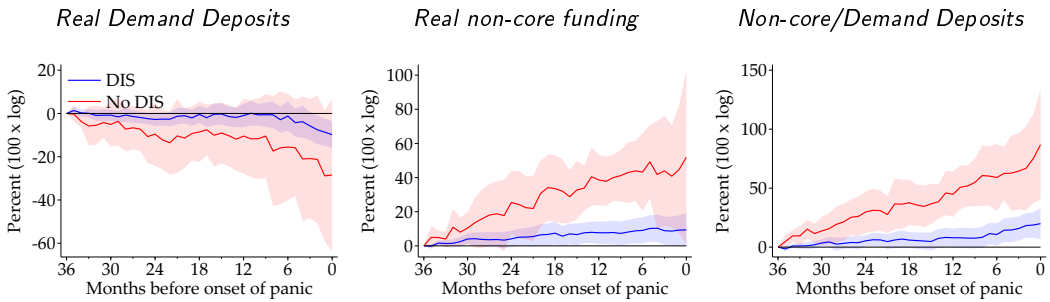
State-dependency due to deposit insurance?



Notes: Estimates of $\{\boldsymbol{\beta^h}\}_{h=0}^{36}$ and $\{\boldsymbol{\gamma^h}\}_{h=0}^{36}$ with 95% CIs of $y_{i,t-36+h} - y_{i,t-36} = \alpha_i^h + \boldsymbol{\beta^h}\mathbb{1}\{\textbf{panic}_{i,t} = 1\}\mathbb{1}\{DIS_{i,t} = 1\} + \boldsymbol{\gamma^h}\mathbb{1}\{\textbf{panic}_{i,t} = 1\}\mathbb{1}\{DIS_{i,t} = 0\} + e_{i,t-36+h}$. Information on the presence of explicit DISs comes from Demirgüç-Kunt et al. (2014).

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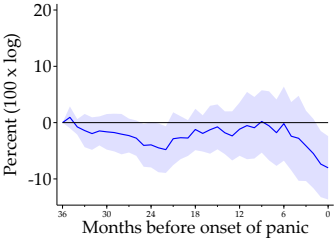
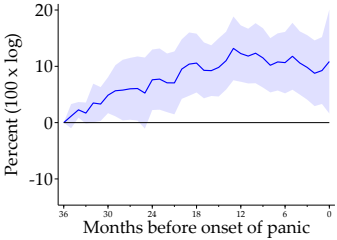
Including country×decade fixed effects

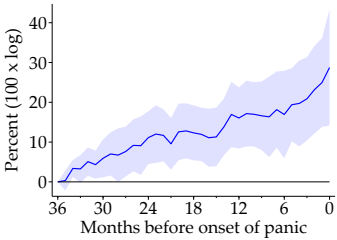
Real Demand Deposits



Real non-core funding



Non-core/Demand Deposits



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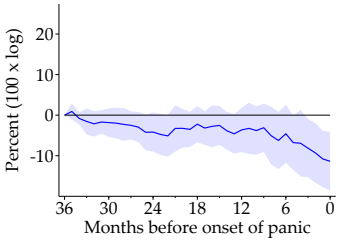
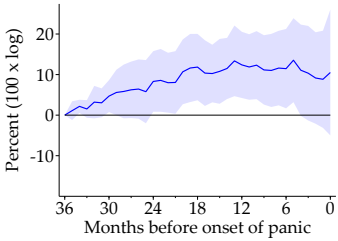
Including year fixed effects

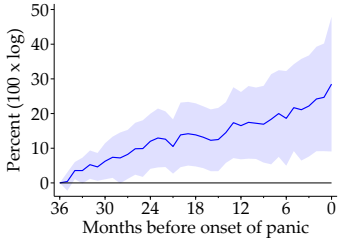
Real Demand Deposits



Real non-core funding



Non-core/Demand Deposits



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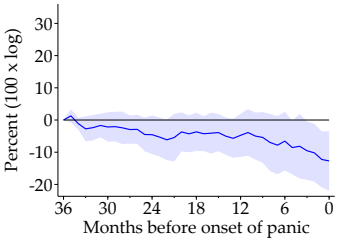
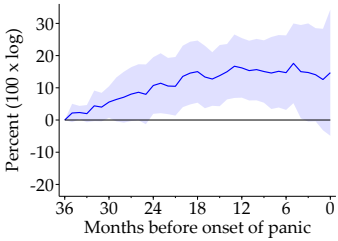
Including year×month fixed effects

