

Sovereign exposures in the Portuguese banking system: determinants and dynamics

[Preliminary and incomplete; Please do not cite]

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**All views expressed throughout this presentation
are our own – not those of our employer or the
Eurosystem**

Presents an original dataset that allows for an exhaustive identification of the exposure of banks operating in Portugal to the respective sovereign.

- **Documents the evolution of those exposures.**
- **Identifies their key determinants**

1. Motivation

2. Data

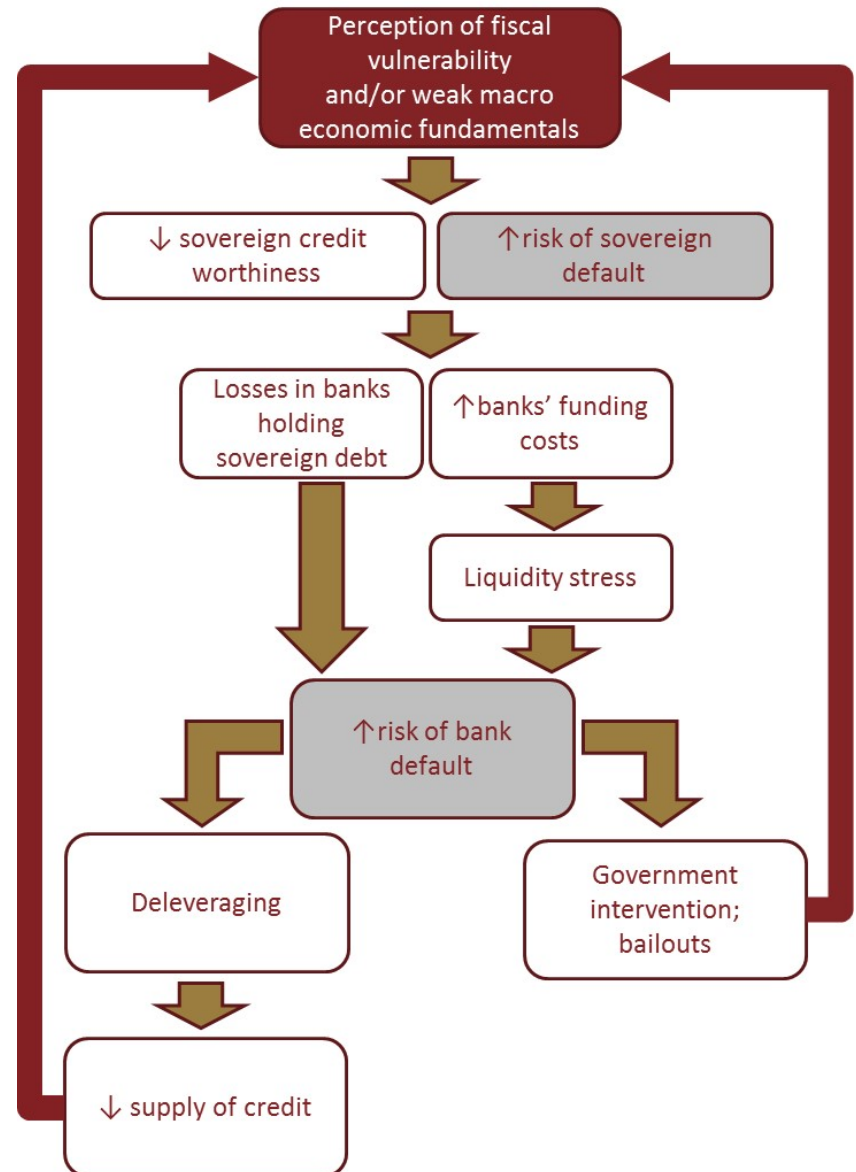
3. Empirical strategy

4. Findings: what drives banks' sovereign exposures in Portugal?

- General government (bonds)
- SOEs (bonds and loans)

5. Concluding remarks

The bank-sovereign nexus



Existing literature

Theoretical

Uhlig (2014), Gennaioli *et al.* (2014), Ari (2016), Farhi and Tirole (2017)

Empirical

Battistini *et al.* (2013), Ivashina (2014), Erce (2015), Horváth *et al.* (2015), Popov and van Horen (2015), Altavilla *et al.* (2016), Ongena *et al.* (2016) , De Marco and Macchiavelli (2016) , Acharya *et al.* (2016) , Crosignani *et al.* (2016)

Key findings:

- The adverse loop between banks and sovereigns is particularly strong in high-debt, fiscally distressed, periphery countries.
- Home bias in banks' public debt holdings is a key determinant of the loop
 - Evidence of moral suasion mechanisms
 - Undercapitalized banks have incentives to *gamble for resurrection*.
 - Liquidity incentives

Portugal: (short) recent facts sheet

2009

- Real GDP contraction; high unemployment; fiscal deterioration
- A series of successive sovereign debt downgrades begins

2010

- Sovereign debt market tensions and downgrades intensify
- Portuguese banks become increasingly reliant on ECB funding

