

# The Effect of Central Bank Liquidity Injections on Bank Credit Supply

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# Central Bank Liquidity Provision During Crises

Central banks providing extraordinary liquidity during crises

- Fed (TAF), ECB (LTRO), BoE (FLS)
- Goal: restore bank credit supply following a negative shock

## Theory

- Banks are fragile because of liquidity transformation
- Banks hit by a negative shock reduce credit supply
- Central bank liquidity provision restores bank credit supply

Empirical evaluation is difficult

- Recent episodes
- Data limitation
- Even with data, not obvious how to use

# This Paper

Analyze the effectiveness of central bank liquidity injections

- ECB December 2011 liquidity provision
- Official goal of “supporting bank lending”

The intervention

- The 3-Year Long Term Refinancing Operation
- Provision of collateralized loans to banks
- Largest liquidity provision in history (€1 trillion)

Effect on Italian bank credit supply

- Banks hit by a dry-up before the intervention
- Regulatory intervention to identify the transmission channel
- Combine loan credit registry and bank holdings of securities

# Contribution

Central bank liquidity is effective in restoring bank credit supply following a wholesale funding dry-up

- Banks hit by the dry-up :
  - reduce credit supply during the dry-up
  - restore credit supply after the intervention
- Firms benefit from the intervention

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2) Central bank liquidity encourages reaching-for-yield

- Banks not hit by the dry-up use central bank liquidity to buy high-yield securities

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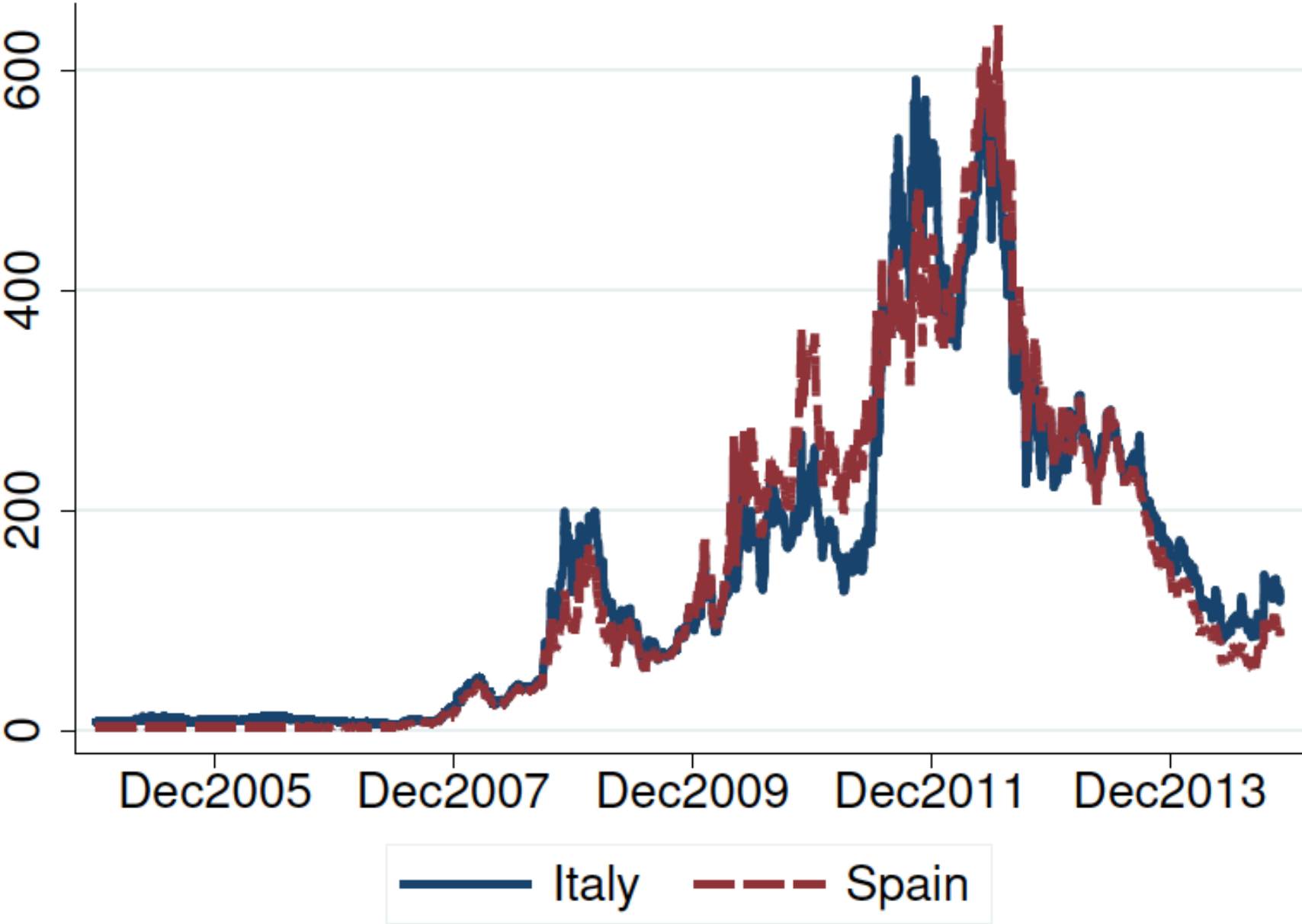
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**What's new? Transmission varies in the cross-section**