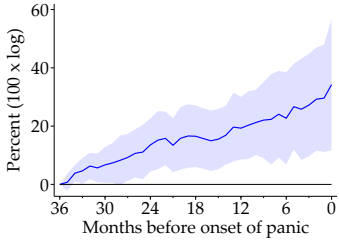
Real Demand Deposits



Real non-core funding



Non-core/Demand Deposits



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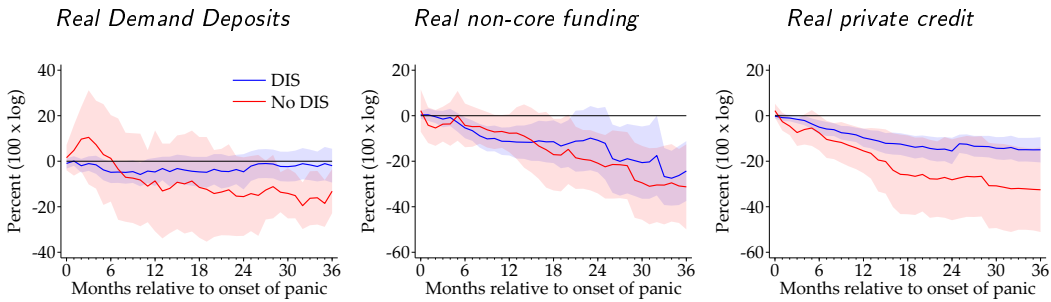
Paths after banking panics



Notes: Estimates of $\{\boldsymbol{\beta^h}\}_{h=0}^{36}$ and $\{\boldsymbol{\gamma^h}\}_{h=0}^{36}$ with 90% CIs of $y_{i,t+h} - y_{i,t} = \alpha_i^h + \boldsymbol{\beta^h}\mathbb{1}\{\textbf{panic}_{i,t} = 1\}\mathbb{1}\{DIS_{i,t} = 1\} + \boldsymbol{\gamma^h}\mathbb{1}\{\textbf{panic}_{i,t} = 1\}\mathbb{1}\{DIS_{i,t} = 0\} + e_{i,t+h}$. Information on the presence of explicit DISs comes from Demirgüç-Kunt et al. (2014).

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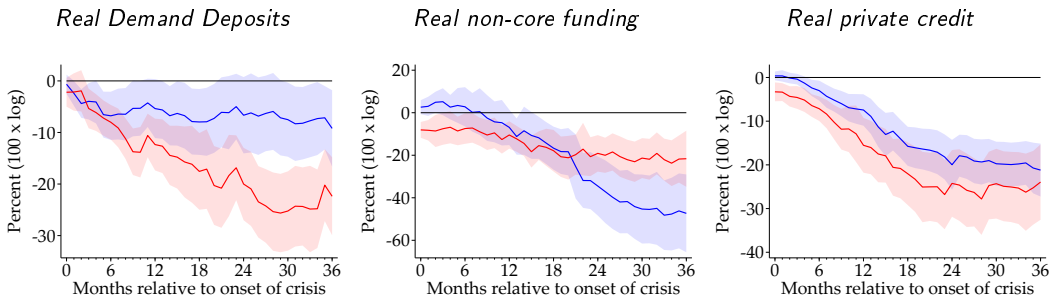
Paths after financial crises



Notes: Estimates of $\{\boldsymbol{\beta^h}\}_{h=0}^{36}$ and $\{\boldsymbol{\gamma^h}\}_{h=0}^{36}$ with 90% CIs of $y_{i,t+h} - y_{i,t} = \alpha_i^h + \boldsymbol{\beta^h}\mathbb{1}\{\textbf{crisis}_{i,t} = 1\}\mathbb{1}\{DIS_{i,t} = 1\} + \boldsymbol{\gamma^h}\mathbb{1}\{\textbf{crisis}_{i,t} = 1\}\mathbb{1}\{DIS_{i,t} = 0\} + e_{i,t+h}$. Information on the presence of explicit DISs comes from Demirgüç-Kunt et al. (2014).