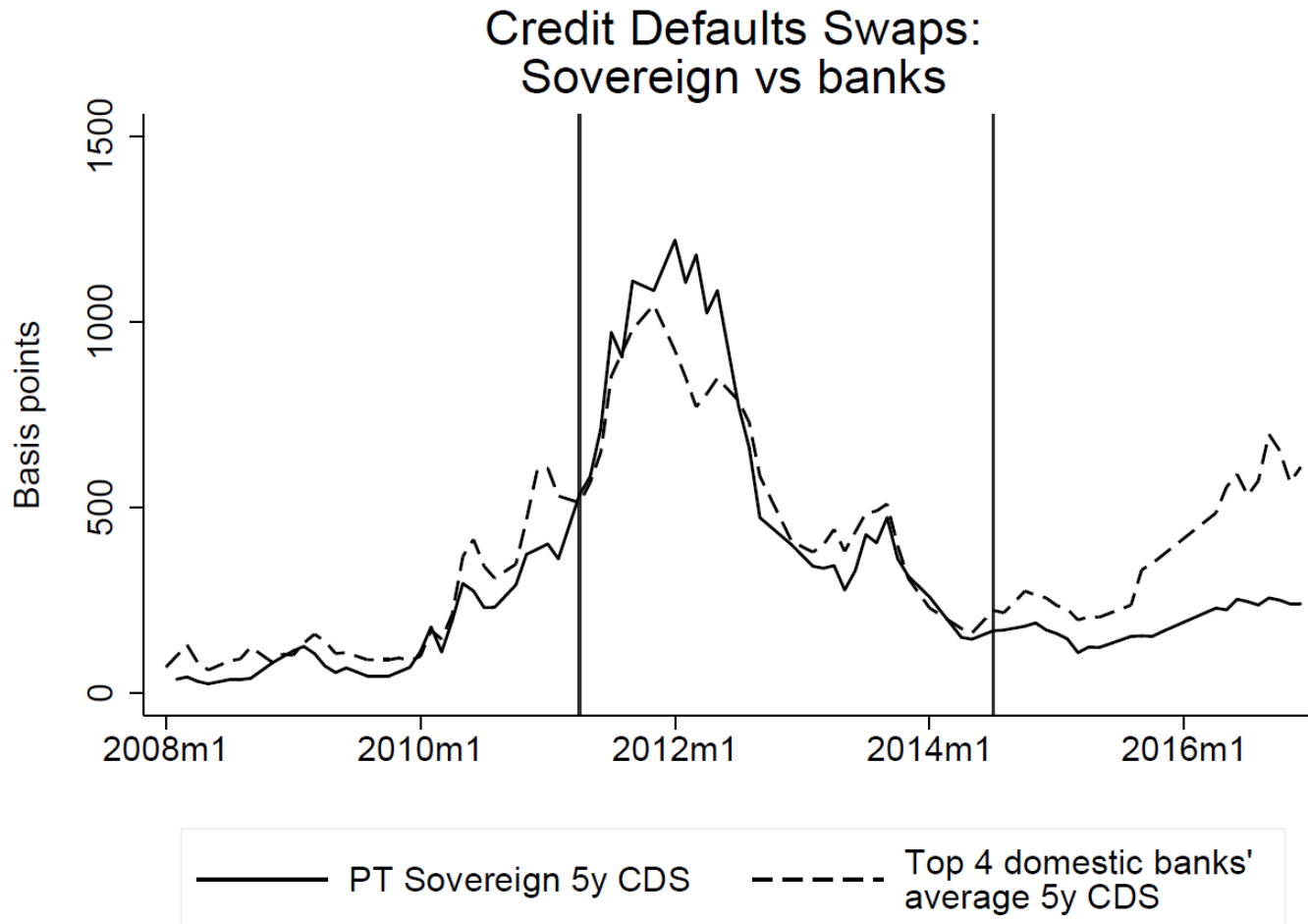
2011

- Portugal agrees on an economic and financial assistance programme
- External funding for SOEs steeply declines

2014

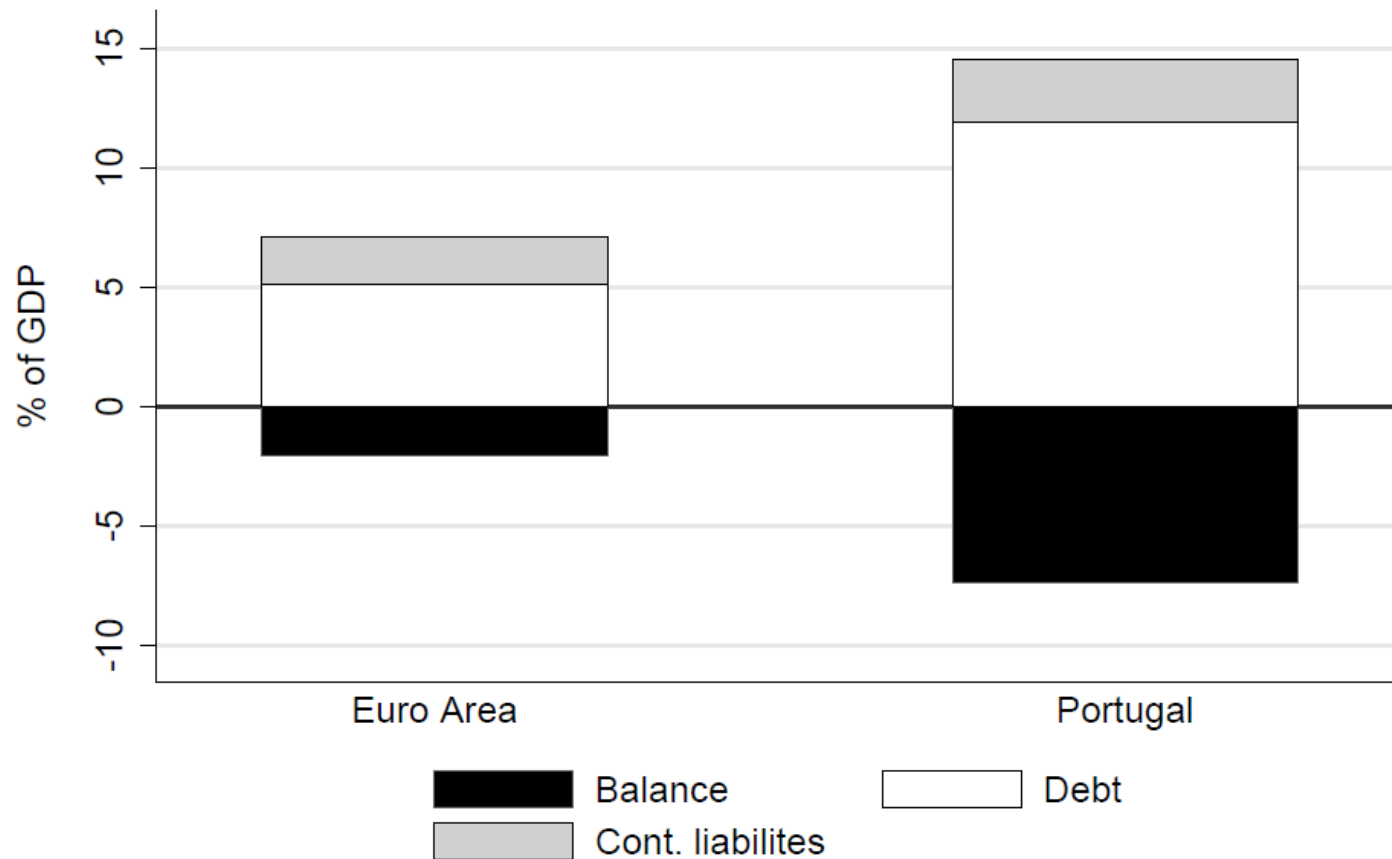
- Portugal exits the Programme and regains market access

Is there evidence of the *doom loop* in Portugal?