# Empirical Setting and Data



# Sovereign CDS Spreads (bps)



# The ECB 3-Year LTRO

## 3-Year Long Term Refinancing Operation (LTRO)

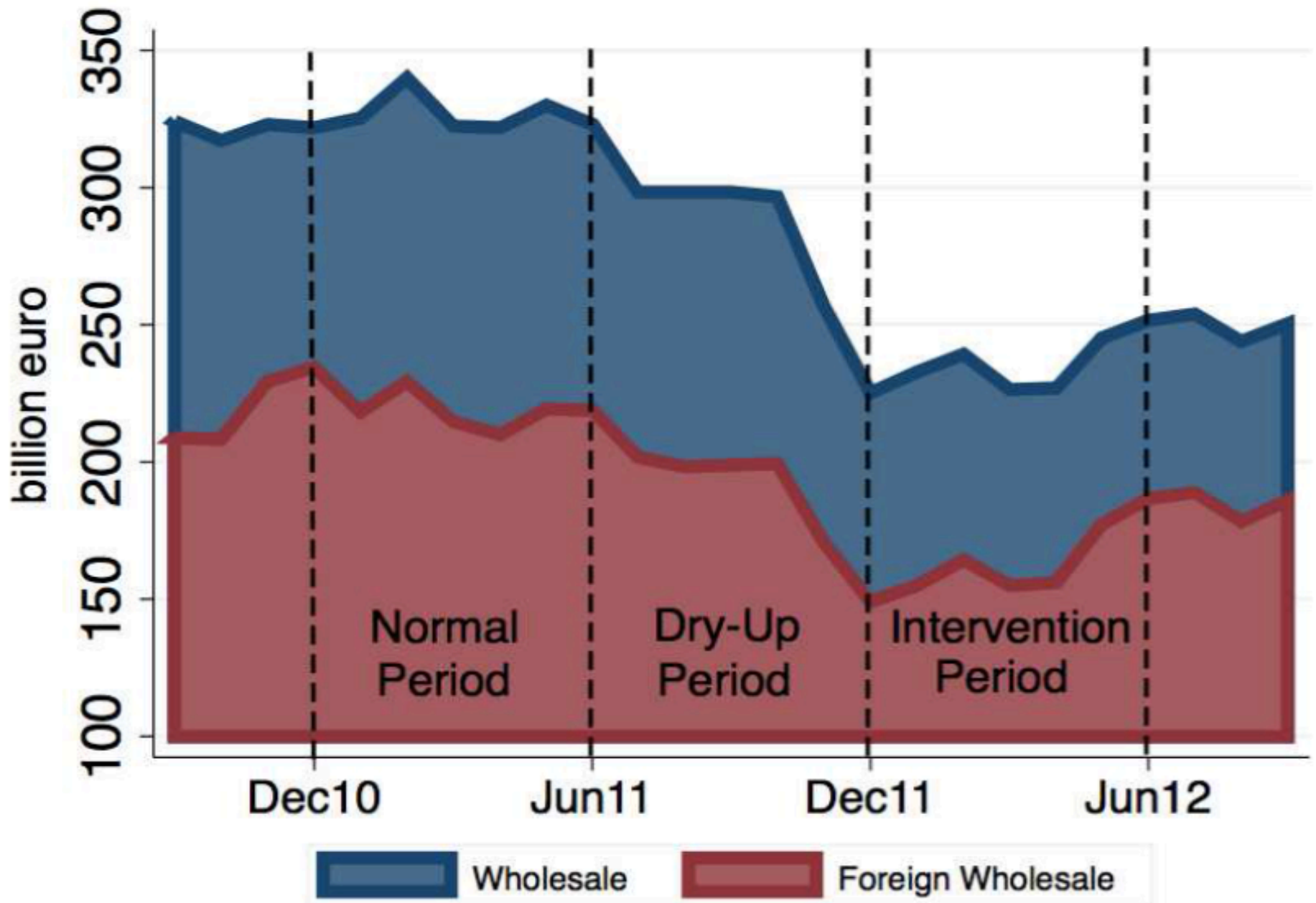
- Largest LOLR intervention in history
- Turning point of the crisis
- Italian and Spanish banks largest users (2/3 total uptake)

