

# Corporate debt structure and heterogeneous monetary policy transmission

Marie Alder\*, Nuno Coimbra\*\*, Urszula Szczerbowicz\*\*\*

\* European University Institute

\*\* Banque de France

\*\*\* SKEMA Business School

**Workshop "New insights from financial statements"**

*The views expressed in this paper are solely those of the authors and do not represent the views of the Eurosystem or the Banque de France*

## Corporate bonds since the Global Financial Crisis

- Share of bond debt in non-financial corporations (NFCs) has increased since GFC
- Rise in bond share of corporate debt particularly high in the Euro Area (EA)
  - Almost doubled between 2007 and 2021 (9% to 17%)
  - France: from 19% to 30%
  - Spain: from 3% to 15% in 2021

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    - Almost doubled between 2007 and 2021 (9% to 17%)
    - France: from 19% to 30%
    - Spain: from 3% to 15% in 2021
- ⇒ How much does debt structure matter for MP transmission?
- Does it depend on the type of monetary policy?

▸ Literature

▸ Contribution

# Corporate debt structure and monetary policy transmission

Debt structure is important in the view of policy-makers:

- **P. Lane (2022)**: “As a more **bank-based** system, the euro area might entail a **more delayed** reaction through the interest rate channel, as compared to countries where firms finance themselves predominantly with market-based debt.”

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⇒ Affects **speed** and **responsiveness** of MP transmission

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## Findings

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  - Contract investment relatively **more** after contractionary conventional monetary policy,
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Inspecting the mechanism:

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$\Rightarrow$  *Akin to funding supply shocks in each market (CMP  $\leftrightarrow$  bank loans, BSP  $\leftrightarrow$  bonds)*

## High-frequency Identification of Monetary Policy Shocks

# Conventional Monetary Policy shocks

**CMP shocks:** updated Jarociński and Karadi (2020) shocks

- Unexpected changes in assets around the ECB announcements
  - First principal component of Overnight Index Swaps (OIS) with maturities up to 1 year
- Monetary Event-window as in Altavilla et al. (2019)
  - Median quote from 13:25-13:35 compared to median quote 15:40-15:50
- Cleaned from CB information effects

▶ Decomposition

# Bond Spread shocks (BSP)

## Overview

- Capture unconventional monetary policy shocks connected to FR bond markets
- High-frequency changes in 10-Year France-Germany sovereign spread
  - Around ECB announcements
  - Monetary Event-window from Altavilla et al. (2019)
- Further orthogonalized with respect to CMP surprises
  - Remove structural impact of CMP on spreads and liquidity

▶ Motivation

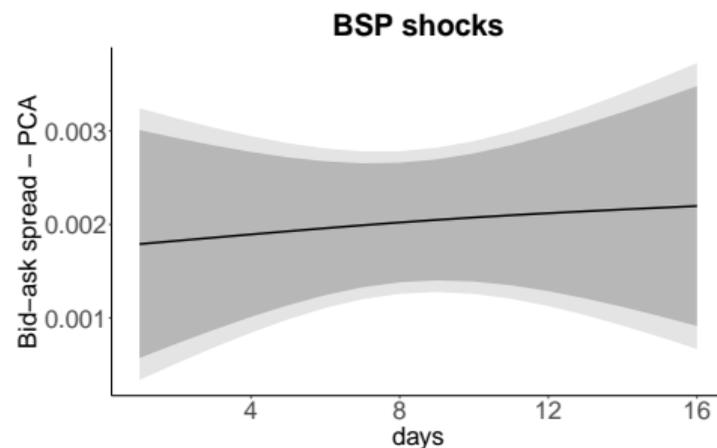
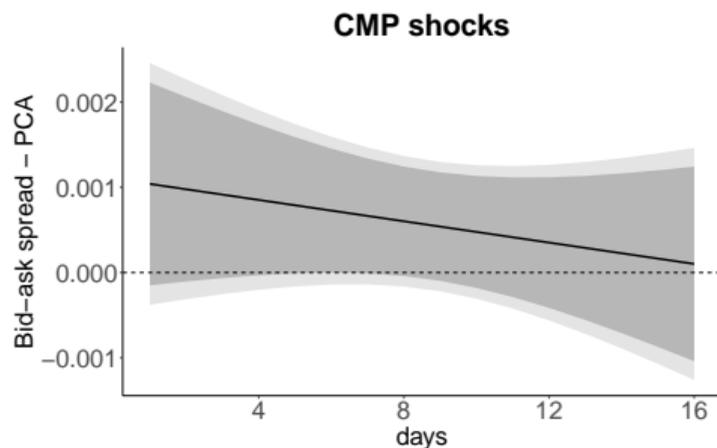
▶ Time Series

▶ Narrative description

# Bond Spread shocks and bid-ask spreads

Strong link between BSP shocks and bid-ask spreads of FR sovereign bonds

- First Principal Component across all maturities (FR bonds): [Individual maturities](#)



[Details](#)