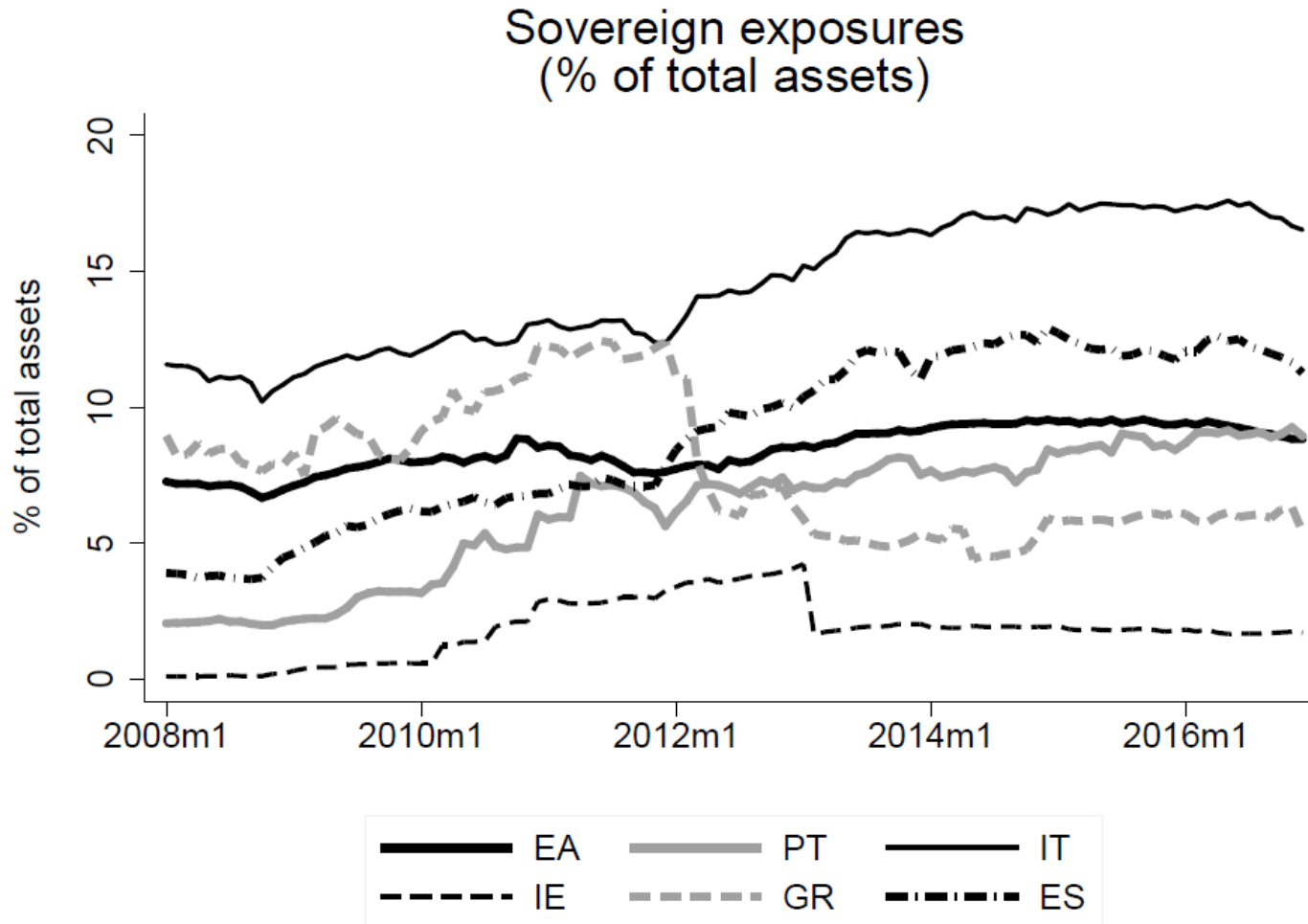


Is there evidence of the *doom loop* in Portugal?

Cumulative impact of government support to the banking sector: 2008-2016



Is there evidence of the *doom loop* in Portugal?

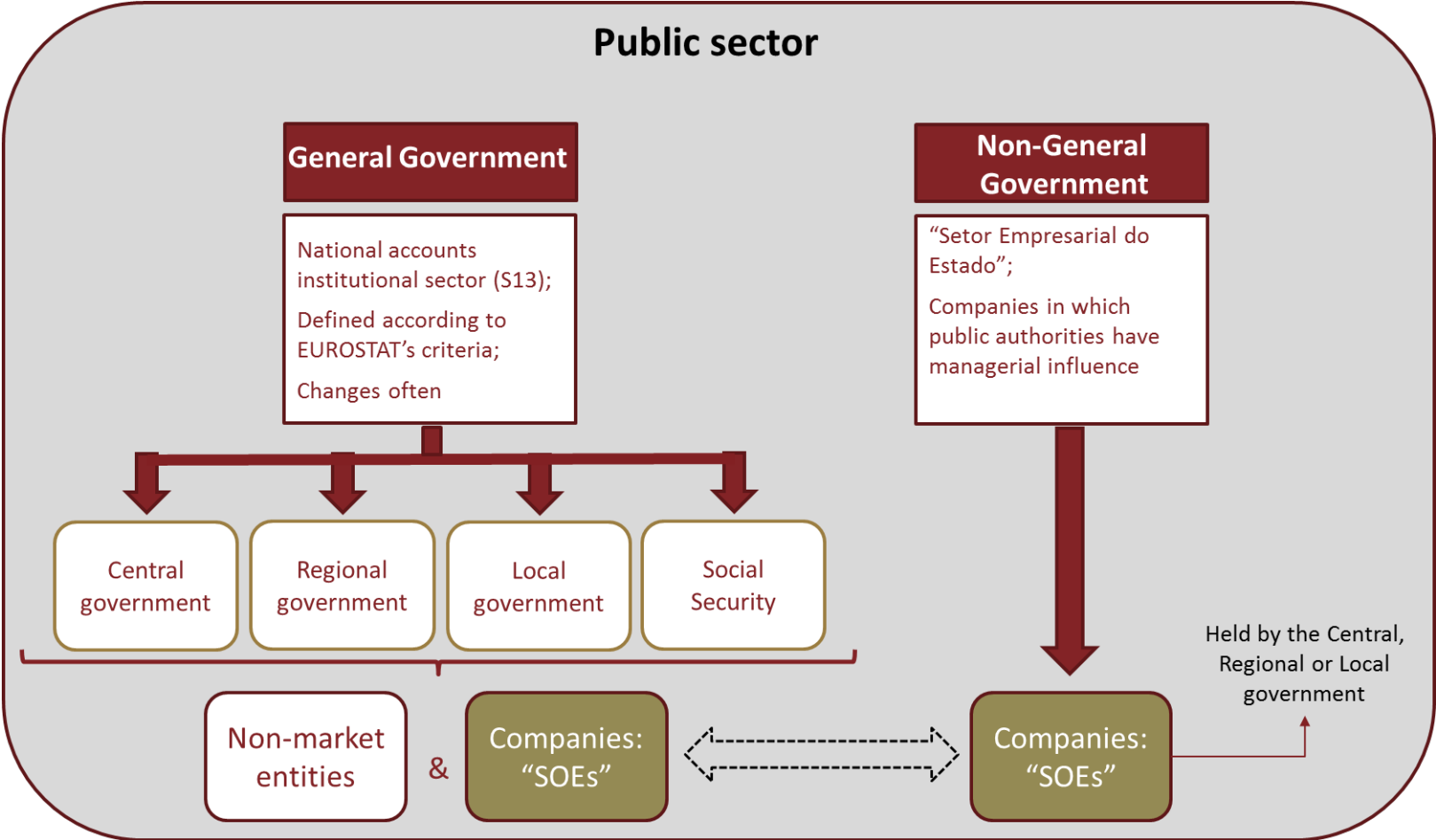


Our dataset

- Assembled using several Banco de Portugal data sources: CRC (for loans), SSIS (for securities), MFS (banks' balance sheet) and prudential data (solvency and liquidity).
- All data on individual basis.
- Covers 2005-2016.
- Monthly frequency (as of 2008).
- **Full coverage of banking sector:**
 - ✓ 191 MFIs, of which 44 banks or savings banks, 111 mutual agricultural credit banks, 27 branches of non-domestic institutions and 9 money market funds.
 - ✓ Public vs private ownership, domestic vs foreign, size, group members, subsidiaries, branches.
- **Full coverage of the public sector**