## Simple design

- 3-year maturity collateralized cash loans
- Banks can choose how much to obtain in two allotments
- Need to pledge collateral (government bonds, ABS,...)

Our laboratory: Italian economy

# Italian Banks Suffer a Dry-Up



# Data on the Entire Intermediation Chain

## Central Bank to Banks

- Bank-level borrowing at ECB
- Bank-level borrowing at the 3-Year LTRO

## Banks

- Standard balance-sheet characteristics
- Detailed composition of funding
- Security-level holdings (incl. collateral)

## Bank to Firms

- All outstanding loans €30,000 (credit registry)
- Term loans, credit lines, trade credit

## Firms

- Profitability and balance sheet characteristics
- Large subset (55%) of firms

# Empirical Strategy

## Two Empirical Challenges

- 1) Borrowers are not randomly assigned to banks
  - Stock of credit is an *equilibrium quantity* (demand, supply)
  
- 2) Negative funding shock is *non-random* and banks *choose* how much to borrow from the central bank

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Solution 1: Reliance on the foreign wholesale market to capture the exposure to the dry-up (Iyer et al. (2014))

Solution 2: Regulatory experiment to capture the exposure to the intervention

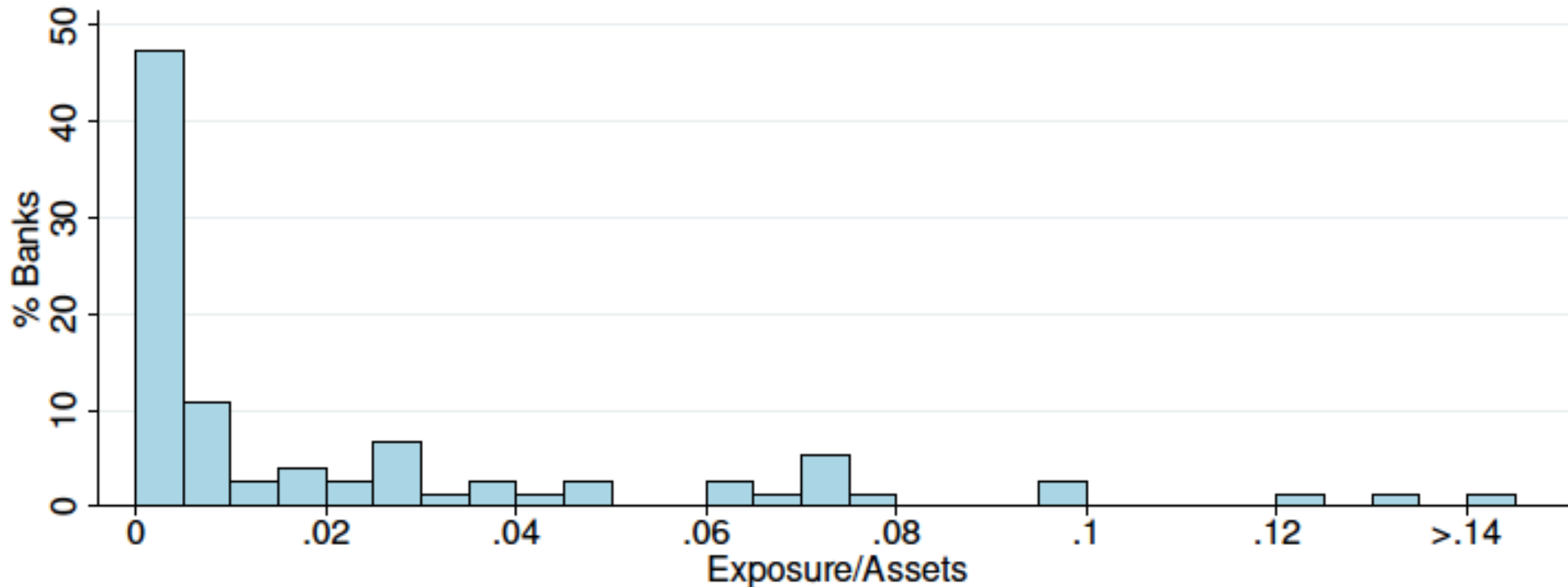


## Exposure to the Dry-Up

$$Exposure_j = \frac{ForeignWholesale_{j,Jun11}}{Assets_{j,Jun11}}$$

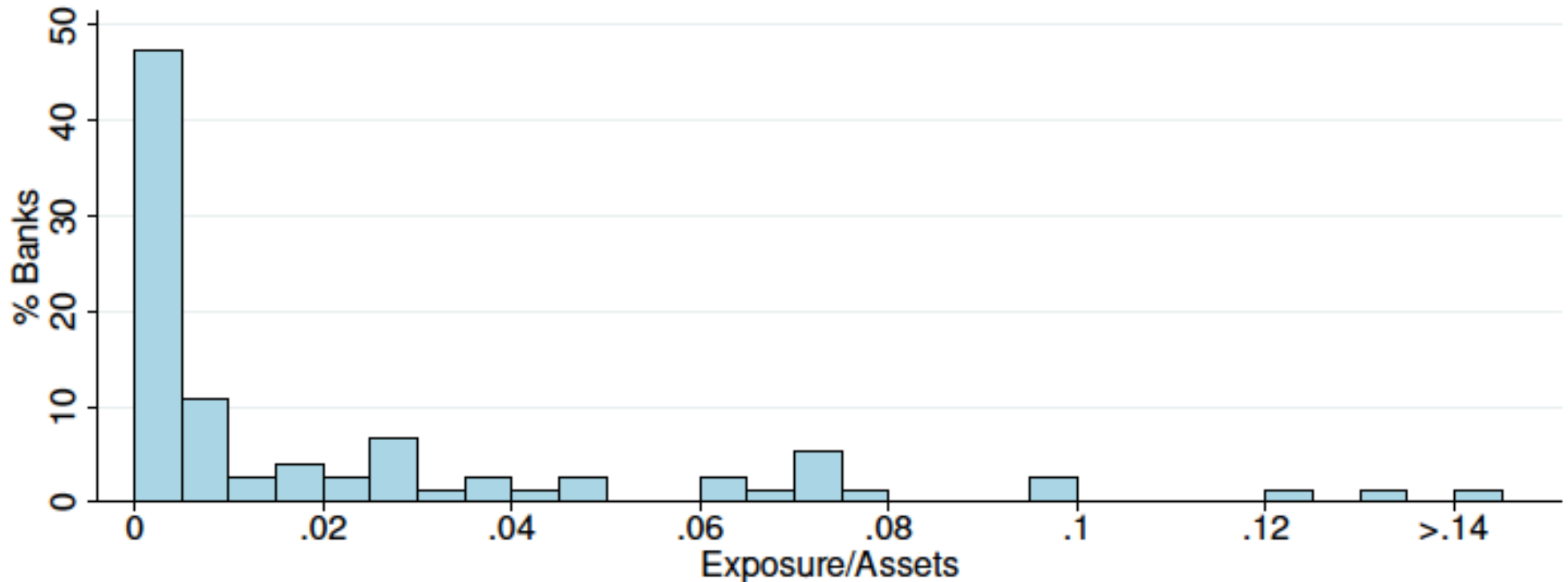
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**75% of loans belong to banks with exposure > 5%**

## Summary Statistics and Bank Exposure

	Unit	Exposed	Non-Exposed
Total Assets	billion €	11.0	1.3
Leverage	Units	13.2	10.8
Tier 1 Ratio	Units	9.1	11.4
Risk-Weighted Assets	% Assets	71.2	68.0
Nonperforming Loans	% Loans	8.6	8.7
Private Credit	% Assets	68.9	70.1
Securities	% Assets	14.2	14.0
Cash Reserves	% Assets	0.4	0.5
ROA	Profits/ Assets	0.2	0.1
Central Bank Borrowing	% Assets	1.8	0.0
Household Deposits	% Assets	24.7	34.9
Wholesale Funding	% Assets	12.2	1.6
Bond Financing	% Assets	22.8	20.2