Baseline results

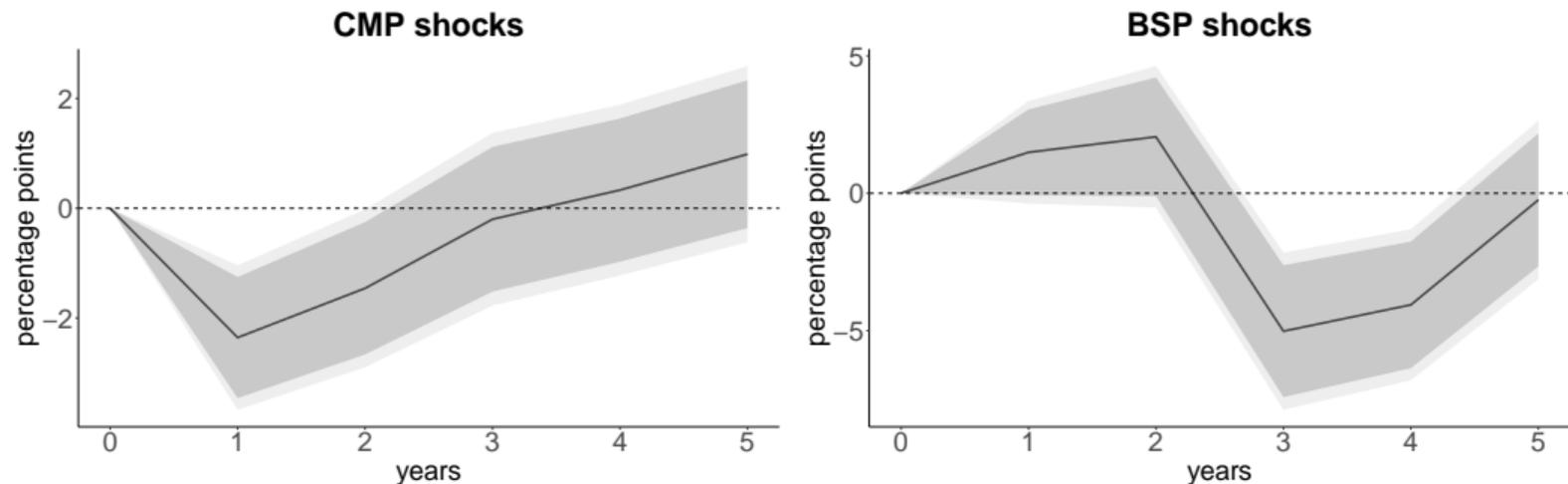
## FIBEN dataset

- Yearly firm-level data on French companies from the FIBEN consolidated database
  - Data collected from corporate tax declarations (*liasse fiscale*)
- >80k observations for >11k different firms
  - Unbalanced panel, firm entry and exit from dataset
- Yearly aggregation of shocks aligned to reporting month of each firm
- **Net investment rate:** first difference of net tangible assets (NTA) in year  $t$ , divided by total assets (A) in year  $t - 1$

$$I_{i,t} = \frac{NTA_{i,t} - NTA_{i,t-1}}{A_{i,t-1}}$$

# MP impact on French NFC investment

Average response of investment to CMP and Bond Spread shocks ▸ Specification

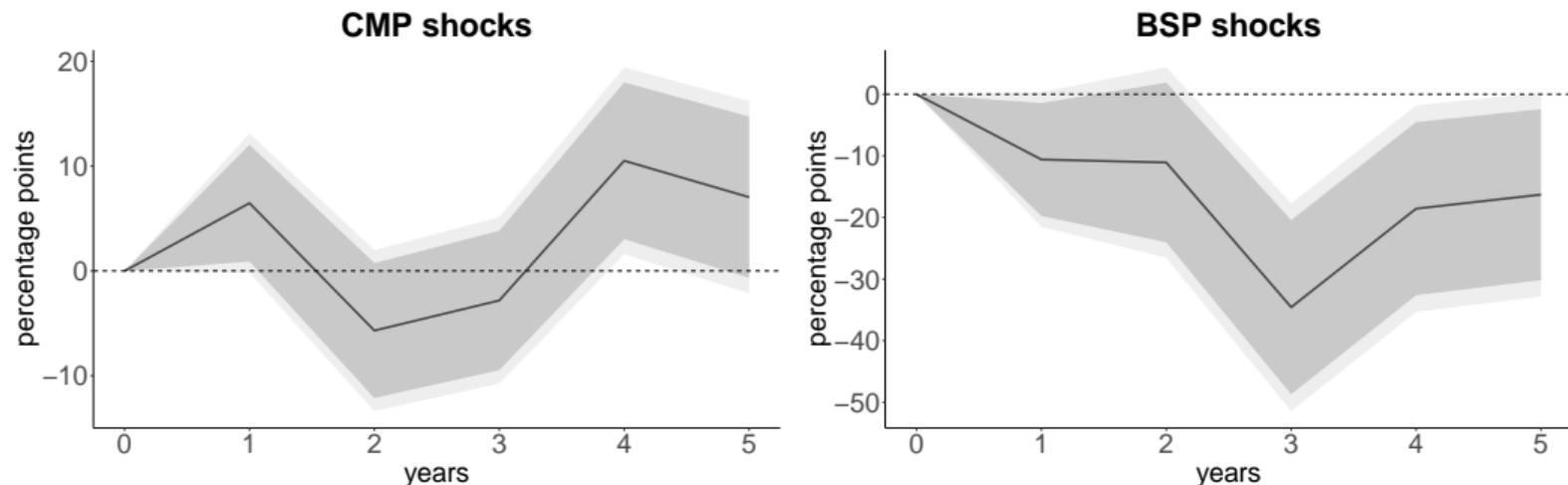


Note: estimated effect of a 100 bp upward surprise for CMP (left panel) and BSP (right panel) shocks on the net investment rate at the firm level, at each horizon  $h$  (up to 5 years).

- ↗ 100bp CMP  $\Rightarrow$  2.4pp ↘ of investment wrt firm's total assets
- ↗ 100bp BSP  $\Rightarrow$  5.0pp ↘ of investment wrt firm's total assets

# MP and Investment: the role of debt structure

Interacting shocks with firms' bond ratios [▶ Specification](#)



Note: IRFs for the interaction term of the MP shock with the lagged bond share. 100 bp upward surprise for CMP (left panel) and BSP (right panel) shocks, at each horizon  $h$  (up to 5 years).

## MP and Investment: the role of bond share

- Contractionary CMP: investment rate falls **less**, the **higher** its share of bond financing
  - Contemporaneous decline of a fully bond reliant firm ( $B_{i,t-1} = 1$ ) is **6.4pp less per 100bp** than a fully bank reliant one ( $B_{i,t-1} = 0$ )
  - Effect peaks at **10.5pp** during the 3rd year after the shock (1.11pp per stdev)

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- Contractionary BSP: investment falls **more**, the **higher** its share of bond financing
  - Contemporaneous decline in investment rates of fully bond reliant firms is **10.5pp larger per 100bp** than a fully bank reliant one
  - Effect peaks at **34.6pp** during the 3rd year after the shock (1.36pp per stdev)

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### Robustness:

▶ Calendar aggregation

▶ Other aggregate Controls

▶ No aggregate Controls

▶ Excluding Maturity

## Inspecting the Transmission Channels

## Inspecting the mechanism

Look at the impact of the two types on shocks on:

- **Total credit** of French firms (panel) ▶ Average impact ▶ Role of bond share
  - Similar results: funding  $\leftrightarrow$  investment