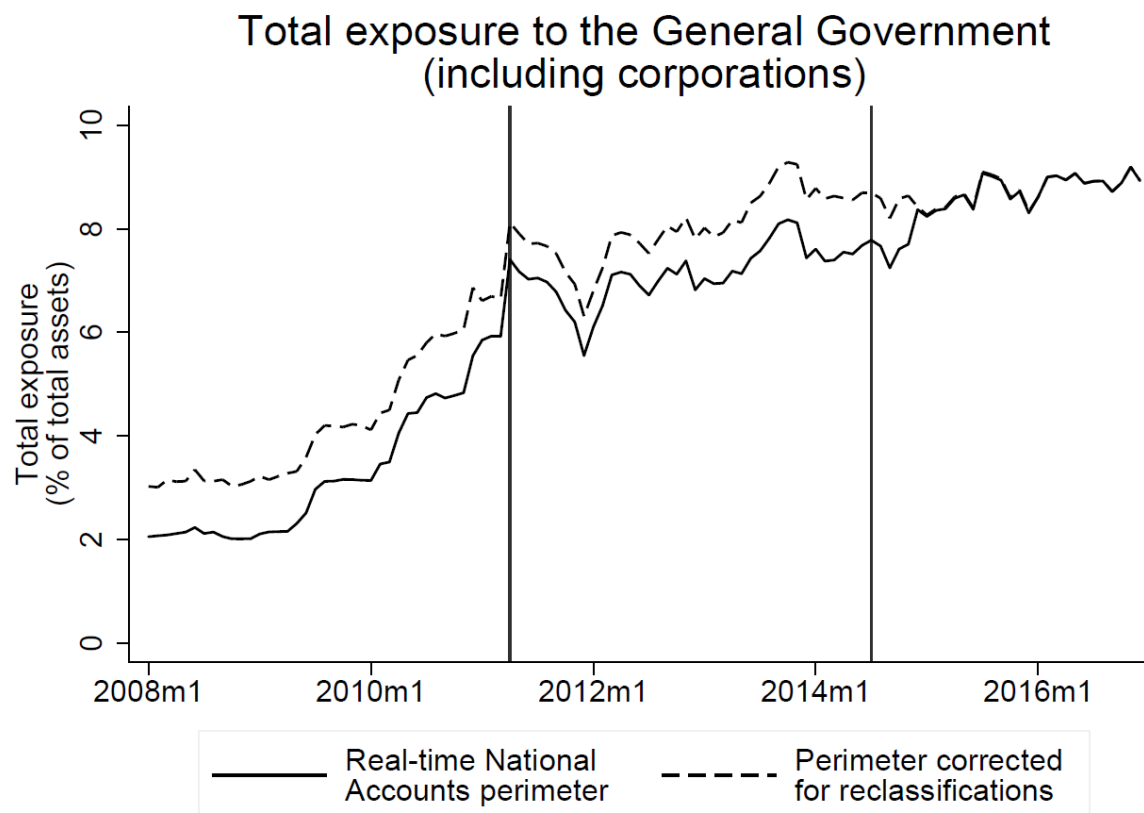
Our dataset

The Portuguese public sector: overview



Our dataset

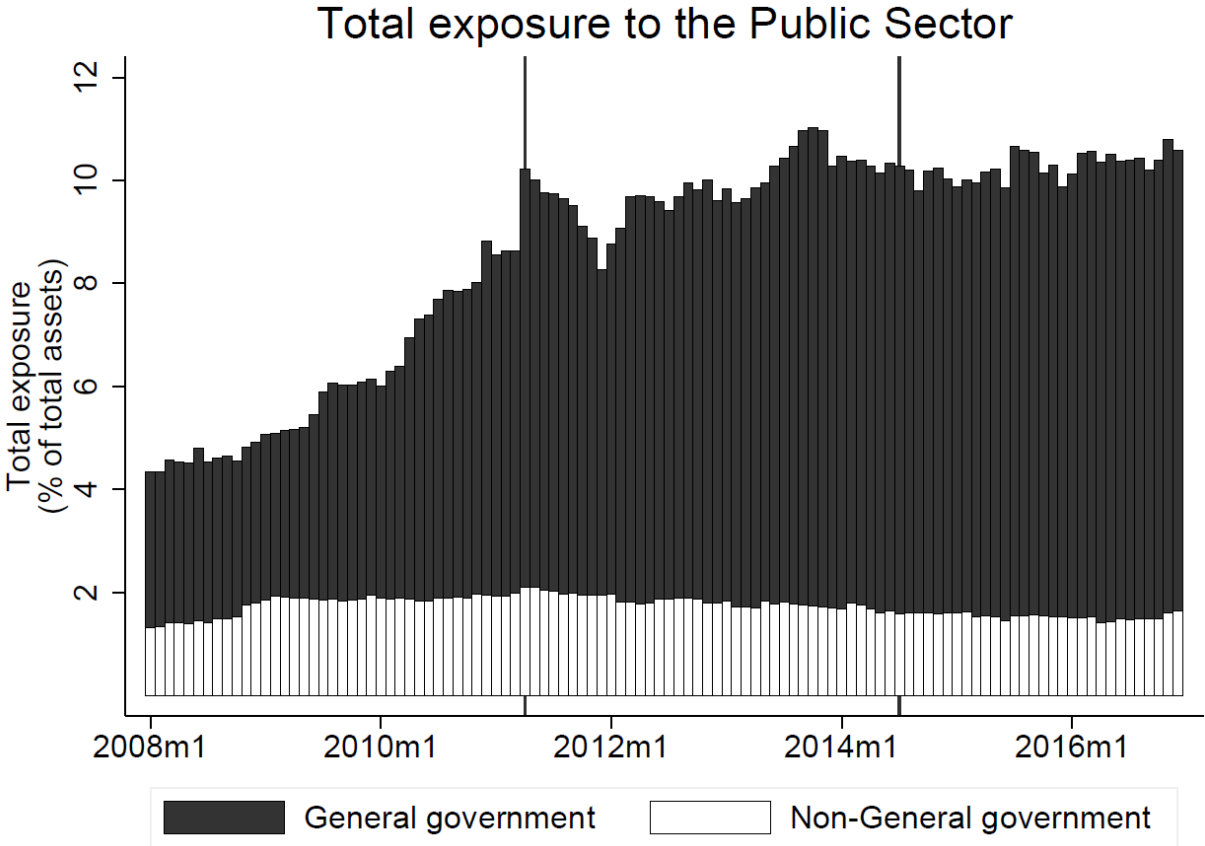
The Portuguese public sector: baseline option is an universe of entities corrected for reclassifications



Note: Exposure computed as the sum of every institution's stock of public sector debt (both loans and securities) as a ratio to the sum of assets in all institutions' balance sheets.

Insights from the data

Strong growth of banks' exposure before the Programme...