## Exposed Banks Are Large and Highly Levered

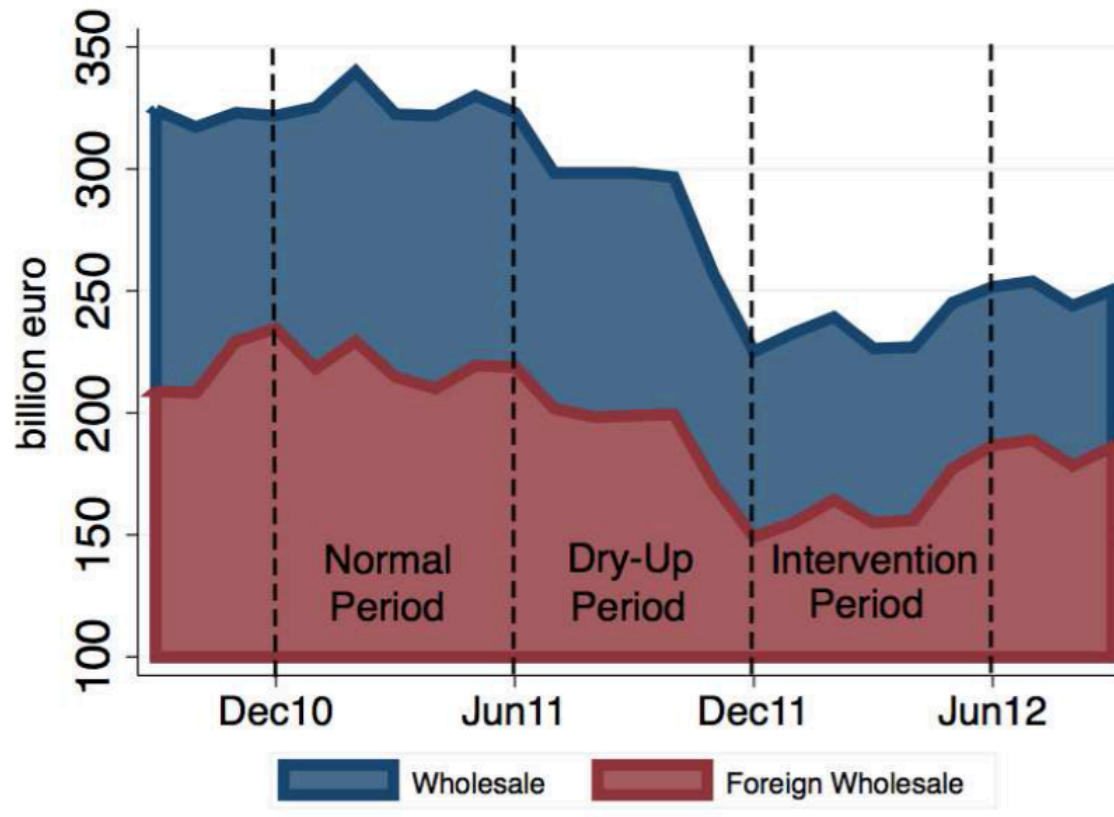
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→ Need to control for bank characteristics

# Three Time Periods, Two Comparisons



We identify three periods from the evolution of bank funding and *compare* bank credit supply between

- the *normal* and the *dry-up* period
- the *dry-up* and the *intervention* period