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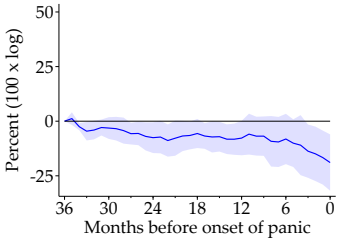
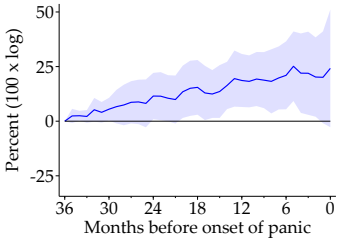
Exluding the years 2007 & 2008

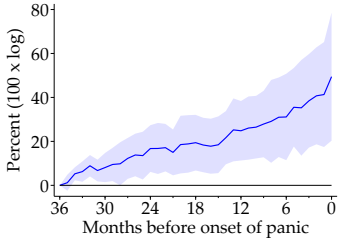
Real Demand Deposits



Real non-core funding



Non-core/Demand Deposits



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Predicting banking panics and financial crises: framework

$$\log\left(\frac{p_{i,t+1}}{1-p_{i,t+1}}\right) = \alpha_i + \boldsymbol{\beta}\,\Delta_{36}\left(\log\frac{Non-core}{Demand}\right)_{i,t} + \boldsymbol{\Gamma}\boldsymbol{X}_{i,t} + u_{i,t+1}$$

- $p_{i,t+1}$: prob. that crisis or panic starts in year-month $t+1$
- $\boldsymbol{X}$: 36-month changes in same controls as before + lags of dep. var.
- Following: ML estimates of $\boldsymbol{\beta}$ with country-based cluster-robust SEs

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Predicting banking panics and financial crises: results

	Banking panics		Financial crises	
	(1)	(2)	(3)	(4)
$\Delta_{36}\left(\log \frac{Non-core}{Demand}\right)_{i,t}$	0.244***	0.253***	0.094***	0.129***
	(0.037)	(0.032)	(0.027)	(0.045)
Controls	✗	✓	✗	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
Countries	33	31	76	60
Observations	10174	9264	25595	17414
AUROC	0.74	0.73	0.70	0.69
p-value	0.00	0.01	0.00	0.18

Notes: Marginal effects evaluated at the sample means of the covariates. Indep. variables are normalized. Last line: DeLong et al. (1988) test of equality of ROC areas vis-à-vis a model that excludes $\Delta_{36}\left(\log \frac{Non-core}{Demand}\right)$.

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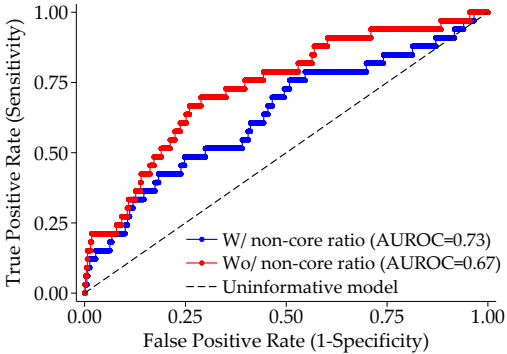
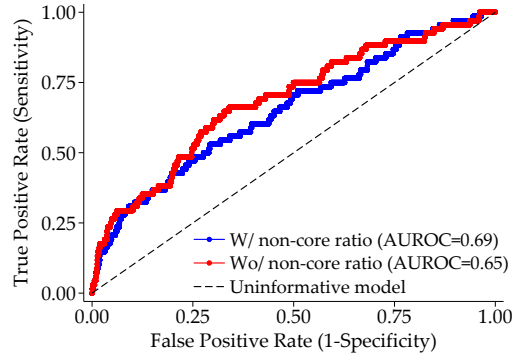
Predicting banking panics and financial crises: ROC curves

Banking panics



Financial crises



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Beyond narratively identified panics & crises

Framework

$$y_{t+12} = \alpha_i + \boldsymbol{\beta}\, \Delta_{36} \left(\log \frac{Non - core}{Demand} \right)_{i,t} + \boldsymbol{\Gamma} \boldsymbol{X}_{i,t} + u_{i,t+1}$$

- $\boldsymbol{X}$: 36-months changes in same controls as before + lags of dep. var.
- Following: ML (if y binary) or OLS (if y continuous) estimates of $\boldsymbol{\beta}$

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Beyond narratively identified panics & crises

Shift towards non-core funding predicts non-core runs ...