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  - CMP tightening  $\Rightarrow$  relative cost of bank loans rises
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  - CMP tightening  $\Rightarrow$  relative cost of bank loans rises
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- **Debt issuance** in bonds and bank loans (aggregate) ▶ Relative flows ▶ Absolute flows
  - CMP tightening  $\Rightarrow$  bank loan issuance *falls*, bond issuance *rises*
  - BSP tightening  $\Rightarrow$  bank loan issuance *rises*, bond issuance *falls*
  - Aggregate flows contract but some degree of **substitutability**

# Conclusions

- Contractionary CMP and BSP shocks decrease investment of French firms
- MP impact on firm investment depends on firm debt structure:
  - Firms which are more reliant on bank credit contract investment relatively more after contractionary CMP shocks,
  - but contract investment less after contractionary BSP shocks
- Imperfect integration across the two markets
  - Some degree of substitutability,
  - but not enough to undo impact on NFC investment and credit

# Conclusions

## Key messages for statistical producers

- Data granularity and firm-level analysis
  - Importance of firm-level data to capture heterogeneous impact of MP
  - Lack of data on firm-specific funding costs for each debt instrument
- Data frequency
  - Monthly frequency can be important when looking at financial variables (firm credit...)
- Need for more loan-level data

## Appendix

### **Financial frictions and investment**

- Cloyne et al. (2023) find that financial frictions account for about one third of the aggregate investment response to monetary policy.
- Firm-level response to MP shock depends on default risk (Ottonello and Winberry, 2020), the firms' age (Cloyne et al., 2023), firms' size (Gertler and Gilchrist, 1994) and their holdings of liquid assets (Jeenas, 2019).

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### **Debt composition and monetary transmission**

- Share of floating-rate debt and the debt maturity were shown to affect the transmission of MP to firms' investment and stock prices (Ippolito et al., 2017, Gürkaynak et al. 2022, Jungherr et al., 2022).
- Bond/loan composition: higher bond share weakens CMP transmission (Crouzet 2021, Holm-Hadulla and Thurwachter 2021), but the opposite is true when bond market frictions dominate (Darmouni et al. 2020) or when LT rates are affected by the CB (Holm-Hadulla and Thurwachter 2021).

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### MP identification

- MP shocks using high-frequency identification: Kuttner (2001), Gerko and Rey (2017), Jarocinski and Karadi (2020), Altavilla et al (2019), ...

1. We identify a **bond-liquidity channel of MP** and provide evidence on its impact on French firms' investment. In particular, we provide evidence on the impact of the ECB policies on the liquidity of the French bond market and its effect on corporate bond prices.
2. We study the **role of corporate debt structure** in the transmission of both types of monetary policy to investment.
3. We uncover the **relative importance of bond and bank credit supply shocks** induced by CMP and Bond Spread (BSP) shocks  
⇒ novel evidence on the bank lending and liquidity channels of both MP types.

## Conventional Monetary Policy shocks [◀ Go back](#)

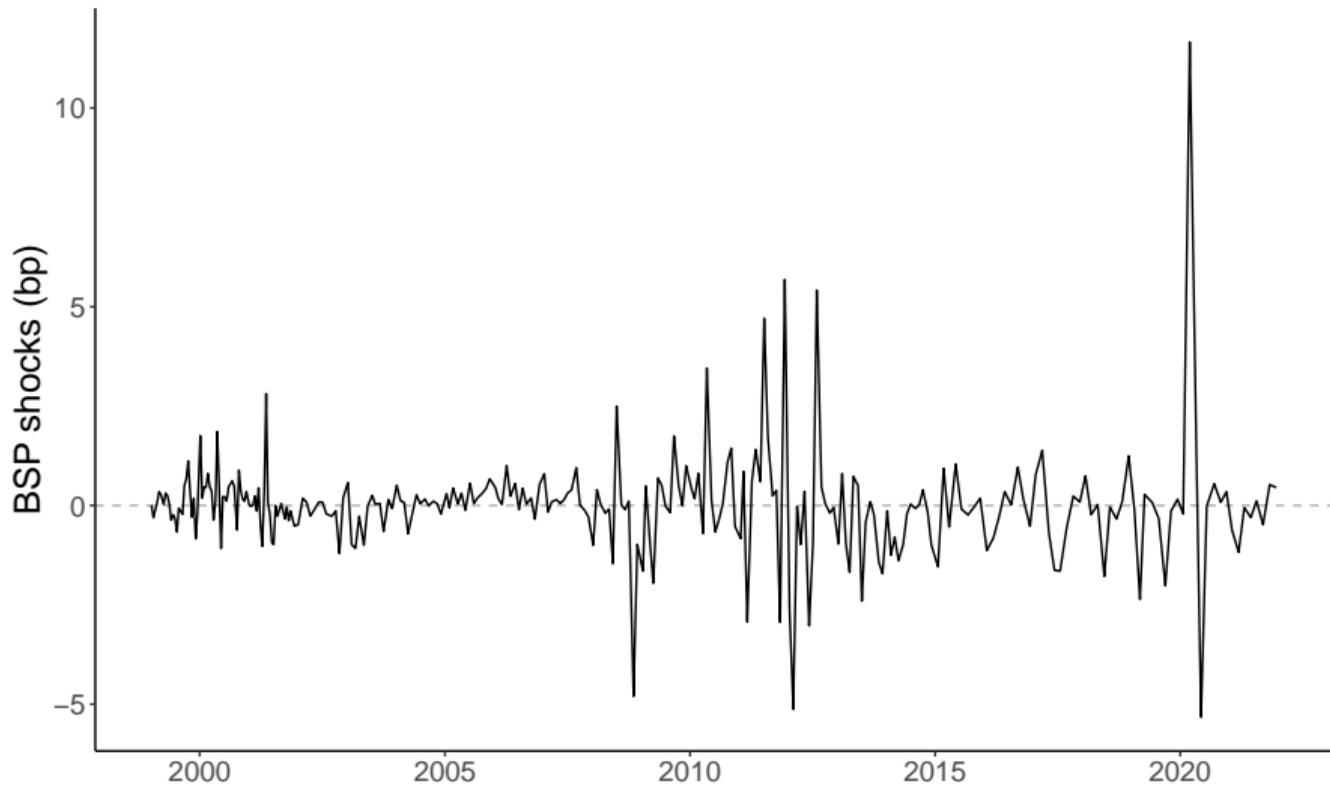
| Variable                             | Shock                                     |  |
|--------------------------------------|---|--|
|                                      | Monetary policy<br>(negative co-movement) | CB information<br>(positive co-movement) |
| <i>m<sub>t</sub>, high frequency</i> |   |  |
| Interest rate                        | +   | +  |
| Stock index                          | -   | +  |