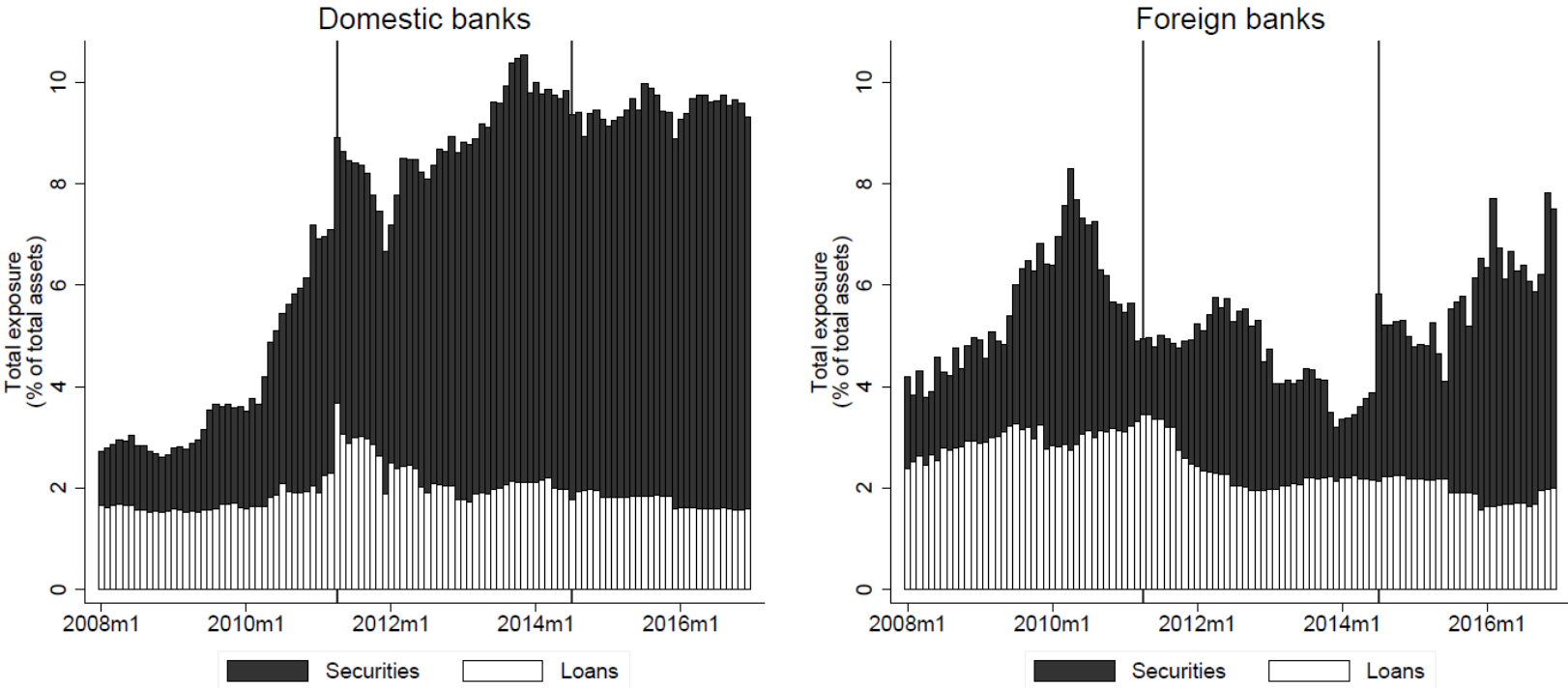


Note: Exposure computed as the sum of every institution's stock of public sector debt (both loans and securities) as a ratio to the sum of assets in all institutions' balance sheets.

Insights from the data

... largely driven by domestic banks and mostly referring to general government entities. Foreign banks reacted faster, adjusting exposures more often.

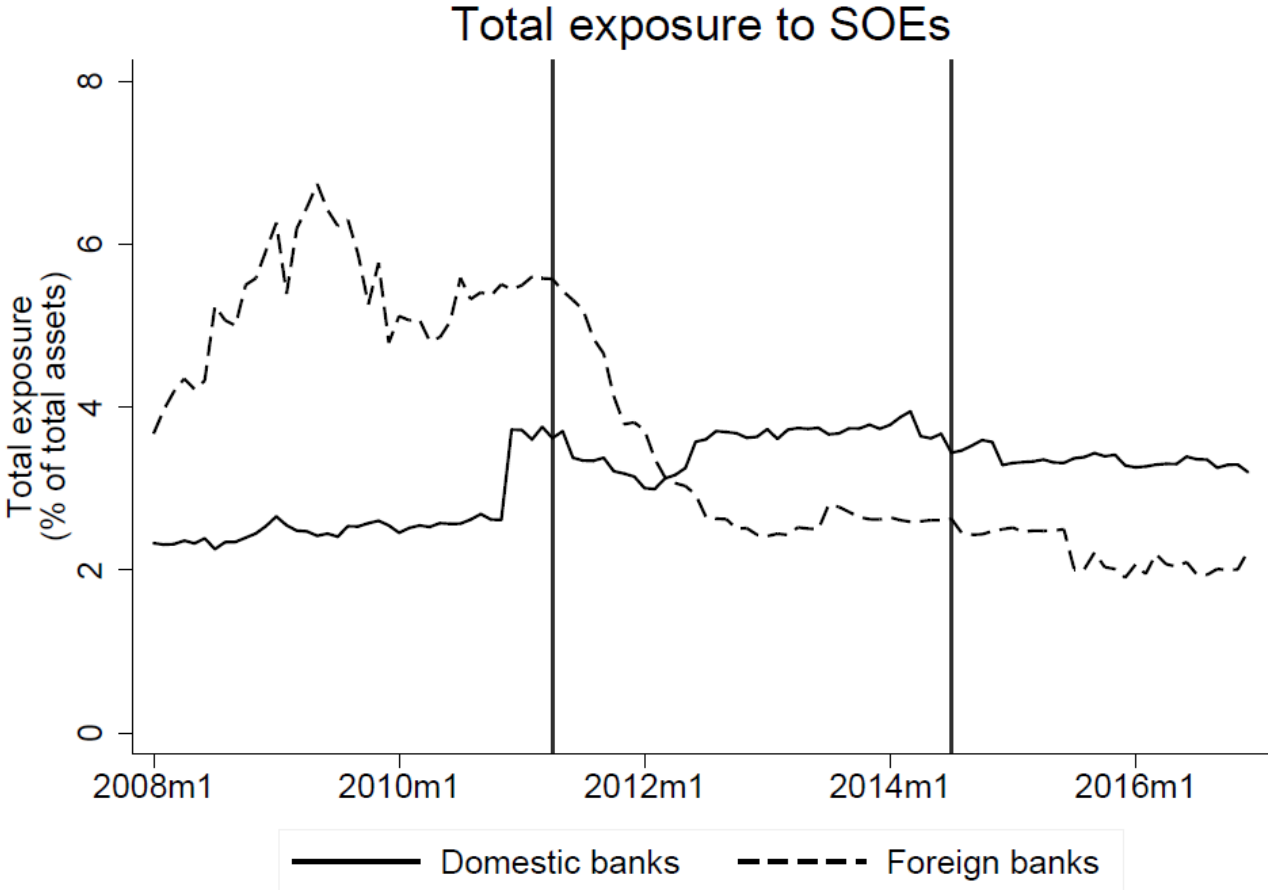
Total exposure to the general government by debt instrument