	Δ_{12} (log *Real Non-core*)$_{i,t+12}$		$\mathbb{1}\{\Delta_{12}$ (*Real Non-core*)$_{i,t+12} < 10^{th}$*perc.*$\}$	
	(1)	(2)	(3)	(4)
$\Delta_{36}\left(\log \frac{Non-core}{Demand}\right)_{i,t}$	-3.445***	-4.912***	1.222***	1.328***
	(0.763)	(0.804)	(0.279)	(0.277)
Estimation	OLS	OLS	Logit	Logit
Controls	✗	✓	✗	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
Countries	186	185	160	159
Observations	56892	54770	49825	48183

Notes: Columns (3) and (4): marginal effects evaluated at the sample means of the covariates. Indep. variables are normalized.

Back

Beyond narratively identified panics & crises

. . . and credit busts . . .

	Δ_{12} (log *Real Priv. Credit*)$_{i,t+12}$		$\mathbb{1}\{\Delta_{12}$ (*Real Priv. Credit*)$_{i,t+12} < 10^{th}$*perc.*	
	(1)	(2)	(3)	(4)
$\Delta_{36}\left(\log \frac{Non-core}{Demand}\right)_{i,t}$	-0.651**	-0.722**	1.412***	1.249***
	(0.306)	(0.282)	(0.326)	(0.323)
Estimation	OLS	OLS	Logit	Logit
Controls	✗	✓	✗	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
Countries	186	184	159	159
Observations	56274	55925	50539	50341

Notes: Columns (3) and (4): marginal effects evaluated at the sample means of the covariates. Indep. variables are normalized.

Back

Beyond narratively identified panics & crises

. . . and real disasters. . .

	Δ_{12} (log *Real GDP*)$_{i,t+12}$		$\mathbb{1}\{\Delta_{12}$ (*Real GDP*)$_{i,t+12} < 10^{th}$*perc.*$\}$	
	(1)	(2)	(3)	(4)
$\Delta_{36}\left(\log \frac{Non-core}{Demand}\right)_{i,t}$	-0.879***	-1.018***	2.085***	1.379**
	(0.252)	(0.253)	(0.664)	(0.622)
Estimation	OLS	OLS	Logit	Logit
Controls	✗	✓	✗	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
Countries	103	102	101	100
Observations	18214	17887	18146	17819

Notes: Columns (3) and (4): marginal effects evaluated at the sample means of the covariates. Indep. variables are normalized.

Back

Beyond narratively identified panics & crises

. . . but *not* withdrawals of retail deposits

	$\Delta_{12}(\log \textit{Real Demand})_{i,t+12}$		$\mathbb{1}\{\Delta_{12}(\textit{Real Demand})_{i,t+12} < 10^{th}\textit{perc.}\}$	
	(1)	(2)	(3)	(4)
$\Delta_{36}\left(\log \frac{Non-core}{Demand}\right)_{i,t}$	-0.004	-0.377	0.104	0.276
	(0.282)	(0.308)	(0.353)	(0.368)
Estimation	OLS	OLS	Logit	Logit
Controls	✗	✓	✗	✓
Country FEs	✓	✓	✓	✓
Time FEs	✗	✗	✗	✗
Countries	186	184	174	172
Observations	56342	55490	54722	53555

Notes: Columns (3) and (4): marginal effects evaluated at the sample means of the covariates. Indep. variables are normalized.

Back

Bank funding shifts coincide with weakening fundamentals...