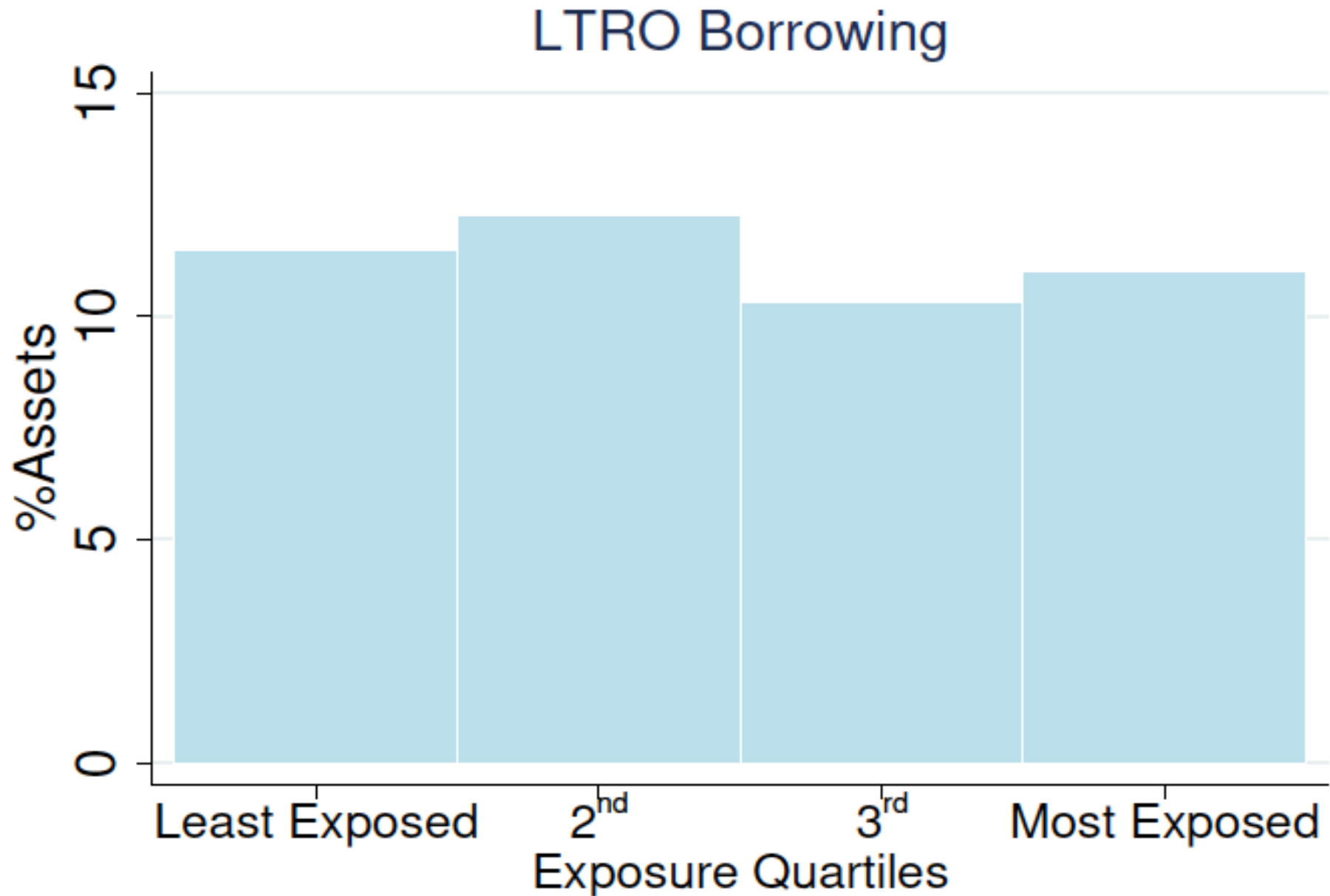
# Bank Credit Supply: Contraction and Restoration





# Transmission Channel

# Banks Borrow $\approx 10\%$ Total Assets at the LTRO



# Reconciling Our Findings

Need to reconcile two findings:

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Exploit regulatory intervention by the Italian government

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- Dec11: Govt offers a guarantee on securities for a fee
- Banks can “manufacture” collateral

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Large use of the government program

- 28 banks create €102.8 billion collateral
- Govt-guaranteed collateral backs 57% of total ECB loans
- Exposed banks are the largest users (1Q 68% Vs. 4Q 17%)

# 1) Transmission to Bank Private Credit

$$\Delta \text{CreditGranted}_{ijt} = \alpha + \beta \text{Uptake}_j \times \mathbb{I}_{LTRO} + \mu_{it} + \gamma_{ij} + \phi' X_{jt} + \epsilon_{ijt}$$

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<i>Uptake<sup>GovtGuarantee</sup></i> × $\mathbb{I}_{LTRO}$		0.249** (0.122)	
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Bank-Firm FE	✓	✓	✓
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Bal. Sheet Controls	✓	✓	✓
<i>N</i>	1,381,420	1,381,420	1,381,420
<i>R</i> <sup>2</sup>	0.655	0.655	0.655

