Challenges for Monetary Policy Transmission in a Changing World

Selected key findings on financial intermediaries, firms and households

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Monetary policy transmission from banks to firms

Carlo Altavilla, Margherita Bottero, Björn Imbierowicz, Jorge Abad, Sofia Anyfantaki, Konstantīns Beņkovskis, Sebastian Bredl, Lorenzo Burlon, Tomas Carrera de Souza, Tommaso Gasparini, Massimo Giovannini, Zuzana Gric, Simona Malovaná, Franziska Maruhn, Alessandro Modica, Giulio Nicoletti, Aino Silvo and Kārlis Vilerts

Overview

Bank-based MP transmission to EA firms remains effective in the aggregate.

Three overarching findings emerge when analyzing granular data:

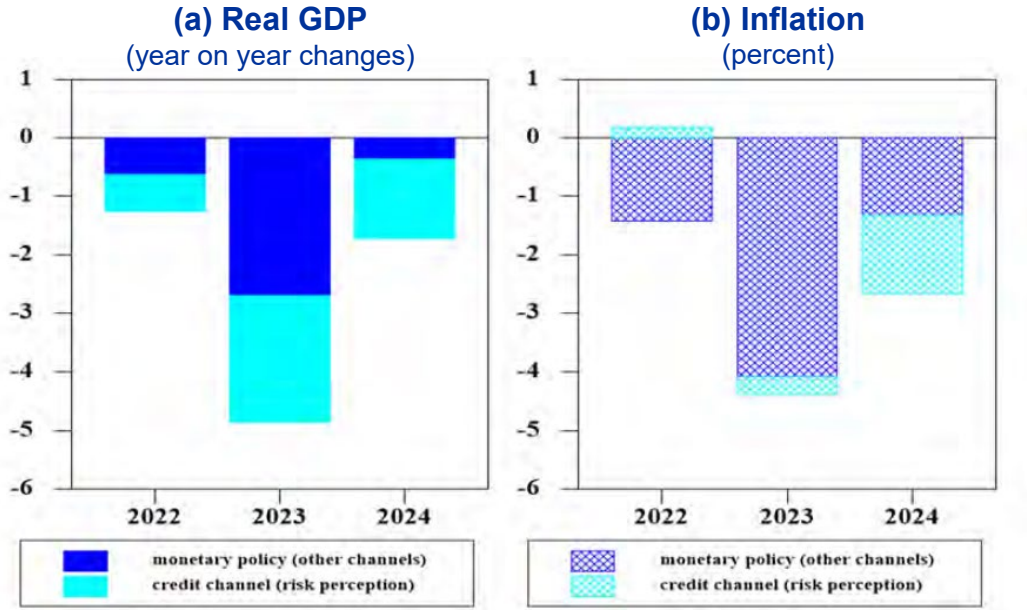
1. **transmission continues to be segmented at the country level**

2. **bank and firm balance sheets matter at least as much**

3. **understanding and monitoring** these heterogeneities is key to address them in a proportional way with a **broad policy toolkit, centered on the main reference rates**

Bank-based MP transmission to EA firms remains effective in the aggregate

Macroeconomic effects of the 2022-23 tightening: the role of the credit channel

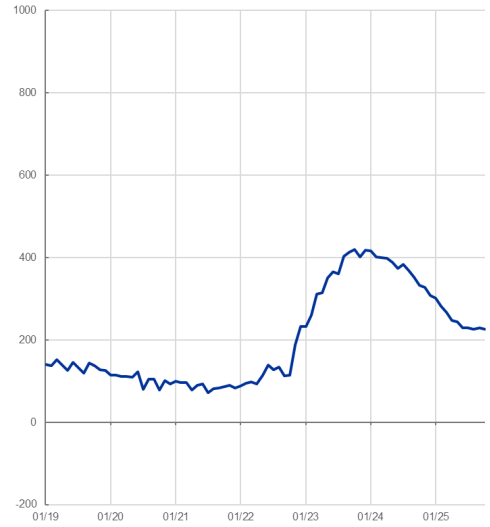


Source: Conti et al. (2024); Notes: simulations based on the posterior mean of the distribution of the parameters according the baseline model described in Section 4.1. The cyan bar refers to the average impact of the credit channel (i.e. the effect obtained by computing the difference between the actual tightening and a counterfactual one in which we mute the impact of banks' risk perception on lending rates), while the blue bar refers to the impact of other channels of monetary policy.

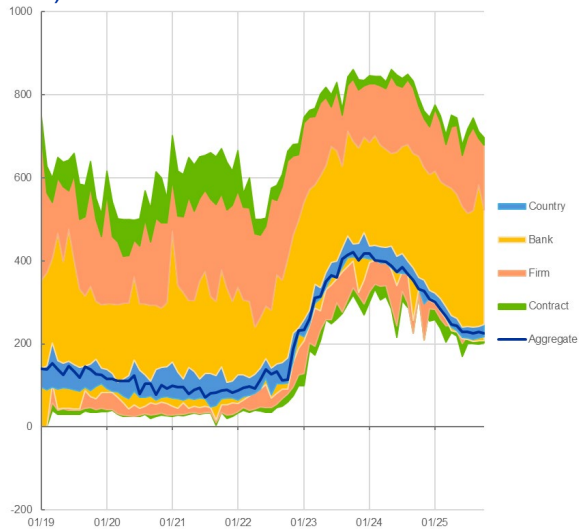
Beyond aggregates, loan rates embed country, bank and firm characteristics, which actively filter transmission

Variation in lending rate measures at different levels of aggregation (country, bank, firm, and contract)

(basis points)



micro data uncover…



Variance dec. of loan rate spreads reveals…

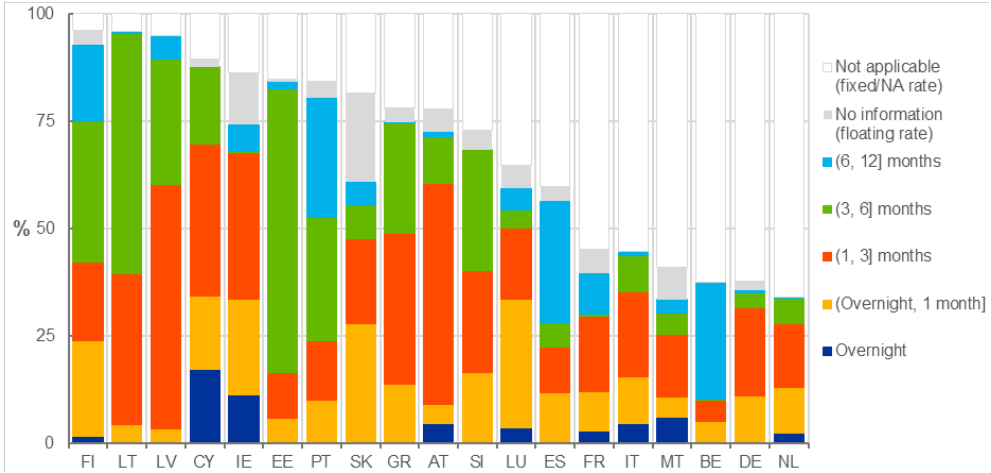
- 50% Country
- 25% Bank
- 15% Firm
- 10% Contract

Source: Altavilla, Gürkaynak, Quaedvlieg (2024). Notes: the chart depicts the value-weighted average bank loan rate. Each shaded region provides the 5%–95% distribution of bank loan rates at the relevant level of aggregation.