Dep. var.: Cum. bank equity returns	from t to $t+12$	from $t-36$ to t
$\Delta_{36}\left(\log \frac{Non-core}{Demand}\right)_{i,t}$	-2.868	-14.243***
	(1.849)	(5.041)
Controls	✓	✓
Country FEs	✓	✓
Time FEs	✗	✗
Countries	40	40
Observations	11065	11065

Notes: OLS estimates of $R^{equity}_{i,t} = \alpha_i + \beta\,\Delta_{36}\left(\log \frac{Non\text{-}core}{Demand}\right)_{i,t} + \boldsymbol{\Gamma}\boldsymbol{X}_{i,t} + u_{i,t}$ $\boldsymbol{X}$ includes the same controls as in the main part. The independent variables are normalized.

Back

. . . but bank fundamentals cannot explain my findings

	Non-core / Demand Dep.	Real Quantities: Demand Dep.	Real Quantities: Non-core
$\Delta R_{i,t}^{policy}$	8.124***	-4.341*	6.757***
	(3.090)	(2.395)	(2.602)
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	43.72	67.30	48.55
Countries	40	41	41
Observations	10856	11829	11223

Notes: Lags 0 to 12 of monthly bank equity returns are included as additional control variables.

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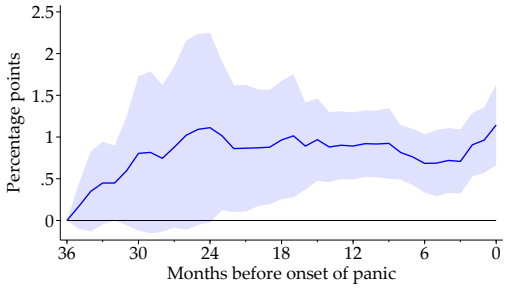
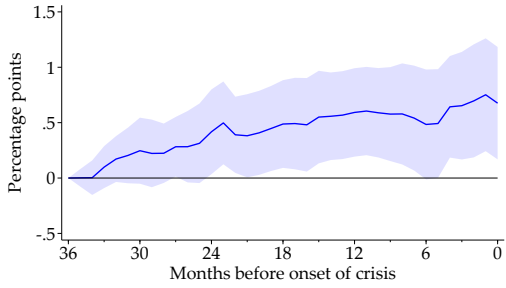
Before panics and crises, monetary policy tightens

Shocks before panics



Shocks before crises



Notes: OLS estimates of $\{\beta^h\}_{h=0}^{36}$ of $\sum_{k=0}^{h} \Delta \widehat{R^{policy}_{i,t-36+k}} = \alpha_i^h + \beta^h \mathbb{1}\{event_{i,t} = 1\} + e_{i,t-36+h}$. $\widehat{\Delta R^{policy}}$ denote first-stage residuals. Shaded areas: 95% confidence intervals based on country-based cluster-robust standard errors.

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Relative frequency tables

Relative frequencies conditional on $panic_{i,t+1,t+12} = 0$

	$\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} \leq 0$	$\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0$
$\Delta R^{policy}_{i,t-12} < 0$	32.94	21.34
$\Delta R^{policy}_{i,t-12} > 0$	19.54	26.19

Relative frequencies conditional on $panic_{i,t+1,t+12} = 1$

	$\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} \leq 0$	$\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0$
$\Delta R^{policy}_{i,t-12} < 0$	20.44	19.89
$\Delta R^{policy}_{i,t-12} > 0$	17.13	42.54

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Financial crises

Dep. var.: Financial crises	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	9.891**		-0.320
	(4.148)		(3.271)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		0.745*	1.132*
		(0.421)	(0.632)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			37.063**
			(14.964)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	25.59		3.23
Countries	141	141	141
Observations	29434	29434	29434

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Including country×decade fixed effects

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	6.614**		1.143
	(2.804)		(3.695)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		1.629**	1.525**
		(0.714)	(0.746)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			12.647*
			(7.503)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Fixed effects	C × D	C × D	C × D
KP weak IV	45.61		23.17
Countries	41	41	41
Observations	13406	13406	13406

Back

Including year fixed effects

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	15.833***		7.524*
	(4.237)		(4.147)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		0.117	0.137
		(0.617)	(0.796)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			20.327**
			(8.792)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	Year	Year	Year
KP weak IV	41.93		17.83
Countries	41	41	41
Observations	13406	13406	13406

Back

Additionally controlling for real activity

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	17.715***		8.946***
	(5.271)		(2.987)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		2.271**	1.509
		(1.041)	(1.014)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			24.029**
			(9.579)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	138.39		24.29
Countries	39	39	39
Observations	7982	7982	7982

Notes: Monthly growth rates in real GDP from lag 0 to 12 are included as additional control variables.