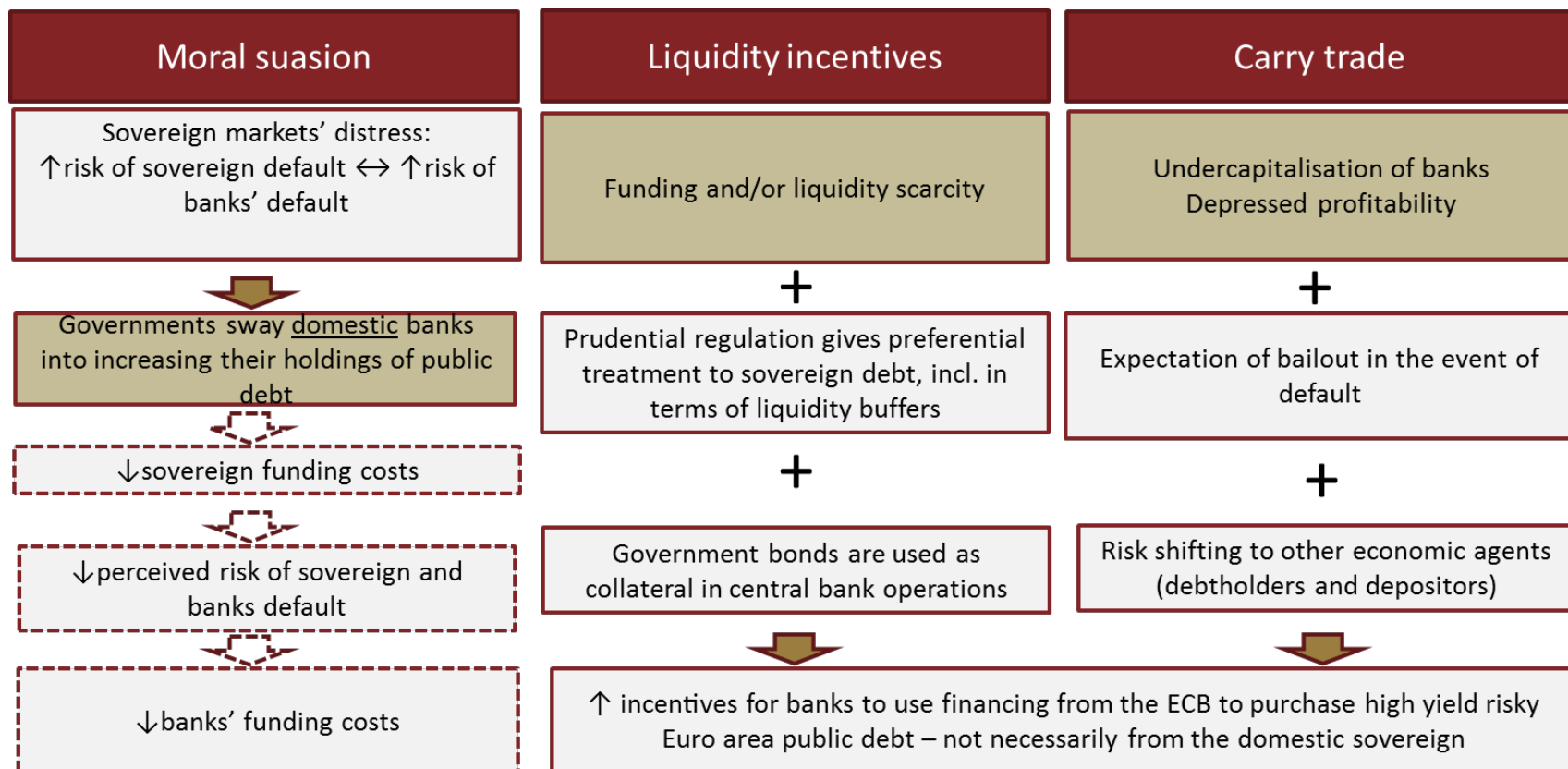
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Insights from the data

Exposure of foreign banks to SOEs (in and out of GG) significantly dropped since 2011



Key channels



Different mechanisms for **gen. government securities** (mostly Treasury bonds) and **SOEs** (within gen. government or not) → moral suasion likely to hold in both cases; carry trade and liquidity more relevant for the former.

The **dependent variable** is the monthly relative change in the debt (securities and/or loans) holdings of bank i in month t (trimmed at $[-1, 1]$)

$$\frac{flow_{it}}{stock_{it-1}} \leftarrow \rightarrow \neq \Delta stock_{it}$$

All estimates based on OLS regressions, **with bank and time fixed-effects** and standard-errors clustered at the bank level.

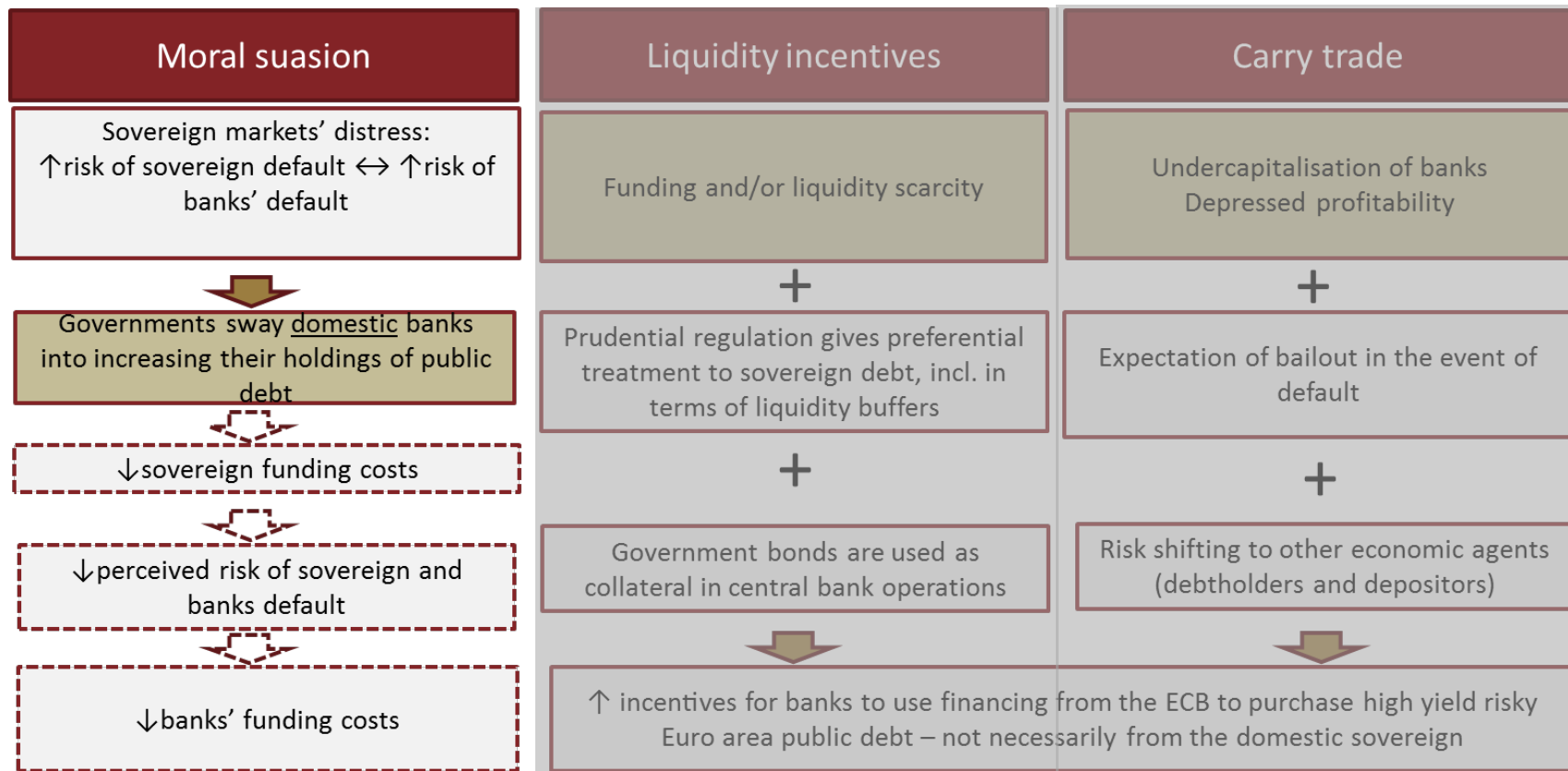
All regressions include bank-specific balance sheet controls: $\log(\text{assets})$; capital/assets; loans/deposits; deposits/assets.

Sample corrected for reclassifications over **2008-2016**.

