The Heterogenous Bank Lending Channel of Monetary Policy

Jorge Abad[†] Saki Bigio[‡] Salomon Garcia-Villegas[†] Joel Marbet[†] Galo Nuño[†]

[†]Banco de España [‡]UCLA

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Does bank heterogeneity matter for monetary policy transmission?

- Transmission of monetary policy to lending depends on bank-level characteristics
  - Liquid assets and size (Kashyap and Stein, 2000)
  - Leverage (Jimenez et al., 2012; Dell'Ariccia et al., 2017; Altavilla et al., 2020)
  - Interest rate risk exposure (Gomez et al., 2021)
  - Loan-rate fixation (Altunok, Arslan and Ongena, 2023)

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- Structural models can complement this empirical work by allowing to
  - Recover the effect of heterogeneity on aggregate responses, and
  - Implement counterfactual exercises

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$\rightarrow$ Which forms of bank heterogeneity matter for monetary policy transmission?

Preview of the results

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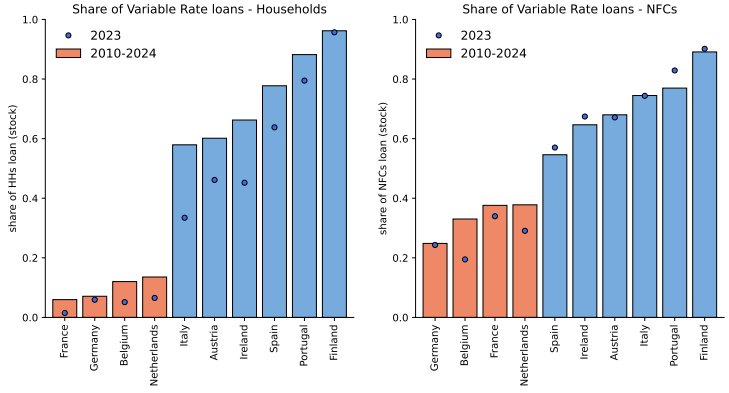
  - Also: implications for financial stability
- Key insight: sources of heterogeneity interact
  - Without heterogeneity in leverage, heterogeneity in loan pricing is less relevant

Heterogeneity in loan-rate fixation

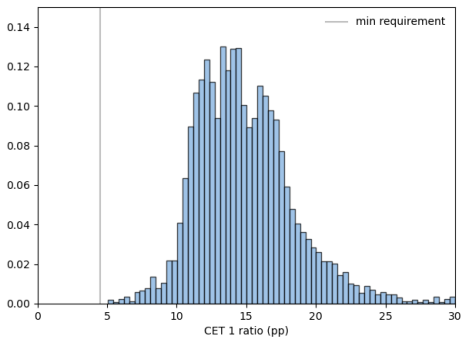


Data sources: ECB Statistical Data Warehouse. Lending to households includes mortgage loans, consumer loans, and other loans.

- Fixed raters: Germany, France, Belgium, and Netherlands
- Variable raters: Spain, Portugal, Italy, Austria, Finland, Ireland.
- Loan-rate pricing patterns are highly persistent over time

Heterogeneity in bank leverage

CET 1 capital ratios



Sources: S&P Global. The sample corresponds to 163 large and medium-sized European banks from 2013 to 2020.

- Large heterogeneity in CET 1 capital ratios

The model – Banking sector

- Continuum of perfectly competitive banks
- **Assets:** Hold both short- and long-term assets
  - Reserves are safe and short-term, earning the policy rate
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- **Regulation:**
  - *Minimum capital requirement*: Failure to comply results in resolution of the bank
  - *Liquidity requirement*: Reserves proportional to short-term liabilities

The model – Bank problem and environment

- **Problem of a bank:** Maximize expected discounted dividend payments
  - Banks choose new loan origination, deposits, and reserves, subject to constr.

  $\rightarrow$ Ex-post heterogeneity in equity and leverage due to idiosyncratic loan default shocks

  $\rightarrow$ Ex-ante heterogeneity due to fixed-rate and variable-rate loans ($\rightarrow$ two sep. economies)

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- **Environment:** Banking sector is embedded in an environment where
  - Entrepreneurs demand loans to fund long-term investment projects, sensitive to loan rates
  - Households supply deposits and own banks
  - Central bank sets policy rate; government runs deposit insurance

The model – Main frictions

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- Main amplification channel:

$$\text{MP shocks} \rightarrow \text{equity accumulation} \rightarrow \text{lending}$$

Loan-rate fixation regimes: Key differences

Fixed-rate regime:

- Interest rate on new loans fixed at origination and constant over the loan's life
- Legacy portfolio reprices gradually as maturing loans are replaced by new ones
- Monetary tightening initially compresses net interest margins (NIM)
  $\rightarrow$ funding costs rise while loan income lags

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Variable-rate regime:

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Implication: The speed of loan rate adjustment drives differences in profitability, capital ratios and, ultimately, the lending response to monetary policy shocks