Back

Additionally controlling for real act. in Taylor rule

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	5.988**		-12.939
	(2.468)		(9.576)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		2.271**	2.290*
		(1.041)	(1.185)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			49.156***
			(18.500)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	191.45		39.14
Countries	39	39	39
Observations	7739	7982	7739

Notes: Monthly growth rates in real GDP from lag 0 to 12 are additionally included in the Taylor rule.

Back

Continuous interaction term

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	15.587***		19.354***
	(5.307)		(4.673)
$\Delta_{12} \log \left(\frac{Non-core}{Demand} \right)_{i,t}$		0.020	-0.028
		(0.017)	(0.035)
$\Delta R^{policy}_{i,t-12} \times \Delta_{12} \log \left(\frac{Non-core}{Demand} \right)_{i,t}$			0.504**
			(0.240)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	53.64		12.18
Countries	41	41	41
Observations	13406	13327	13327

Back

Indicators based on real growth rates

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	17.082***		7.753
	(6.362)		(4.837)
$\mathbb{1}\{\Delta_{12} \log \textit{Real Non-core}_{i,t} > \textit{median}\}$		0.085	-0.361
		(0.881)	(0.990)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12} \log \textit{Real Non-core}_{i,t} > \textit{median}\}$			24.216**
			(10.485)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	37.31		20.34
Countries	42	42	42
Observations	13703	13703	13703

Back

Indicators based on real growth rates (ctd.)

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	15.484***		20.425***
	(5.169)		(7.805)
$\mathbb{1}\{\Delta_{12} \log \textit{Real Demand}_{i,t} > \textit{median}\}$		-2.212**	-1.193
		(0.840)	(0.908)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12} \log \textit{Real Demand}_{i,t} > \textit{median}\}$			-10.149
			(8.483)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	54.62		28.27
Countries	42	42	42
Observations	14277	14277	14277

Back

Individual non-core items

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	14.996***		6.448*
	(5.106)		(3.595)
$\mathbb{1}\{\Delta_{12}\left(\frac{Foreign}{Demand}\right)_{i,t} > 0\}$		2.116***	1.585**
		(0.633)	(0.694)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Foreign}{Demand}\right)_{i,t} > 0\}$			22.922**
			(9.618)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	55.66		23.32
Countries	41	41	41
Observations	13037	13037	13037

Back

Individual non-core items (ctd.)

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	16.720***		-2.636
	(4.250)		(4.118)
$\mathbb{1}\{\Delta_{12}\left(\frac{Interbank}{Demand}\right)_{i,t} > 0\}$		4.273***	3.960**
		(1.317)	(1.608)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Interbank}{Demand}\right)_{i,t} > 0\}$			43.553***
			(10.957)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	37.22		42.06
Countries	38	38	38
Observations	6076	6076	6076

Back

Individual non-core items (ctd.)

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	16.753***		13.859**
	(4.698)		(5.565)
$\mathbb{1}\{\Delta_{12}\left(\frac{Securities}{Demand}\right)_{i,t} > 0\}$		0.881	0.675
		(1.200)	(1.299)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Securities}{Demand}\right)_{i,t} > 0\}$			7.193
			(10.277)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	71.25		29.89
Countries	40	40	40
Observations	9904	9904	9904

Back

Individual non-core items (ctd.)

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	14.011***		4.567
	(4.804)		(5.546)
$\mathbb{1}\{\Delta_{12}\left(\frac{STSecurities}{Demand}\right)_{i,t} > 0\}$		1.940	2.085
		(1.631)	(1.791)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{STSecurities}{Demand}\right)_{i,t} > 0\}$			24.131
			(14.840)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	115.34		29.27
Countries	39	39	39
Observations	7101	7101	7101

Back

Individual non-core items (ctd.)

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	23.539***		30.134***
	(4.295)		(9.389)
$\mathbb{1}\{\Delta_{12}\left(\frac{LTSecurities}{Demand}\right)_{i,t} > 0\}$		1.253	0.221
		(1.981)	(1.977)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{LTSecurities}{Demand}\right)_{i,t} > 0\}$			-15.635
			(16.812)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	53.79		24.79
Countries	38	38	38
Observations	4616	4616	4616

Back

Individual non-core items (ctd.)