Source: Jarociński and Karadi (2020)

## Motivation

- French and German sovereign bond markets have many similarities
  - Ejsing and Sihvonen, 2009
  - Same currency, similar credit rating, comparable amounts outstanding
- Evidence that movements in spread reflect mostly changes in **liquidity premia**
  - ECB Monthly Bulletin 09/2009
- They also affect French sovereign bond market liquidity

## Bond Spread shocks: daily [◀ Go back](#)



- **Largest BSP shocks and the events that triggered them:**

| Date       | Shock (bp) | Description                                    |
|------------|------------|--|
| 2012/02/09 | -5.13      | Eligibility rules eased for sovereigns         |
| 2012/12/08 | 5.69       | Downplayed possible renewal of bond purchases. |
| 2020/03/12 | 11.66      | CL: "We are not here to close spreads"         |
| 2020/06/04 | -5.33      | PEPP increased, includes corporates            |

# BSP shocks and bid-ask spreads [◀ Go back](#)

Smooth Local Projections (Barnichon and Brownlees, 2019)

We check the link between BSP shocks and liquidity

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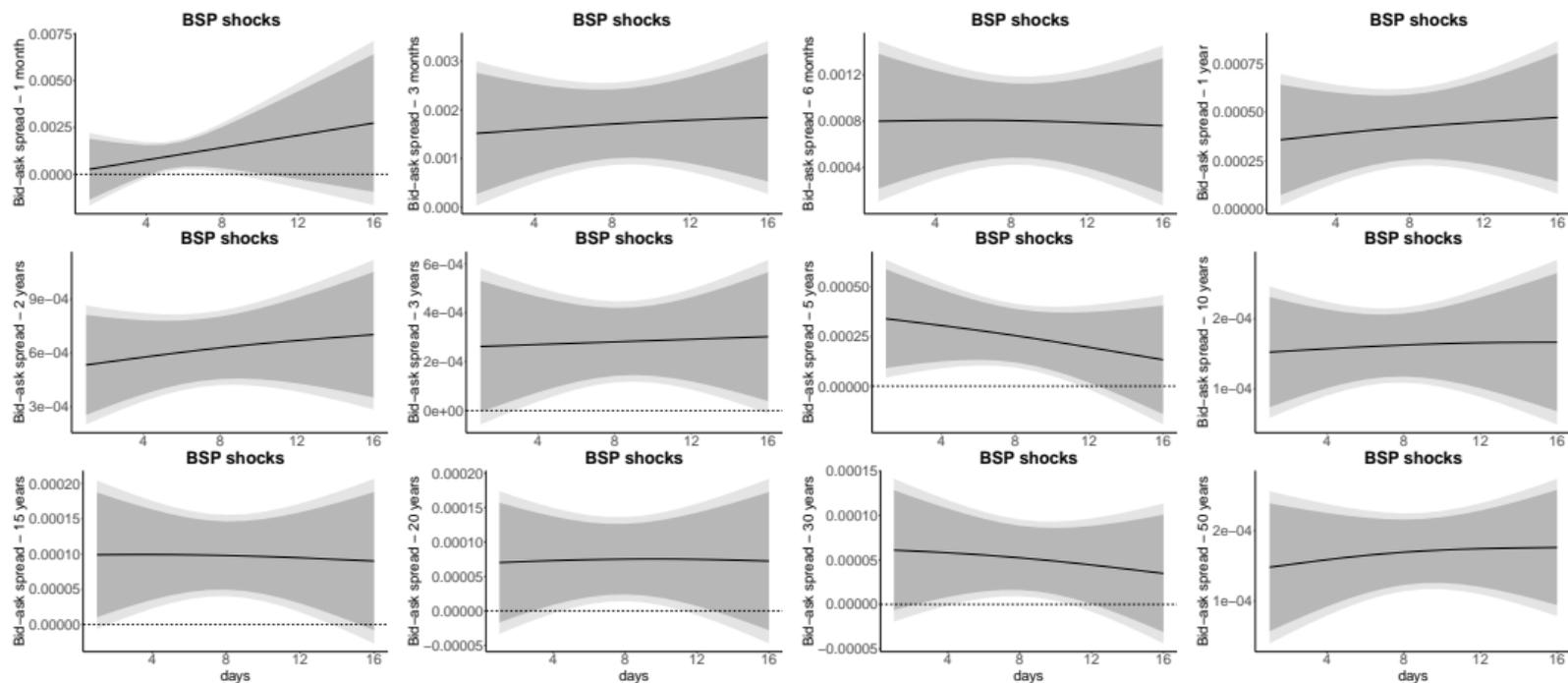
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⇒ S-LP penalize variability w/o ex-ante restricting shape of IRFs

[▶ Detail](#)

# Bond Spread shocks and bid-ask spreads

[▶ Go Back](#)



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Following Barnichon and Brownlees (2019):

- 5-fold cross-validation to select  $\lambda$
- Pick  $\lambda$  with best mean pseudo-out-of-sample fit

## 1. CMP and the bank lending channel

- CMP tightening  $\Rightarrow$  firms switch from bank loans to bonds
  - In line with the [bank lending channel](#)
  - Kashyap et al. (1992), Becker and Ivashina (2014)
- ▶ Rate hike  $\Rightarrow$  investment should fall **more** for NFCs with higher shares of **bank** debt

### 2. Quantitative Easing and the bond liquidity channel

- QE reduces risk premia on debt securities  $\Rightarrow$  stimulates corporate bond issuance
- Altavilla & Giannone (2017), Lhuissier & Szczerbowicz (2021), Grosse-Rueschkamp et al. (2019)
- ▶ BSP rise  $\Rightarrow$  investment should fall **more** for NFCs with higher shares of **bond** debt

## MP and Investment: average effects [◀ Go back](#)

The average effects of the ECB MP on French firms' investment are evaluated using panel local projections (Jordá, 2005).

$$\Delta l_{i,t+h} = \beta^h S_{i,t} + \Psi^h Z_{t-1} + \sum_{l=1}^L \Gamma_l^h X_{i,t-l} + \mu_i^h + \epsilon_{i,t+h} \quad (1)$$