Starting with the country dimension, lending practices differ along national borders, notably in interest rate fixation choices

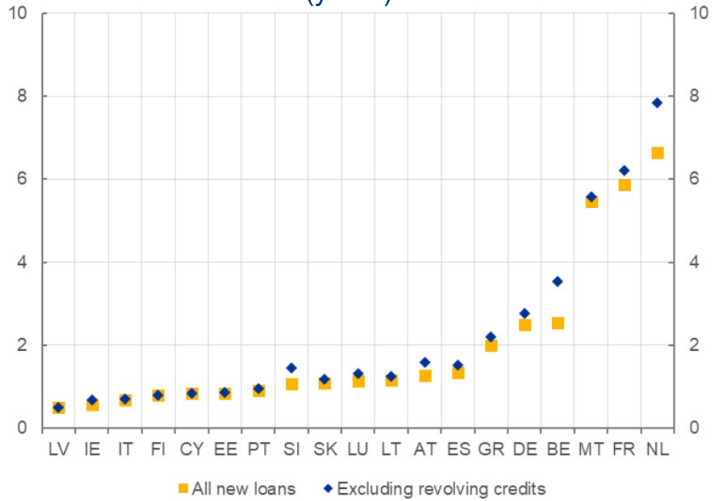
Structure of newly issued floating rate loans to NFCs, by countries and reference rate maturity, 2022-2023 (1)

(per cent of new loans)



Cross-country heterogeneity in the maturity of the relevant risk-free rate (2)

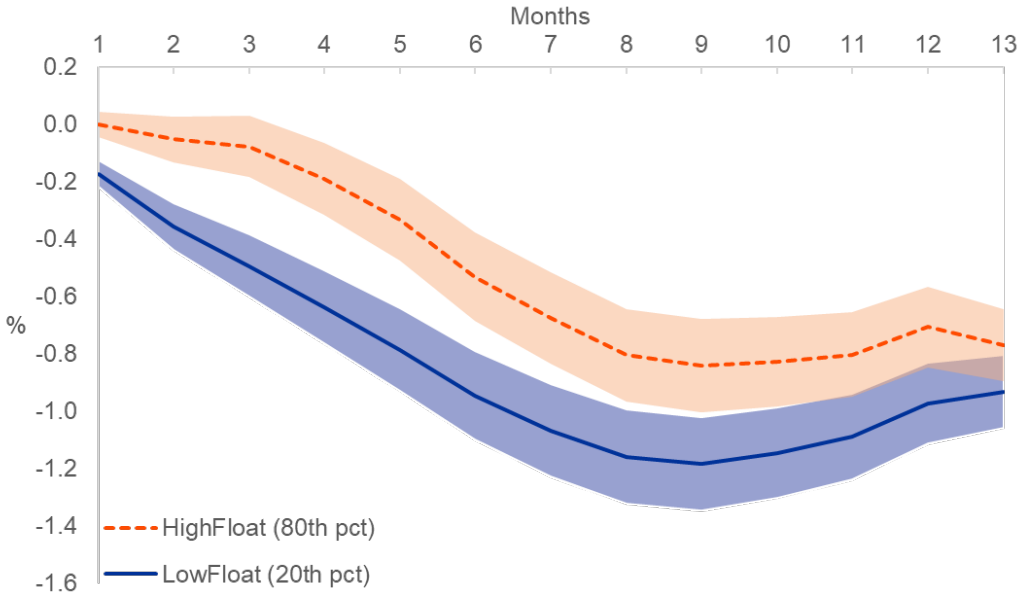
(years)



Source: Vilerts et al. (2025). Notes: (1) new loans to euro area NFCs (excluding financial and insurance activities) issued in 2022-2023, denominated in euro, exceeding €25,000, with a positive interest rate. The sample consists of the following types of loan: credit lines other than revolving credit, revolving credit and other loans, excluding syndicated loans. Fixed rate loans have interest rates that remain constant over the entire duration of the loan. NA means not available. Floating rate loans have interest rates that adjust over time. Shares are value-weighted. The horizontal axis represents the country of residence of the bank.(2) The figure shows the weighted average maturity of the relevant risk-free rate for the newly issued loans of NFCs in euro area countries, 2022-23.

Local interest rate fixation practices can influence transmission all the way to inflation

Inflation response to monetary tightening: fixed versus variable-rate borrowing



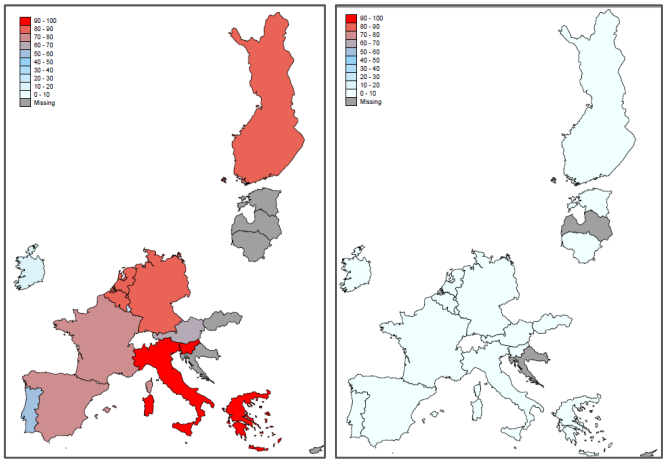
Source: Core, De Marco, Eisert, Schepens (2025). Notes: Impulse response functions for 1 percentage point increase in the deposit facility rate. Estimated with monthly data for firms at the industry-country level from July 2021 to July 2023. Shaded areas represent 95% confidence bands.