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	20.806***		8.110
	(3.951)		(6.446)
$\mathbb{1}\{\Delta_{12}\left(\frac{Derivatives}{Demand}\right)_{i,t} > 0\}$		4.657*	4.604*
		(2.377)	(2.413)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Derivatives}{Demand}\right)_{i,t} > 0\}$			28.544**
			(13.427)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	147.42		49.47
Countries	37	37	37
Observations	3997	3997	3997

Back

Individual non-core items (ctd.)

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	15.811***		14.592***
	(5.310)		(5.538)
$\mathbb{1}\{\Delta_{12}\left(\frac{\text{Other non-core}}{Demand}\right)_{i,t} > 0\}$		-0.138	-0.380
		(0.934)	(0.905)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{\text{Other non-core}}{Demand}\right)_{i,t} > 0\}$			4.838
			(9.676)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	58.10		6.15
Countries	42	42	42
Observations	13788	13788	13788

Back

Time Deposits

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	15.899***		1.820
	(5.395)		(3.109)
$\mathbb{1}\{\Delta_{12}\left(\frac{\text{Time}}{Demand}\right)_{i,t} > 0\}$		2.713***	1.511
		(0.931)	(1.171)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{\text{Time}}{Demand}\right)_{i,t} > 0\}$			34.366**
			(17.026)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	57.04		10.78
Countries	42	42	42
Observations	14017	14017	14017

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Time Deposits (ctd.)

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	15.777***		5.470*
	(5.366)		(2.928)
$\mathbb{1}\{\Delta_{12}\left(\frac{\text{Non-core+Time}}{Demand}\right)_{i,t} > 0\}$		2.369***	1.306
		(0.849)	(0.963)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{\text{Non-core+Time}}{Demand}\right)_{i,t} > 0\}$			21.654*
			(11.535)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	54.50		20.80
Countries	42	42	42
Observations	13790	13790	13790

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Panic risk over the next 24 months

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	45.115***		14.892*
	(14.544)		(7.888)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		3.276**	2.641
		(1.414)	(1.743)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			71.189***
			(22.582)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	49.59		34.80
Countries	41	41	41
Observations	12934	12934	12934

Notes: As in the main part with one modification; the dep. variable is now defined as $panic_{i,t+1,t+24}$.

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Panic risk over the next 36 months

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-12}$	47.687***		15.306*
	(15.397)		(8.895)
$\mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		4.204**	3.311
		(1.995)	(2.173)
$\Delta R^{policy}_{i,t-12} \times \mathbb{1}\{\Delta_{12}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			76.728***
			(25.070)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	49.27		37.20
Countries	41	41	41
Observations	12671	12671	12671

Notes: As in the main part with one modification; the dep. variable is now defined as $panic_{i,t+1,t+36}$.

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Non-core growth over a 2-year horizon

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-24}$	32.181**		4.579
	(13.940)		(6.543)
$\mathbb{1}\{\Delta_{24}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		2.190**	1.420
		(1.040)	(0.936)
$\Delta R^{policy}_{i,t-24} \times \mathbb{1}\{\Delta_{24}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			62.003***
			(16.840)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	31.48		9.80
Countries	41	41	41
Observations	11769	11769	11769

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Non-core growth over a 3-year horizon

Dep. var.: Banking panics	(1)	(2)	(3)
$\Delta R^{policy}_{i,t-36}$	13.364***		1.166
	(3.416)		(2.658)
$\mathbb{1}\{\Delta_{36}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$		2.880***	2.569**
		(1.029)	(1.063)
$\Delta R^{policy}_{i,t-36} \times \mathbb{1}\{\Delta_{36}\left(\frac{Non-core}{Demand}\right)_{i,t} > 0\}$			33.595**
			(13.531)
Estimation	2SLS	OLS	2SLS
Controls	✓	✓	✓
Country FEs	✓	✓	✓
Time FEs	✗	✗	✗
KP weak IV	14.61		7.92
Countries	41	41	41
Observations	10340	10340	10340

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