$\Delta l_{i,t+h} = l_{i,t+h} - l_{i,t-1}$ :  $h$ -year forward difference in the net investment rate

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$L = 3$  for all results shown today

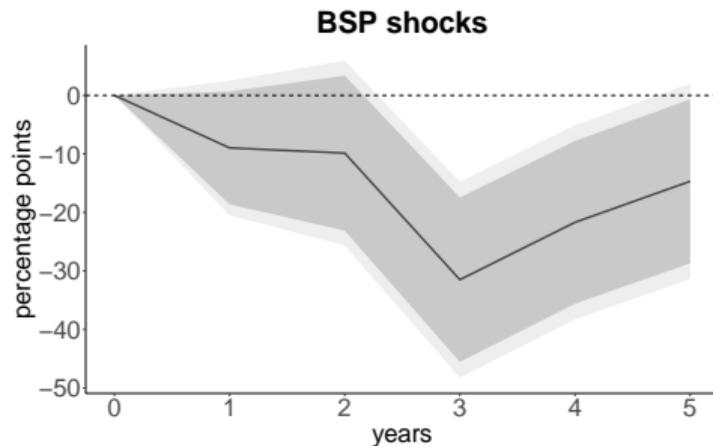
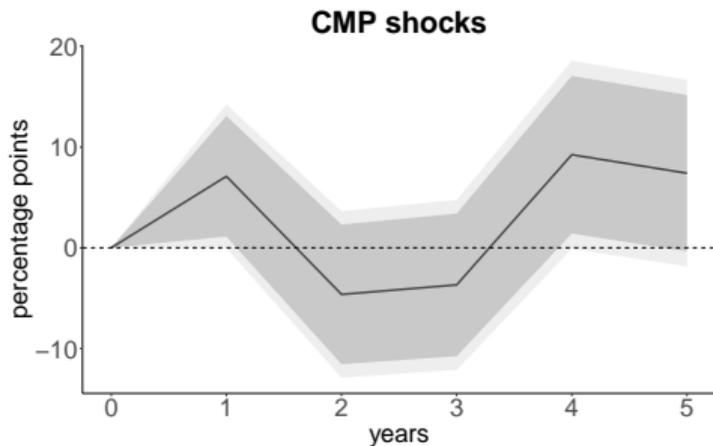
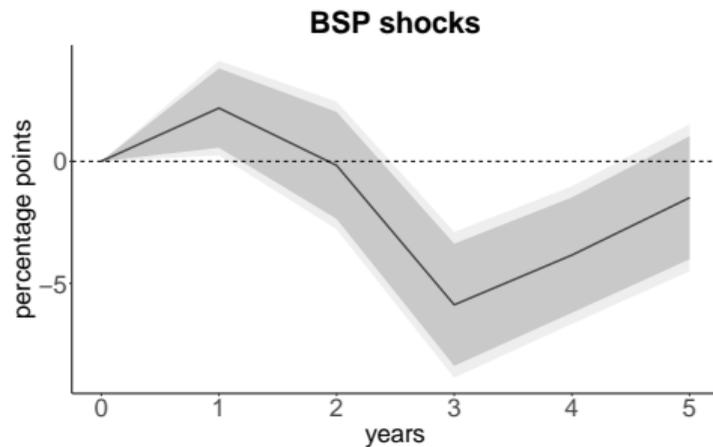
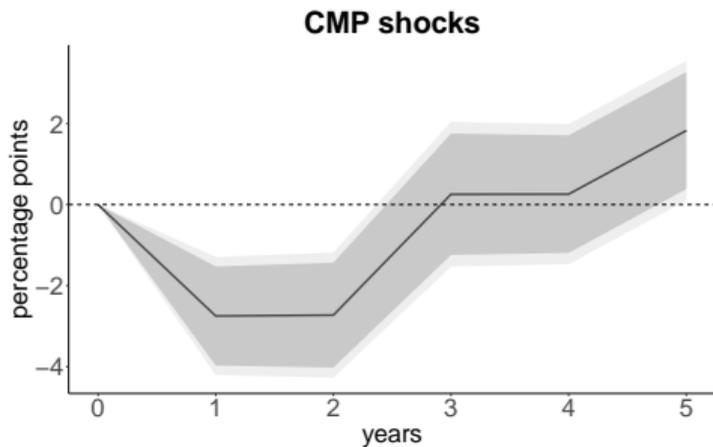
- Investigate cross-sectional differences wrt corporate debt structure
  - Interact MP shocks with the firm's share of bond debt (bond ratio)

$$\Delta I_{i,t+h} = \alpha^h B_{i,t-1} \times S_{i,t} + \beta^h Mat_{i,t-1} \times S_{i,t} + \sum_{\ell=1}^3 \Gamma_{\ell}^h X_{i,t-\ell} + \mu_i^h + \theta_{s,t}^h + \epsilon_{i,t+h} \quad (2)$$

- $B_{i,t-1}$ : lagged bond ratio
- $Mat_{i,t-1}$ : lagged maturity ratio
- $\theta_{s,t}^h$ : sector-time fixed effects

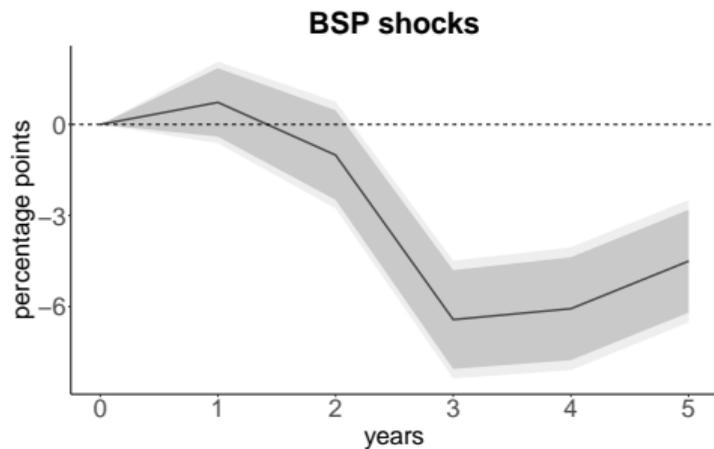
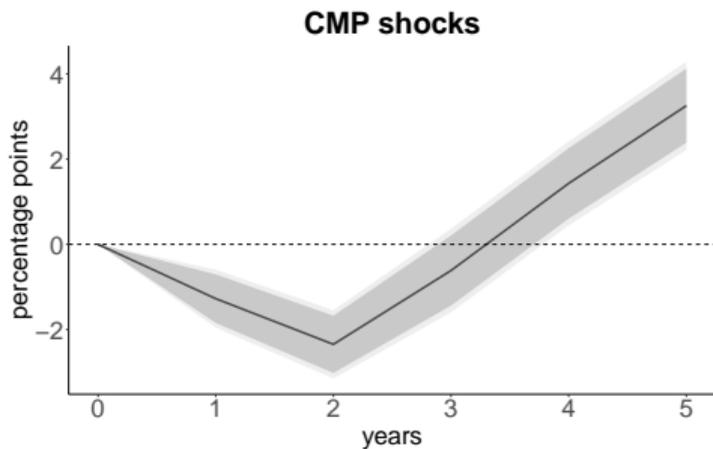
⇒ Positive (negative)  $\alpha^h$  means firms with higher bond ratios are less (more) responsive