Cross-country segmentation is exacerbated by strong home bias in lending, not found in corporate bonds mkts

Home bias in corporate bonds and bank loans

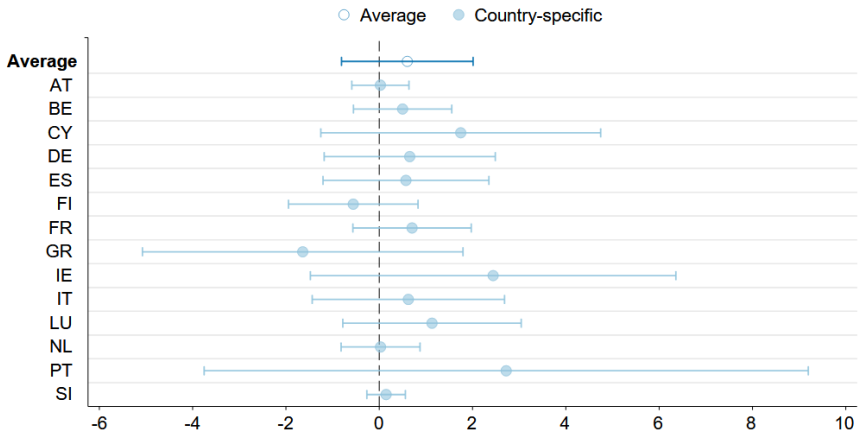
(1) Loans to bond-issuing firms by local banks

(2) NFC bonds held by local banks



Country-specific responses to EA MP surprises

(basis points)



Sources: Chitu et al. (2026). Notes: (1) The map shows the share of NFCs loans issued by domestic banks. For each country, the share is calculated as the sum of the outstanding nominal amounts for loans issued by domestic banks over the sum of outstanding nominal amounts for loans issued by all banks over the sample period. Only loans at issuance are considered. The definition of domestic bank is based on firm's and bank's country of incorporation. Sample period: December 2019 - January 2024. (2) The map shows the share of NFCs bonds held by domestic banks. For each country, the share is calculated as the market value holdings by domestic banks over the bond's outstanding amount at the end of each quarter. The map shows the median share by country over the sample period. The definition of domestic holdings is based on the firm's country of risk. Sample period: 2009 Q1 - 2024 Q4. (3) The chart shows the estimates of bond spreads responses following one basis point contractionary monetary policy surprise. The MP surprise is the pure monetary policy surprise from Jarocinski and Karadi (2020). The dependent variable is the change in option adjusted spreads of bond i issued by the firm j belonging to sector s located in country c between the day before the ECB announcement and 5 days after the announcement. Spreads are measured in basis points. Standard errors are clustered two-way, at the firm and time level. Sample period: Aug 2006 - Sep 2023. Daily data.

Moving to banks, these remain active filters of MP transmission

- At the bank level, bank balance sheet strength remains a first-order driver of heterogeneous monetary policy transmission
  - transmission is stronger for banks that are more balance-sheet constrained (bank lending channel)
- **New results also highlight how the composition of bank funding is a key filter of the transmission** to loan rates and a source of amplification of other shocks
  - Key differences in how wholesale vs retail funding respond to MP shocks
- While it continues to amplify the pass-through of monetary tightening, **risk perception is triggered by new dimensions** (speed of adjustment to green transition, exposure to geopolitical shocks,…)

Finally, firms are not neutral recipients of MP

- At the firm level, monetary policy transmission **depends critically on financing structure, market access, and balance-sheet constraints**
  - New results show that large, bond-dependent firms are more exposed to unconventional policy tightening while smaller, bank-dependent firms are more affected by conventional short-term policy rate hikes

- Monetary policy affects firms asymmetrically depending on size, age and their liquidity and wealth
  - Young and small firms face tighter credit constraints and adjust investment more strongly following monetary tightening, implying a disproportionate real response among firms that are key for productivity growth.

ChaMP takeaways on monetary policy transmission from banks to firms in the EA

- Heterogeneity is an inherent feature of monetary policy transmission to firms in the EA

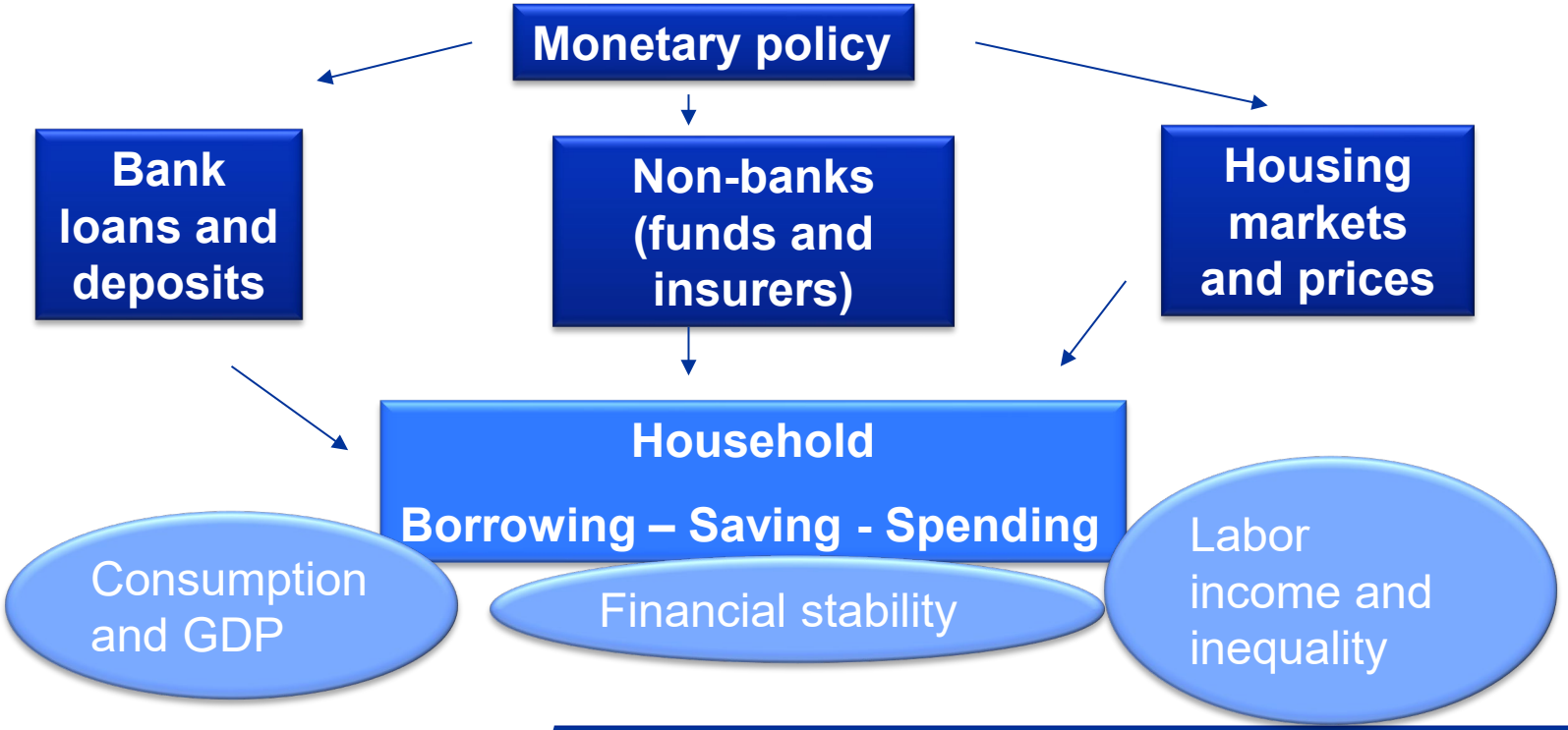
- Deeper integration and stronger financial positions would support a smoother and more predictable transmission of monetary policy
  - Strong case for completing the Savings and Investments Union and the Banking Union