Calibration

- Quarterly frequency
- Matches euro area bank balance sheets (capital ratios, liquid assets, loan maturities)
- Replicates Basel III requirements
- Targets empirical responses of loan rates to monetary policy shocks

Heterogeneity in responses to monetary shocks

- Panel Local Projections with country fixed effects (Jorda et al., 2015)

$$y^{\ell}_{c,t+h} = \alpha_{c,h} + \beta_{1,h}\varepsilon^{MP}_{t} + \beta_{2,h}\left[\varepsilon^{MP}_{t} \times I^{FR}_{c}\right] + \Gamma_h X_{c,t}(L) + e_{c,t+h}$$

ε^{MP}_{t}: ΔECB deposits facility rate instrumented (Jarocinski and Karadi,2020)

I^{FR}_{c}: 1 if country c operates with fixed-rate pricing

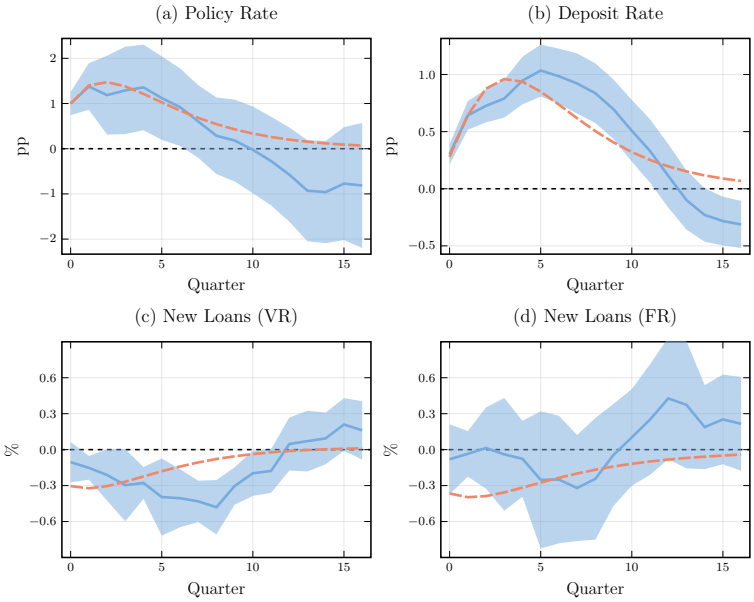
$X_{c,t}$: GDP growth, inflation, BBB corporate yield, 1y DE bond yield

- Different responses across FR and VR economies

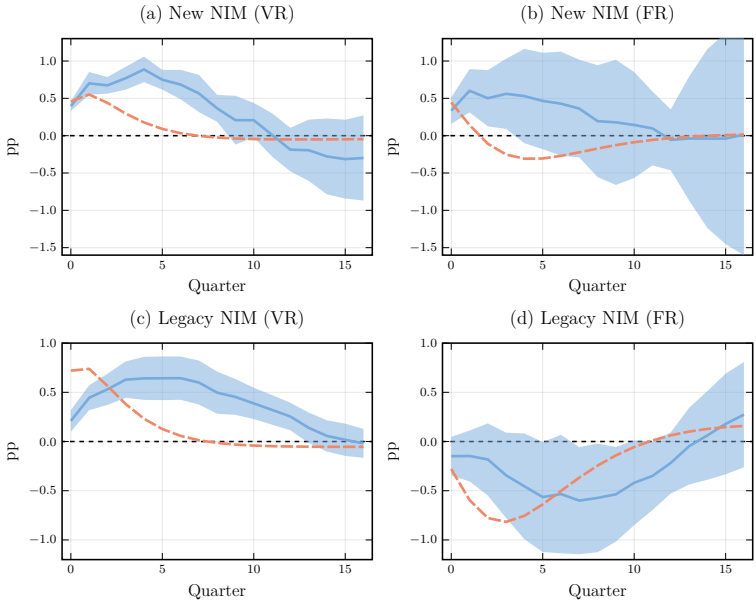
$\{\beta_{1,h}\}_{h=0}^{16Q}$ $\rightarrow$ avg impact on variable-raters

$\{\beta_{1,h} + \beta_{2,h}\}_{h=0}^{16Q}$ $\rightarrow$ avg impact on fixed-raters