# Simple calendar year aggregation [▶ Go Back](#)



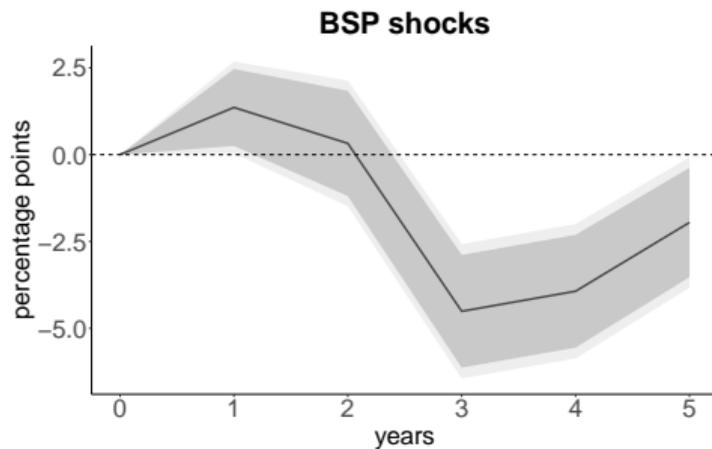
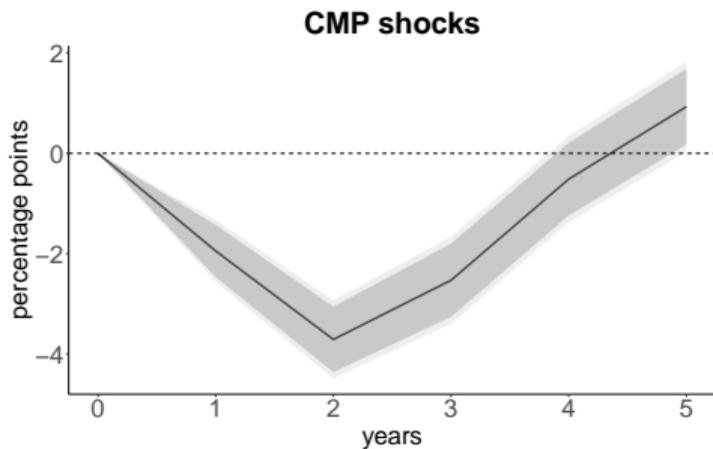
# Only output gap and inflation as controls

[▶ Go Back](#)

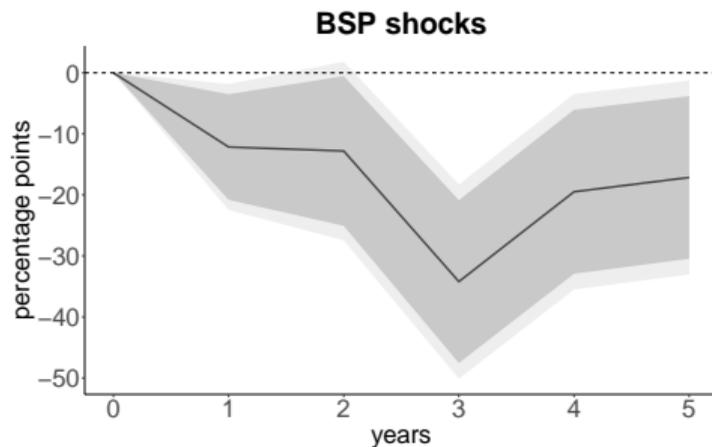
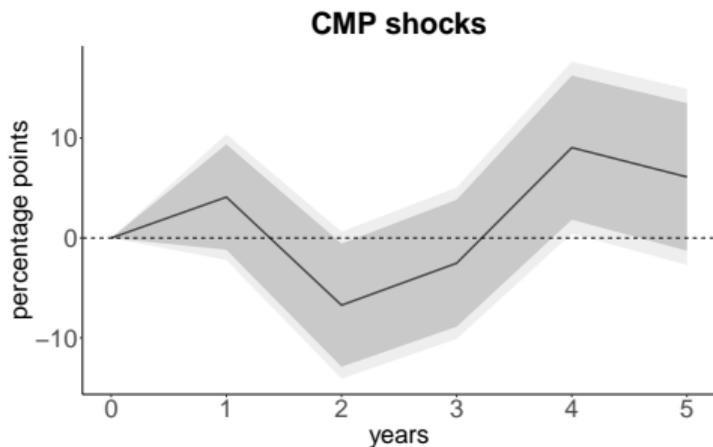
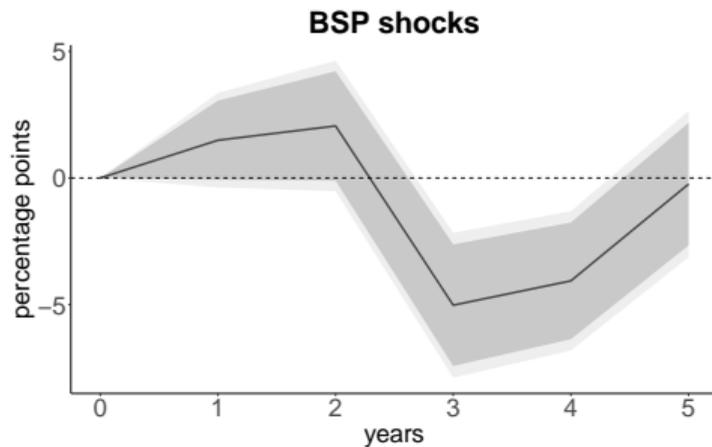
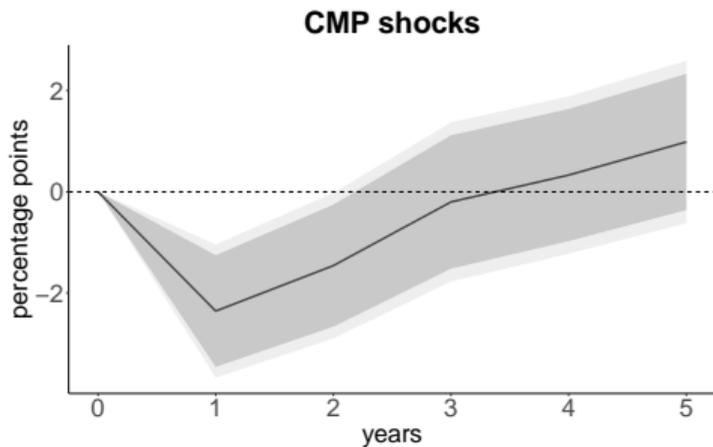