- While the deposit facility rate remains the primary policy instrument, a smooth pass-through may, where necessary, require a broader toolkit, consistent with the principle of proportionality

Monetary policy transmission through the financial system to households

Diana Bonfim, Laura Moretti, Alicia Aguilar, Simone Auer, Emil Bandoni, Tamás Briglevics, Dominic Cucic, Annalisa Ferrando, Olivier De Jonghe, Stephen Kho, Caterina Mendicino, Maria Rodriguez-Moreno, Stefano Pica, Afonso S. Moura

Monetary policy reaches households through interconnected channels



What did we learn about transmission to households?

1 **Through whom?**

Banks and increasingly non-bank intermediaries

2 **To whom?**

Households differ by debt, wealth, age and mortgage type

3 **How fast?**

Spending can react within days or weeks

4 **What does this imply?**

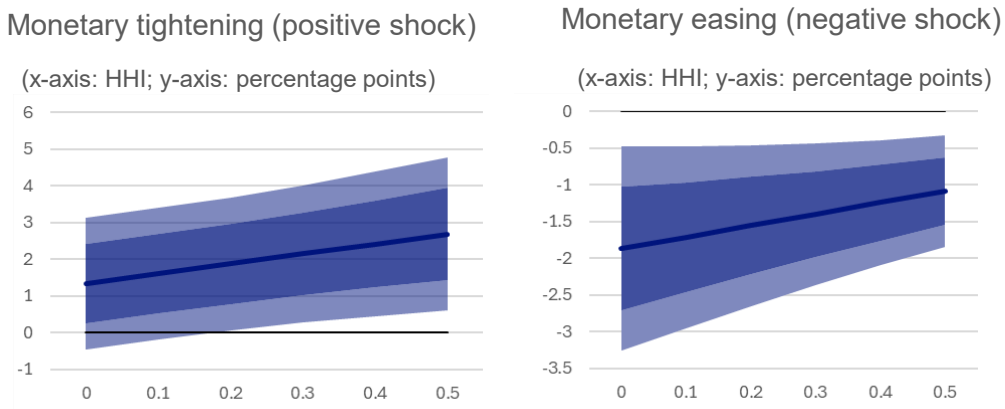
Need for richer data, models and coordination

Financial intermediaries matter: competition

- Deposit-rate pass-through is not uniform across euro area banking sectors: **the transmission to deposit rates in more concentrated banking sectors is slower when rates rise and faster when rates decline**

- Market structure affects how quickly households feel monetary policy

Heterogeneous deposit spread response by banking sector concentration



Notes: The figures show the response of bank deposit rates (weighted average of overnight deposits held by households and non-financial corporations) by degree of banking sector concentration (measured in terms of HHI) in response to either a 100-basis-point positive shock or a 100-basis-point negative shock, four months after impact. Shaded areas correspond to 68% and 90% confidence.
Source: Kho (2025).

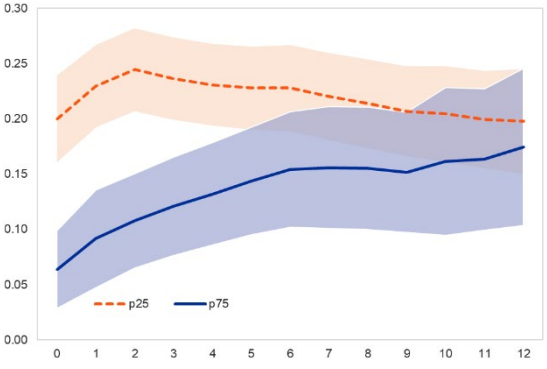
Financial intermediaries matter: funding

- **Deposit funding dampens pass-through**, but mostly in the short run
- Deposit market power has a more persistent effect
- This can spill over **from deposit rates to household borrowing costs**
- The funding structure of **non-banks**, which play an increasingly important role, also shapes transmission (OP3)

State-dependent pass-through to interest rates on households' overnight deposits

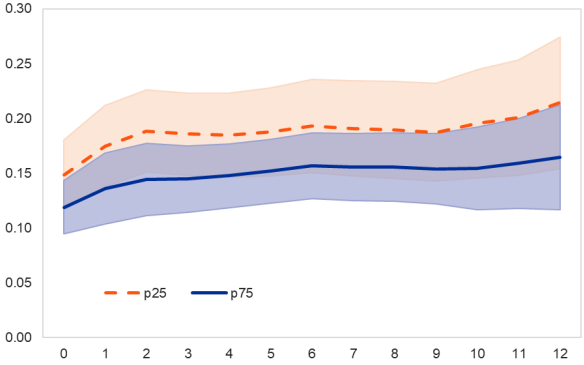
Conditioning on deposit funding

(x-axis: month; y-axis: percentage points)



Conditioning on deposit market power

(x-axis: month; y-axis: percentage points)



Notes: The figures show the impulse response of interest rates on households' overnight deposits to a monetary policy shock, conditioning separately on deposit funding (panel a) and deposit market power (panel b). The two lines, p25 and p75, denote, respectively, the first and third quartile of the distribution of the conditioning variable. See Auer et al. (2026) for more details.
Source: Auer et al. (2026).