Exposures to State-owned banks are excluded.

Baseline estimates obtained for medium and large banks (except for sensitivity analysis)

Findings : Moral suasion



$$\begin{aligned}
 \frac{flow_{it}}{stock_{it-1}} &= \\
 &= \beta_0 + \beta_1 domestic_{it} \times FundingNeed_t \times \Delta yield_t + \beta_2 domestic_{it} \times FundingNeed_t \\
 &+ \beta_3 domestic_{it} \times \Delta yield_t + \mathbf{X}_{it-3}^T \theta + \gamma_i + \delta_t + \varepsilon_{it}
 \end{aligned}$$

Findings : Moral suasion – General government bonds

Evidence of moral suasion: domestic banks' exposure increases in difficult months...

	(1)	(2)	(3)	(4)	(5)	(6)
Dom. × Non-Programme × Δ yield	0.12** (2.20)					
Dom. × High need × Δ yield		0.18*** (2.94)		0.17** (2.73)		
Dom. × High need × Δ yield > 0						0.19** (2.11)
Dom. × High need × Δ yield < 0						0.07 (0.53)
Dom. × Very high need × Δ yield			0.20*** (3.42)			
Dom. × Non-Programme	-0.02 (-1.01)					
Dom. × High need		-0.03 (-1.24)		-0.03 (-1.03)		-0.03 (-1.26)
Dom. × Very high need			-0.01 (-0.68)			
Dom. × Δ yield	-0.02 (-1.30)	-0.03 (-1.71)	-0.03* (-1.75)	-0.03 (-1.42)		
Dom. × Δ yield > 0						0.01 (0.20)
Dom. × Δ yield < 0						-0.06*** (-2.81)
Pub.intervention × High need × Δ yield					-0.01 (-0.15)	
Pub.intervention					-0.05*** (-3.03)	

Findings : Moral suasion – General government bonds

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Findings : Moral suasion – General government bonds

... which is not driven by public or publicly supported banks

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Findings : Moral suasion – SOEs (bonds and loans)

Domestic banks also increase funding to SOEs in difficult months...

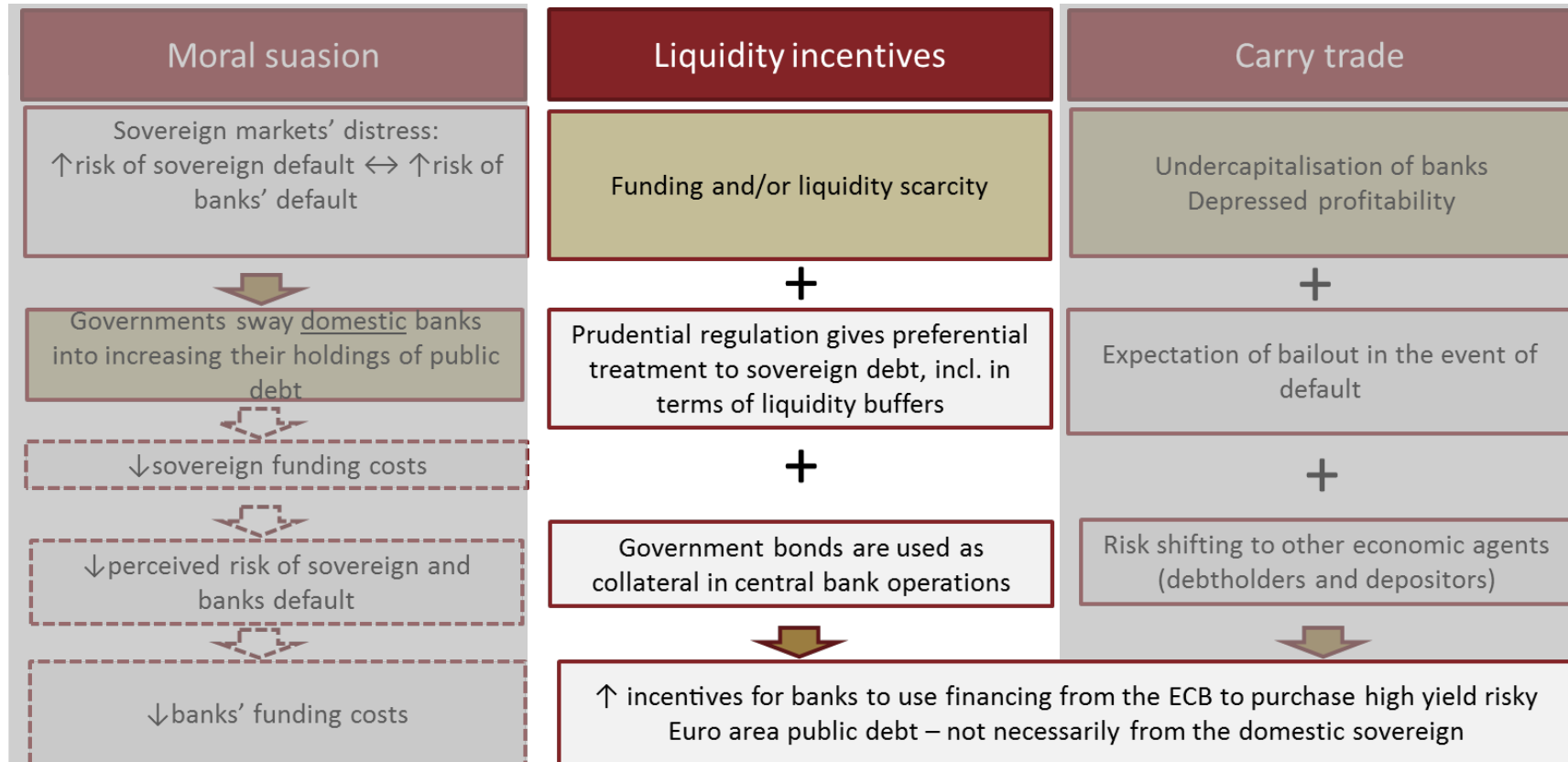
	(1)	(2)	(3)	(4)
Domestic × Programme	0.04* (1.88)			
Dom. × Fall in external funding		0.04** (2.72)	0.05*** (3.51)	
Pub.intervention × Fall in external funding				-0.03** (-2.70)
Pub.intervention				-0.02 (-1.23)
Observations	1819	1819	1255	1116
N. banks	24	24	22	14
Fixed effects	YES	YES	YES	YES
Excludes public or supported banks	NO	NO	YES	NO
Excludes foreign banks	NO	NO	NO	YES
Balance sheet controls	YES	YES	YES	YES

Findings : Moral suasion – SOEs (bonds and loans)

... and also in this case, public intervention is not a driving force

	(1)	(2)	(3)	(4)
Domestic × Programme	0.04* (1.88)			
Dom. × Fall in external funding		0.04** (2.72)	0.05*** (3.51)	
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N. banks	24	24	22	14
Fixed effects	YES	YES	YES	YES
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Excludes foreign banks	NO	NO	NO	YES
Balance sheet controls	YES	YES	YES	YES