# No aggregate controls

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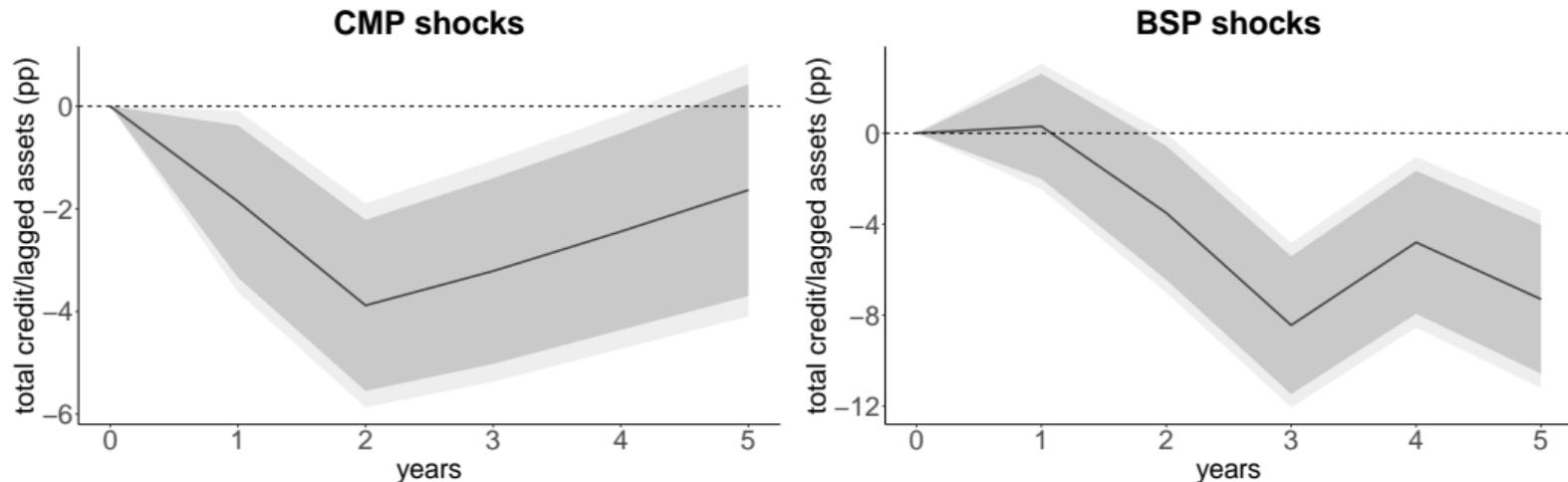


# Excluding maturity interaction [▶ Go Back](#)



# Total Credit [▶ Go Back](#)

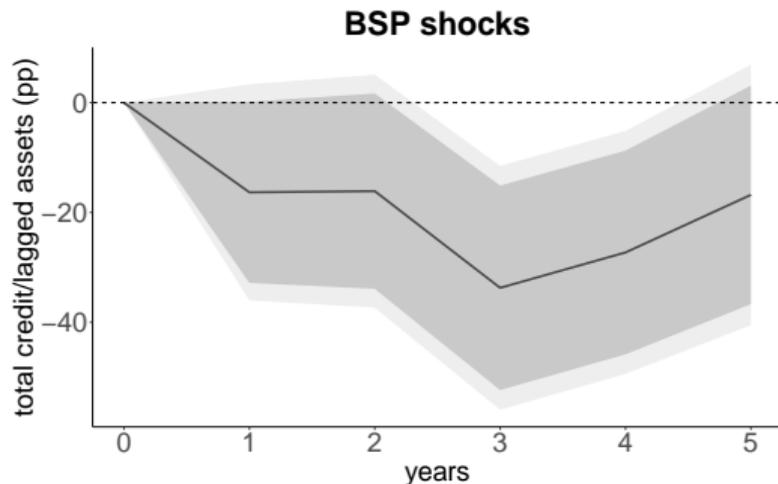
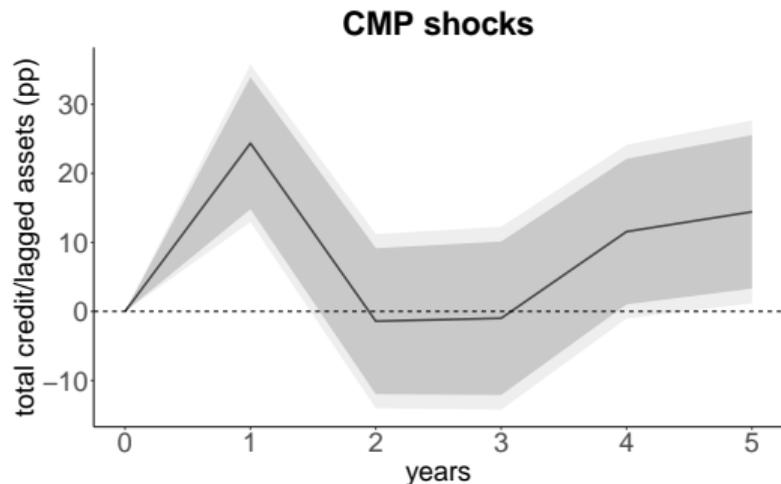
Average response