ChaMP coordinated cross-country project:

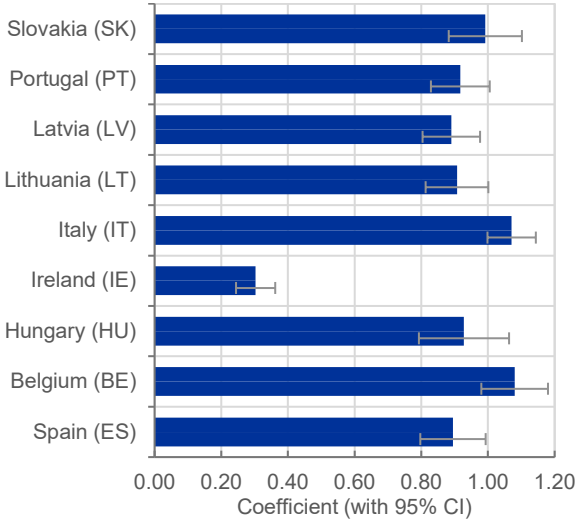
Household borrowing and monetary policy transmission: post-pandemic insights from nine European credit registers

- **Coordinated cross-country project** (9 euro area countries: Belgium, Hungary, Ireland, Italy, Latvia, Lithuania, Portugal, Slovakia and Spain).
- **Broad topic: transmission of monetary policy through household loans** (mortgages and consumer credit) **using national credit register data.**
- **Focus**: stylised facts describing the transmission **after the pandemic** (2022:06-2024:12). Special emphasis on dimensions not available in iBSI/iMIR data (detailed maturity, collateral, age of borrower).

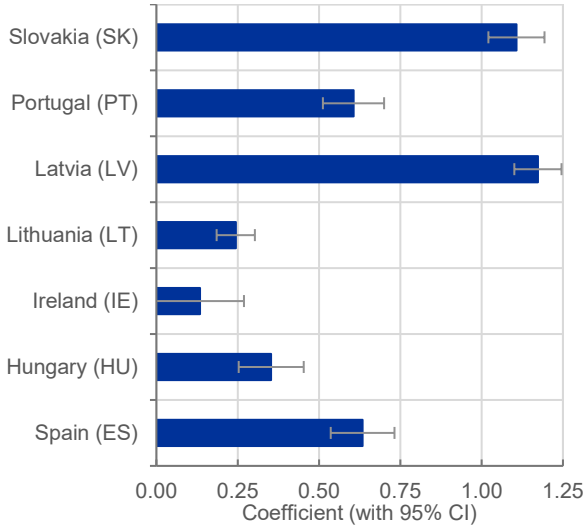
Not all frictions in transmission can be explained by loan and borrower characteristics

- After controlling for all possible loan and debtor characteristics, differences in pass-through remain.
- These are small in mortgages, but large in consumer loans.

Total pass-through of monetary policy to mortgages rates



Total pass-through of monetary policy to consumer loans rates



Notes: Figures plot monetary policy pass-through by country, based on ECB WP 3146 (Jan 2022–Dec 2024). Coefficients represent deviations from the Spanish baseline, estimated via weighted least squares on binned, granular credit register data. Regressions control for loan maturity, interest-rate fixation, and borrower age. Errors reflect 95% confidence intervals based on cluster-robust standard errors.

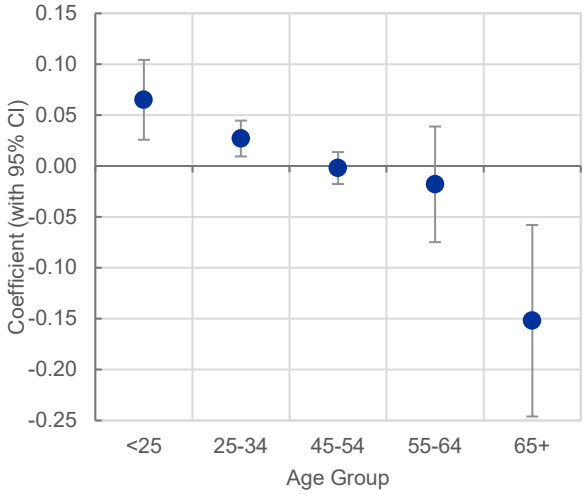
De Jonghe et al. (2025)

Aging affects policy rate pass-through differently in mortgage and consumer loan markets

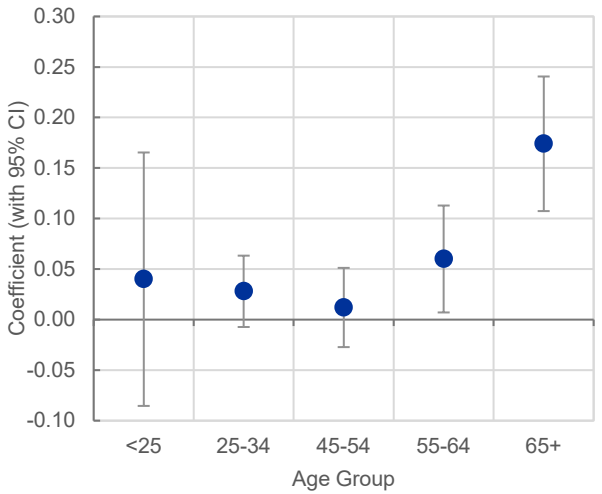
- Borrower age as a novel factor
- Seasoned borrowers in mortgage markets less affected by monetary tightening (credit history, wealth)
- But more affected in consumer loan markets (mainly risky individuals borrow at that age?)
- Aggregate effects of an aging society on monetary transmission

De Jonghe et al. (2025)

Pass-through of monetary policy to mortgages rates



Pass-through of monetary policy to consumer loans rates

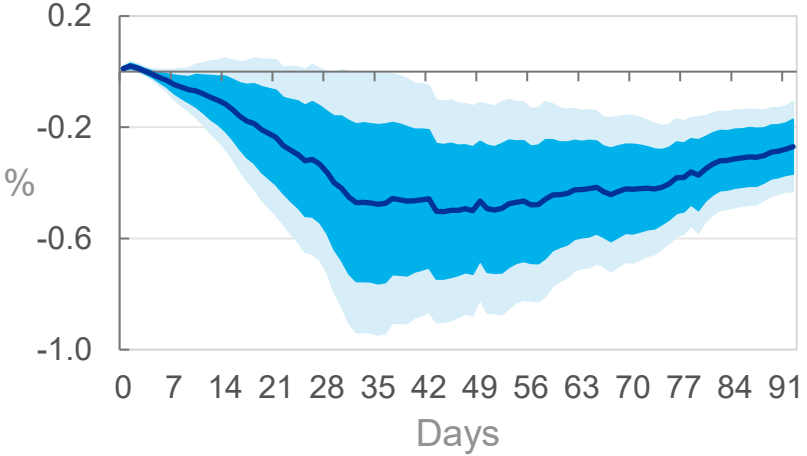


Notes: Plotted coefficients show relative interest rate pass-through by age, derived from harmonized credit register data for new household loans in 9 EU countries (BE, ES, HU, IE, IT, LT, LV, PT, SK) from January 2022 to December 2024. For privacy, data is aggregated into granular bins. Coefficients are estimated via weighted least squares regressions interacting reference rates with age groups, where the 35-44 age group is the omitted baseline.