Findings : Liquidity incentives



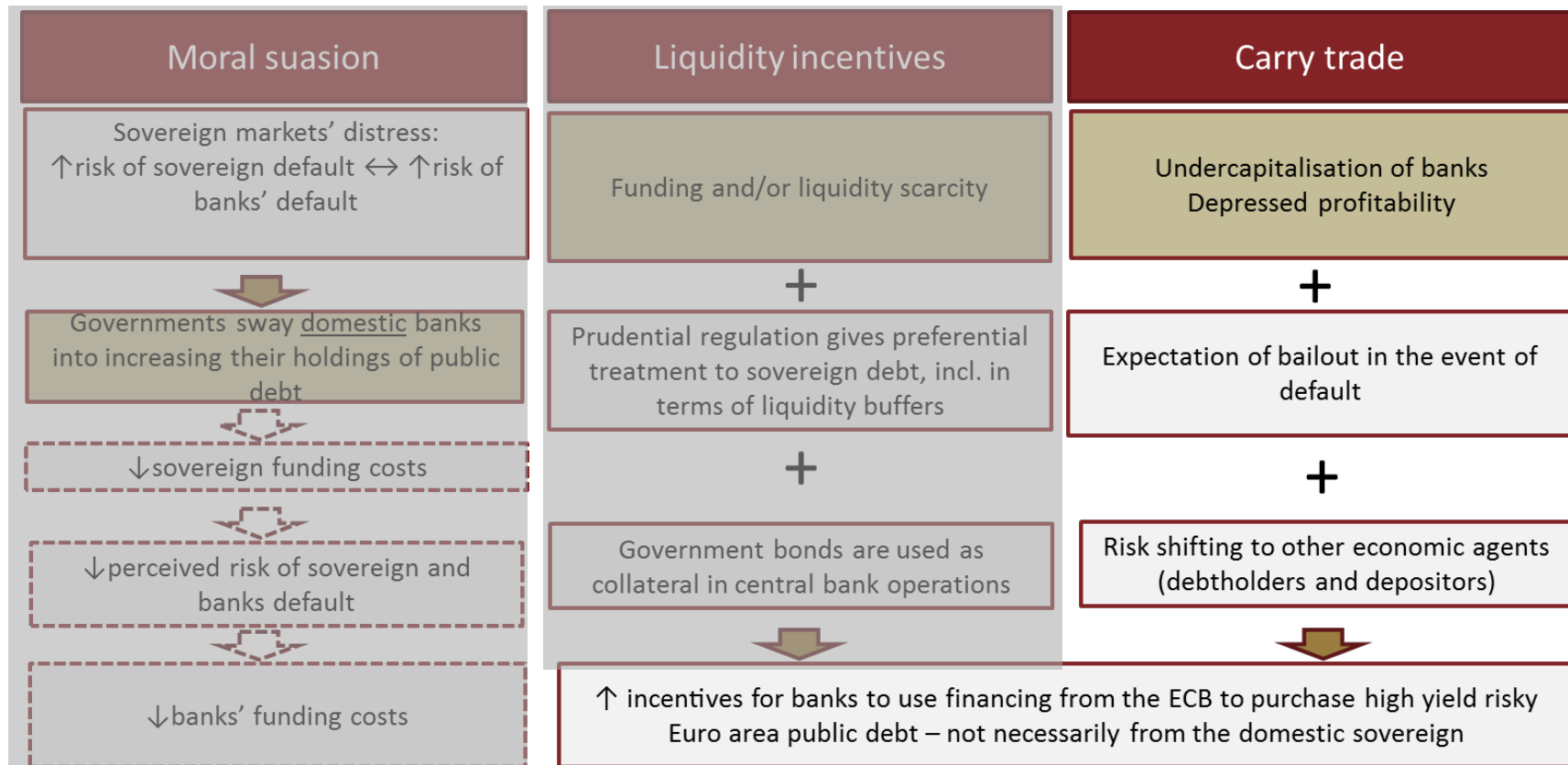
$$\begin{aligned}
 \frac{flow_{it}}{stock_{it-1}} &= \\
 &= \beta_0 + \beta_1 excess\ liquidity_{it} + \beta_2 excess\ liquidity_{it} \\
 &\times Tier1Ratio_{it-1} + \beta_3 excess\ liquidity_{it} \times \Delta yield_t + X_{it-3}^T \theta + \gamma_i + \delta_t + \varepsilon_{it}
 \end{aligned}$$

Findings : Liquidity channel – General government bonds

Periods of improving liquidity position coincide with increases in banks' holdings of public debt securities...

	(1)	(2)	(3)	(4)
ExcLiq.1_AL	-1.4430* (-2.07)			
ExcLiq.1_AL × Tier1 Ratio	13.5431* (2.10)			
ExcLiq.1_AL × Δ yield	-1.1307 (-0.77)			
ExcLiq.1_rate		-0.0040*** (-2.94)		
ExcLiq.1_rate × Tier1 Ratio		0.0430*** (3.80)		
ExcLiq.1_rate × Δ yield		0.0019 (0.41)		
ExcLiq.2_rate			-0.0027* (-1.86)	
ExcLiq.2_rate × Tier1 Ratio			0.0270 (1.58)	
ExcLiq.2_rate × Δ yield			0.0043* (2.05)	
L.Liq_gap3M				0.0006** (2.31)
L.Liq_gap3M × Tier1 Ratio				-0.0019*** (-3.43)
L.Liq_gap3M × Δ yield				0.0001 (0.15)

Findings : Carry trade



$$\frac{flow_{it}}{stock_{it-1}} = \beta_0 + \beta_1 Tier1 Ratio_{it-1} + \beta_2 Tier1 Ratio_{it-1} \times \Delta yield_t + \beta_3 Tier1 Ratio_{it-1} \times VLTRO_t + \mathbf{X}_{it-3}^T \theta + \gamma_i + \delta_t + \varepsilon_{it}$$

Findings : Carry trade channel – General government bonds

No evidence of carry-trade motivations:

Higher Tier 1 ratio banks seem to invest more in public debt securities, but the coefficient is not significant

Tier1 Ratio	0.1128 (1.70)	
Tier1 Ratio \times Δ yield	-0.1156 (-0.30)	
VLTRO=1 \times Tier1 Ratio	0.0098 (0.28)	
Median Tier1 Ratio		-0.0124 (-1.23)
Median Tier1 Ratio \times Δ yield		-0.0431 (-0.28)
VLTRO=1 \times Median Tier1 Ratio		-0.0143 (-0.87)

Findings : Carry trade channel – General government bonds

No evidence of carry-trade motivations:
Periods of higher yields or VLTRO are not statistically significant

Tier1 Ratio	0.1128 (1.70)
Tier1 Ratio \times Δ yield	-0.1156 (-0.30)
VLTRO=1 \times Tier1 Ratio	0.0098 (0.28)
Median Tier1 Ratio	-0.0124 (-1.23)
Median Tier1 Ratio \times Δ yield	-0.0431 (-0.28)
VLTRO=1 \times Median Tier1 Ratio	-0.0143 (-0.87)

Evidence of home bias and *doom loop effects* between banks and the Sovereign in Portugal

- Banks played a key role in supporting public entities throughout the most stressful periods of the crisis.
- Moral suasion appears as the leading channel. The role of liquidity incentives seems weaker and the assumption of carry trade practices by banks does not hold.

Ten years after the crisis erupted, the *loop* is still a source of concern

- Legacy of high public debt, NPLs and banks' exposure to the sovereign remain well above pre-crisis levels.
- In spite of improvements in the institutional framework and in banks' resilience, the *loop* is yet to be broken.
- The ability to improve risk-sharing and effectively break the *loop* crucially depends on the success of ongoing discussions on the future of EMU.

Thank you!