- Total credit falls across firms for all shocks

# Total Credit [▶ Go Back](#)

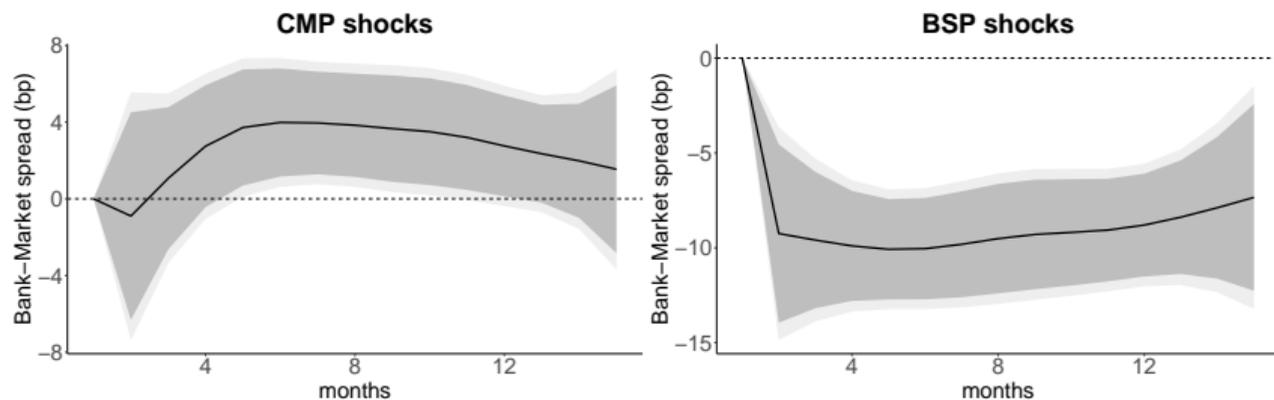
## Heterogeneous response



- CMP has a stronger impact on firms that are more bank-based
- BSP shocks have a stronger impact on more market-based firms

# Relative Cost [▶ Go Back](#)

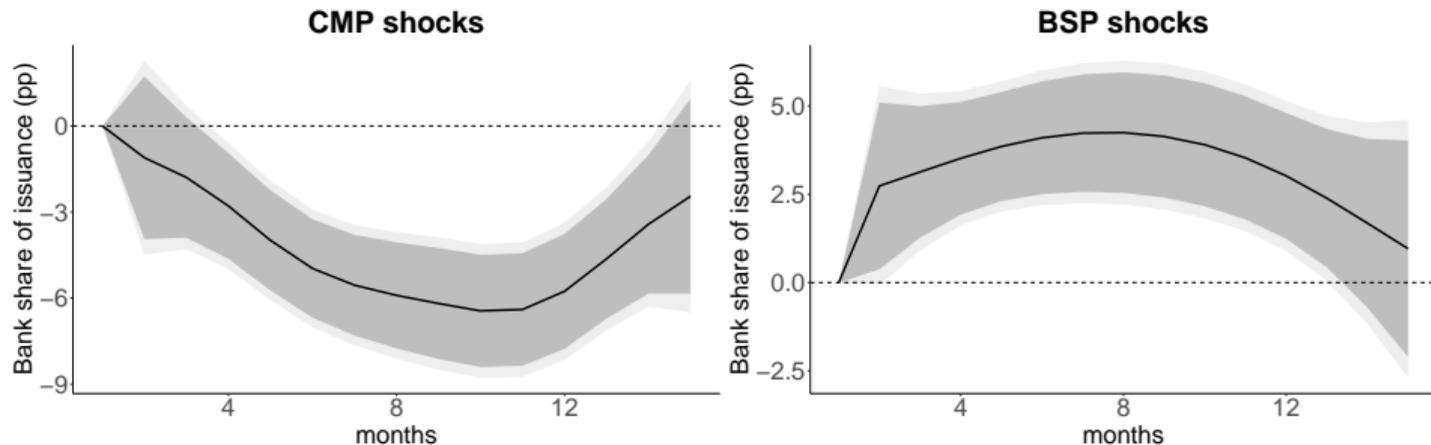
Bank-market spreads i.e. rate of bank loans compared with average yield on corporate bonds



- CMP has stronger pass-through to bank loan rates (Schnabel, 2021),
- but slower transmission after shock (Lane, 2022)
- BSP shock  $\Rightarrow$  market rates rise more than bank rates

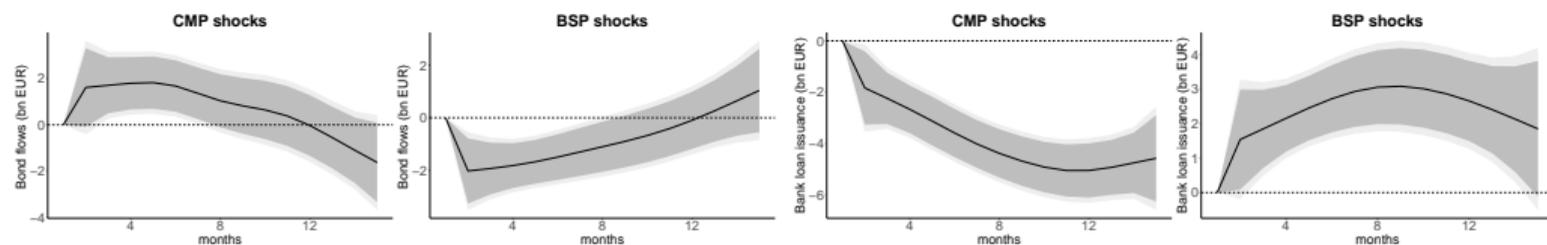
# Debt Issuance

Bank share of debt issuance [▶ Go Back](#)



- CMP shock  $\Rightarrow$  share of bank debt in new issuance falls
- BSP shock  $\Rightarrow$  share of bank debt in new issuance rises

## Bond and loan issuance [▶ Go Back](#)



- CMP shock  $\Rightarrow$  bond flows increase
- BSP shock  $\Rightarrow$  bank loans increase
- Some degree of **substitutability**,
- ...but not sufficient to stop the contractionary effects on aggregate investment