Some elements of aggregate demand react surprisingly fast

- Proxies of consumption or household spending components respond within weeks!
- Cash-flow exposure from variable-rate borrowing induces rapid and persistent adjustments → transmission fast in high-debt variable-rate environments
- No proof that long lags do not dominate overall, but value as early indicators
- Granular high-frequency data only available for Spain and Norway

Consumption (proxied) response to monetary tightening (Spain)



Notes: Impulse response function for 1 standard deviation (3.7 bp) monetary tightening shock. Estimated with daily data from August 2015 to October 2023. Dark blue shaded area represents 68% confidence band, light blue 90%.

Buda et al. (2025)
Ahn, Galaasen and Mæhlum (2024)

Housing shapes transmission

- **Housing-market structure** changes the strength of monetary transmission
- Effects are larger where **household balance sheets and mortgage markets amplify** policy
- Households **refinancing** and renegotiation choices also matter
- Household wealth and mortgage cash flows also **spill over to SMEs and entrepreneurs**

Impact of monetary policy on regional GDP and regional housing-related factors

(y-axis: cumulative percentage change in GDP; x-axis: various units, see Notes)

Notes: The y-axis reports the cumulative percentage change in GDP three years after an accommodative monetary policy shock. The x-axis reports the homeownership rate (percent), house prices, construction share of GDP (percent), LTV ratio (percent), LTI ratio (percent), and the share of fixed rate loans (percent of total loans). Each dot represents a NUTS 2 region in a sample of eight euro area countries (Belgium, Germany, Spain, France, Ireland, Italy, the Netherlands and Portugal).
Source: Battistini et al. (2025).

ChaMP takeaways on monetary policy transmission from banks to households in the euro area

Financial intermediaries matter

Banks and non-banks jointly shape transmission.

Households are heterogeneous

Debt, wealth, age and mortgage type determine responses.

Transmission is fast

Consumption can react within days or weeks.

Housing amplifies transmission

Mortgages, house prices and refinancing matter.

Policy interactions matter

Macroprudential policy shapes effectiveness.

Monitoring monetary policy transmission requires a system-wide and data-driven view of households and financial intermediaries.

Monetary policy transmission and non-bank financial intermediation

Sofia Anyfantaki, Ricardo Barahona, Dominic Cucic, Daniel Fricke, Philipp Hartmann, Christoph Kaufmann, Elizaveta Lukmanova, Angela Maddaloni

Overall, strength of monetary policy has not weakened

Key message: Non-banks can strengthen monetary policy transmission, in aggregate

Three key channels:

1. Non-bank **liability structures** determine whether monetary policy transmission to credit is amplified or attenuated

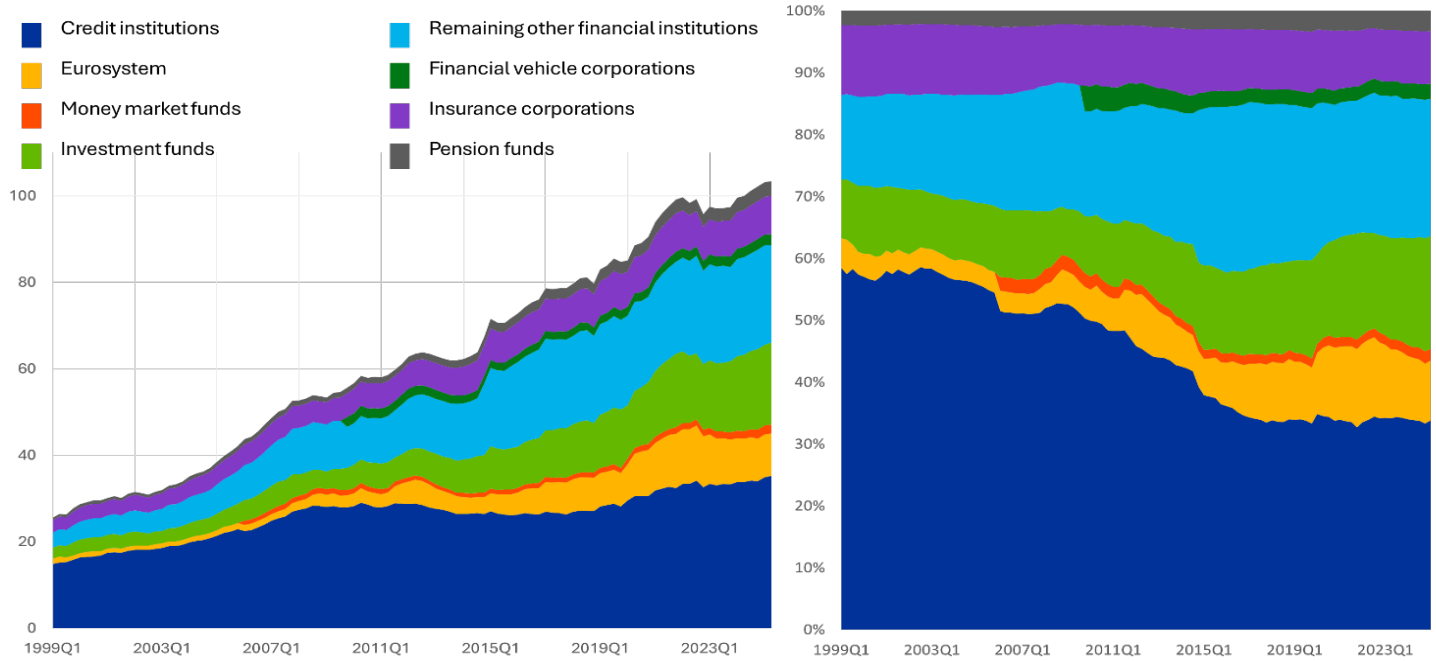
2. Transmission through non-banks is **state-dependent**, with stronger amplification during periods of financial stress

3. Non-banks shape monetary policy transmission beyond lending via **portfolio rebalancing** and collateral dynamics

Overall: Transmission has become more complex, more market-sensitive, and more closely linked to financial stability