Targeted IRFs

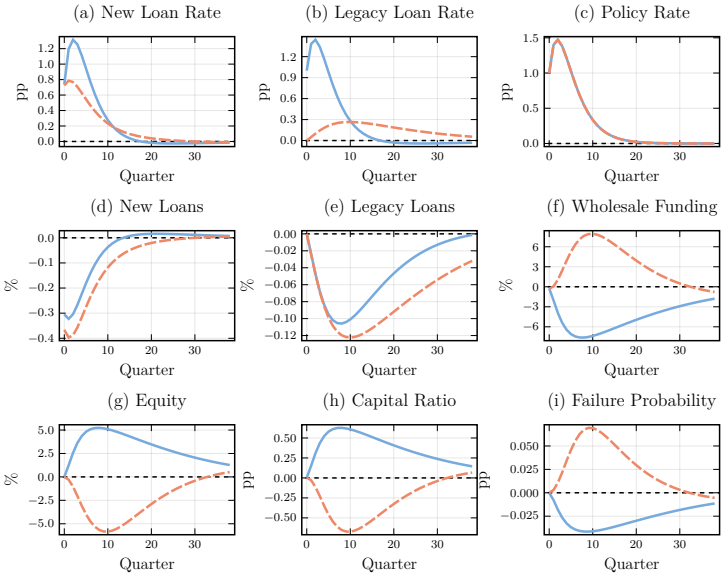


Untargeted IRFs

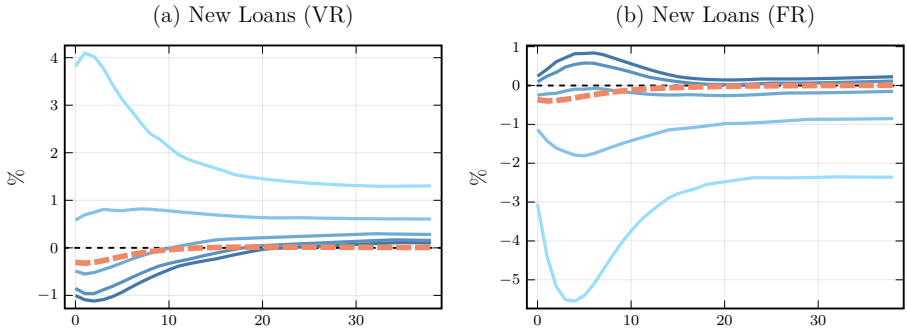


Does heterogeneity matter?

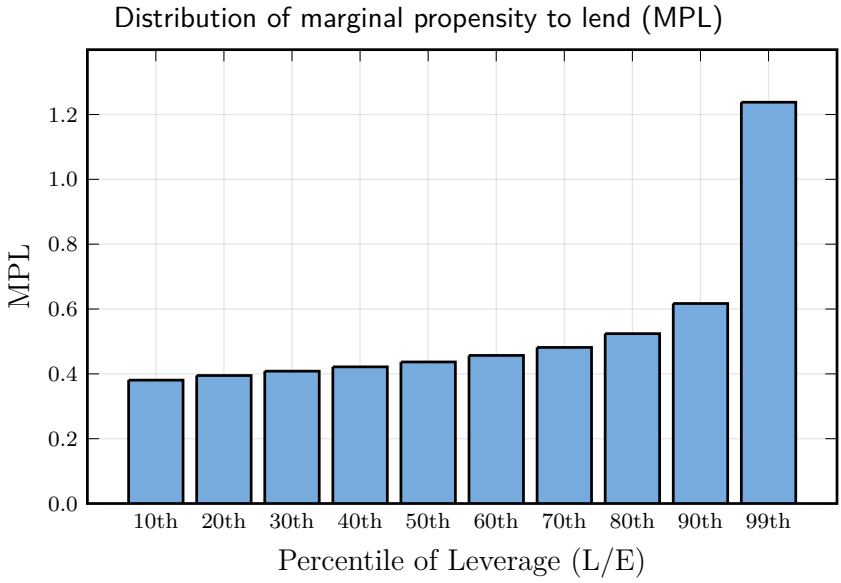
Ex-ante heterogeneity



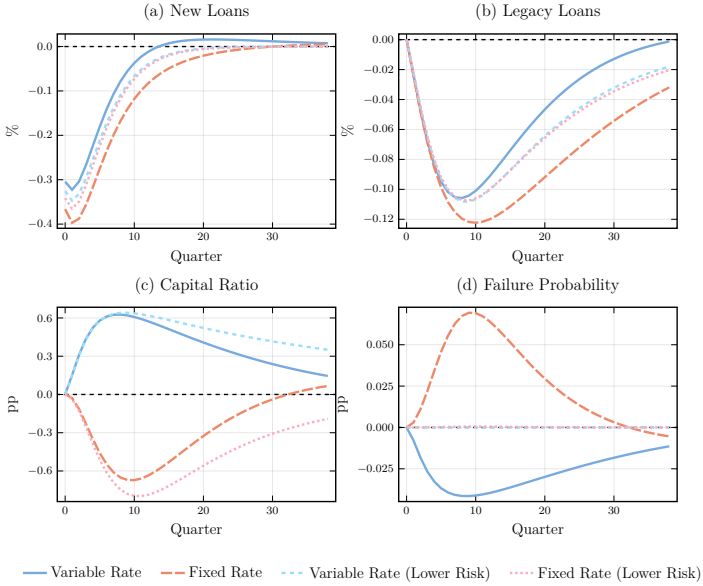
Ex-post heterogeneity



MPL distribution



vs. No ex-post heterogeneity



Concluding remarks

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  - Ex-ante heterogeneity in loan-rate fixation: fixed vs. variable rates
- Aggregate and individual IRFs to monetary policy shocks depend on bank characteristics
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- Sources of heterogeneity interact: Without heterogeneity in leverage, heterogeneity in loan pricing is less relevant