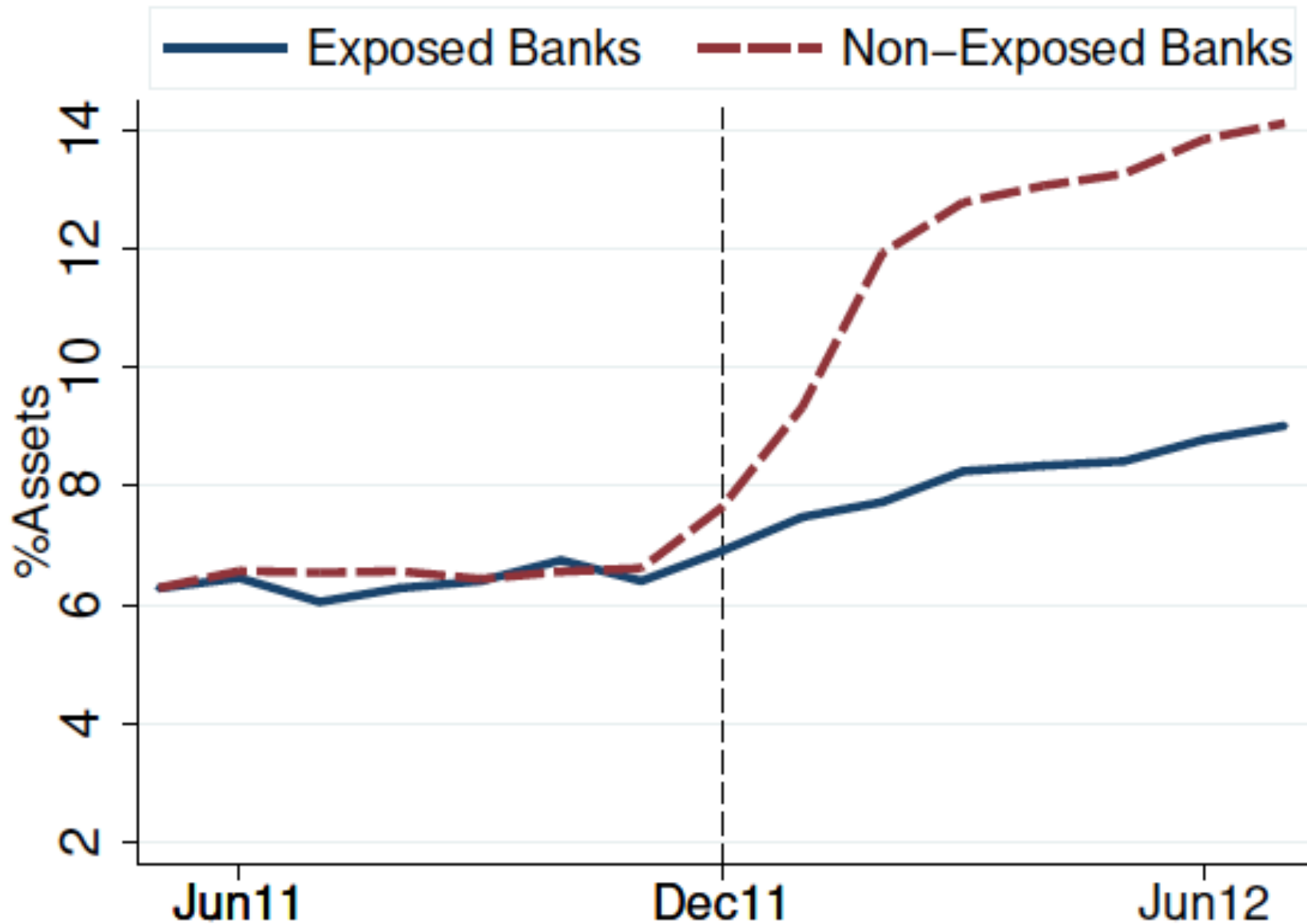
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## 2) Transmission to Holdings of Govt Bonds



# Quantitative Results

Of total €181.5 billion

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€1 to banks that suffered the dry-up:

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Counterfactual exercise (Chodorow-Reich (2014)):

with no LTRO bank credit -5.6% instead of observed -3.6%

# Final Thoughts

Bagehot: “Central banks should require good quality collateral”

- Banks hit by the dry-up are likely collateral constrained
- Italian government guarantee: fiscal side of the intervention

More theory work is needed to understand the optimal collateral policy of central banks during crises