The rise of NBFIs makes them increasingly relevant to monetary policy transmission

(total assets in EUR trillion (left); percentages (right panel); Q1999-Q2 2025)



Notes: The aggregated (non-consolidated) assets of sub-sectors include financial assets and exclude non-financial assets. Remaining other financial institutions include security and derivative dealers, financial corporations engaged in lending (such as leasing or factoring companies), specialised financial corporations (including venture capital companies, export/import financing companies or some central clearing counterparties), financial auxiliaries (including for example asset management companies, securities brokers, investment advisers, insurance brokers or exchanges) as well as captive financial institutions and money lenders (including for example financial holding companies, funding vehicles of non-financial corporations – e.g. supporting their debt securities issuance – and other entities that channel financial flows within non-financial corporations). Data on money market funds are reported separately from credit institutions only as of Q1 2006. Data on financial vehicle corporations, which are undertakings carrying out securitisation transactions, are reported separately from remaining other financial institutions as of Q4 2009.
Source: ECB.

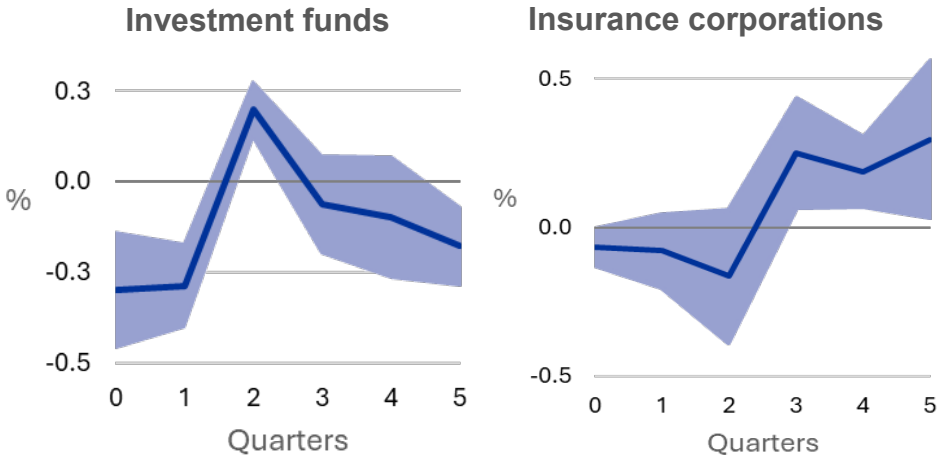
1. Non-bank liability structures determine whether monetary policy transmission to credit is amplified or attenuated

Key message: NBFIs tend to amplify monetary policy in the aggregate, especially when they are financed short term

- Non-bank sector is highly **heterogeneous**
- Investment funds and retail credit firms rely on **short-term** financing
- Insurance corporations, pension funds and specialised finance providers have stable **long-term** funding
- These differences matter for monetary policy transmission

NBFIs amplify monetary transmission to credit in the aggregate, but long-term funded ones can induce attenuation effects

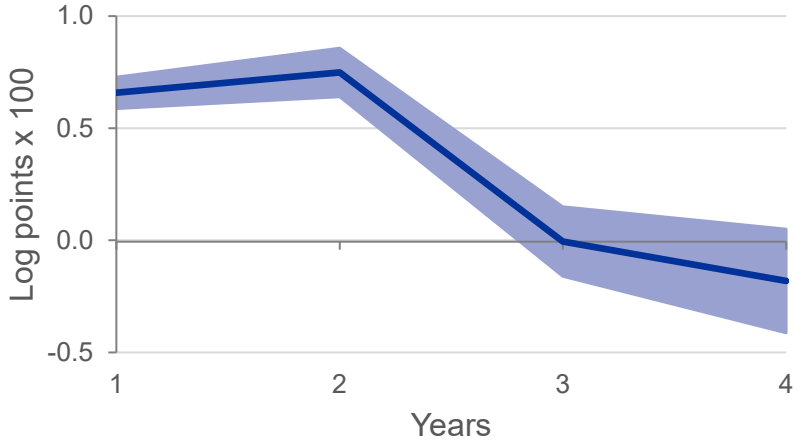
Loan response to monetary tightening, by sector (euro area)



Notes: Impulse response function for 1 basis point monetary tightening shock. Estimated with quarterly data from 2009 to 2022. Shaded areas represent 68% confidence bands. Tightening is further amplified in all sectors under high financial stress.

Tiza Mimun et al. (2025)

Loan response of non-bank lenders to monetary tightening, relative to banks (Denmark)



Notes: Relative effect of 1 standard deviation (7.6 bp) monetary tightening shock on non-bank lending compared to bank lending. Estimated with yearly data at the borrower-lender-year level from 2003 to 2018. Shaded areas represent 90% confidence bands. Non-bank lenders include specialised finance companies, financial leasing companies and wealth managers.

Cucic and Gorea (2025)

2. Transmission through non-banks is state-dependent, with stronger amplification during periods of financial stress

Key message: Financial stress amplifies monetary policy effects, with heterogeneous responses across non-banks

- Financial stress amplifies contractions, with effects varying by NBFI type
- Investment and money market funds are most liquidity-sensitive
- Insurers and pension funds response is more muted, sometimes counter-cyclically
- Tightening triggers stronger outflows in stressed periods and more fragile institutions
- Non-banks propagate shocks across financial markets

Non-bank fragility can amplify shocks across the financial system

Short-term funding exposure of banks and new lending during period of stress

Notes: Marginal effects estimated via regression of a higher exposure to investment fund deposits on changes in selected outcome variables for loans negotiated over the period rom 11 March 2020 up to 18 March 2020.

Nicoletti, Radiga and Rodriguez d'Ácri (2025)

- The importance of non-bank financing for euro area banks has grown significantly, mainly in the form of deposits by investment funds and insurance and pension funds
- Funds' own stress (or inherent fragility) can propagate to banks
- Banks' growing reliance on short-term wholesale funding from investment funds makes then more vulnerable

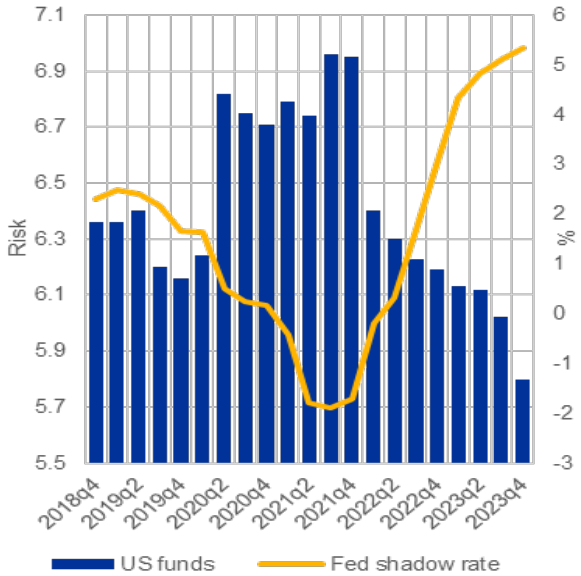
3. Non-banks shape monetary policy transmission beyond lending via portfolio rebalancing and collateral dynamics

Key message: NBFIs reallocate portfolios in response to monetary policy across assets, maturities, and risk

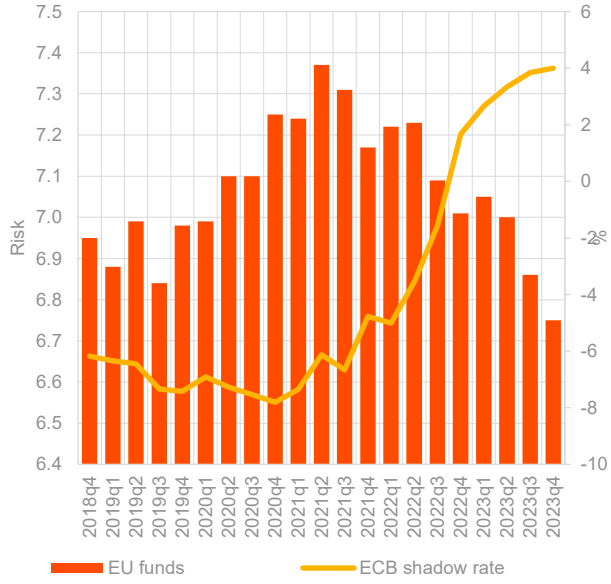
- NBFIs are now the largest holders of euro area securities, with portfolio structures reflecting distinct asset exposures
- Investment funds span broad mandates; money market funds hold short-term, high-quality assets, while insurers and pension funds hold long-duration, safer assets
- Monetary policy has strong and heterogeneous effects on fund flows, often interacting with procyclical behaviour and fragility in some funds
- Monetary easing drives portfolio shifts toward riskier, lower-rated, and longer-dated assets

Loose monetary policy can encourage greater risk-taking by NBFIs

US investment funds and Fed shadow rate



EU investment funds and ECB shadow rate

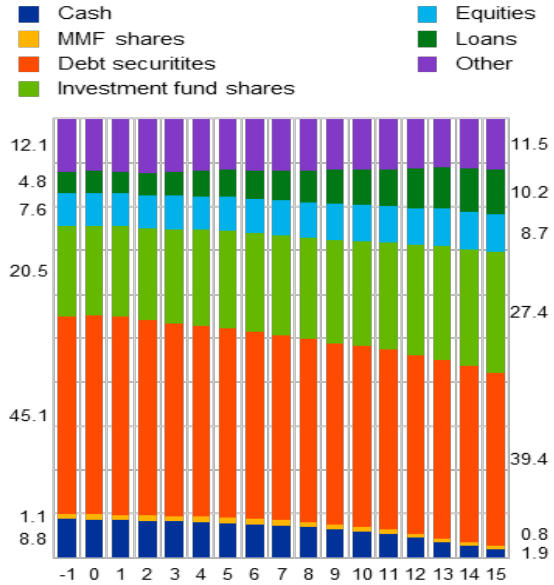


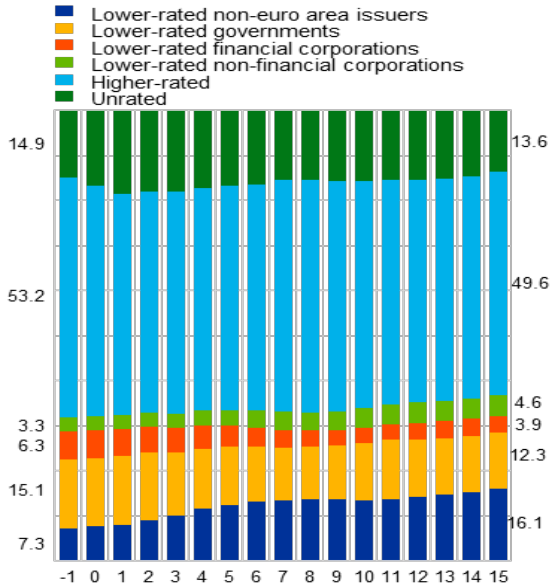
Notes: Left panel shows the median weighted-average credit rating of US bond funds (blue bars) alongside the Fed's shadow rate (yellow line) from Wu & Xia (2016). Right panel presents the same for euro area bond funds (orange bars) and the ECB's shadow rate. The sample period is 2018:Q1 to 2023:Q4.

Anyfantaki, S., Giannakidis, C., Malliaropulos, D., Migiakis, P. and Petroulakis, F. (2026).

Monetary easing prompts insurers to shift toward riskier, lower-rated assets

Balance sheet response of insurance corporations to monetary policy loosening





Notes: Projected evolution of insurance corporations' balance sheet composition following an expansionary high-frequency monetary policy shock inducing a 10 basis point decrease of the term structure factor, normalised to the 5-year Bund rate. Quarterly insurance company balance sheet data for euro area countries from 2008 to 2021 from the ECB's Insurance Corporation Statistics and, until 2016, the Insurance Corporations and Pension Funds Statistics, complemented with granular security-level information from the ECB's Securities Holdings Statistics by Sector (SHSS). x-axis shows quarters after the shock. The bar denoted "-1" represents the sample average for each item.

Kaufmann, C., Leyva, J. and Storz, M. (2024)

ChaMP takeaways on monetary policy transmission through NBFIs

1. Non-banks are highly diverse, with **heterogeneous** balance sheets, funding models, and regulatory constraints

2. The expansion of NBFIs **has not weakened** monetary policy transmission; instead, effects depend on their liability structures

   - In aggregate, NBFIs can amplify monetary transmission within the financial system, particularly when financed short-term

3. Monetary transmission through NBFIs is **state-dependent**

   - Financial stress can amplify contractions, while stress in funds can propagate shocks through linkages with banks

Occasional Papers related to ChaMP WS1

No 389, “Monetary policy transmission via banks to firms”

No 390, “Monetary policy transmission through the financial system to households”

No 391, “Monetary policy transmission and non-bank financial intermediation”