Long-Term Debt and Short-Term Rates: Fixed-Rate Mortgages and Monetary Transmission

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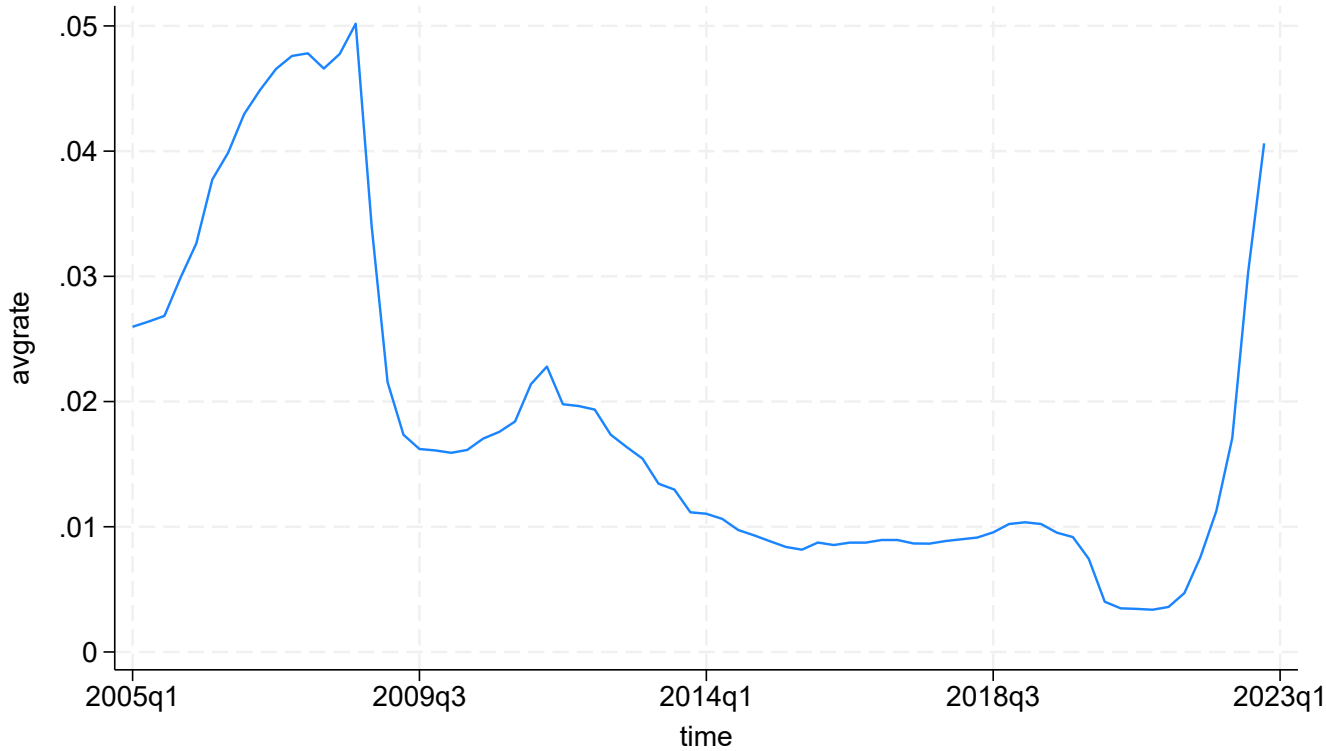
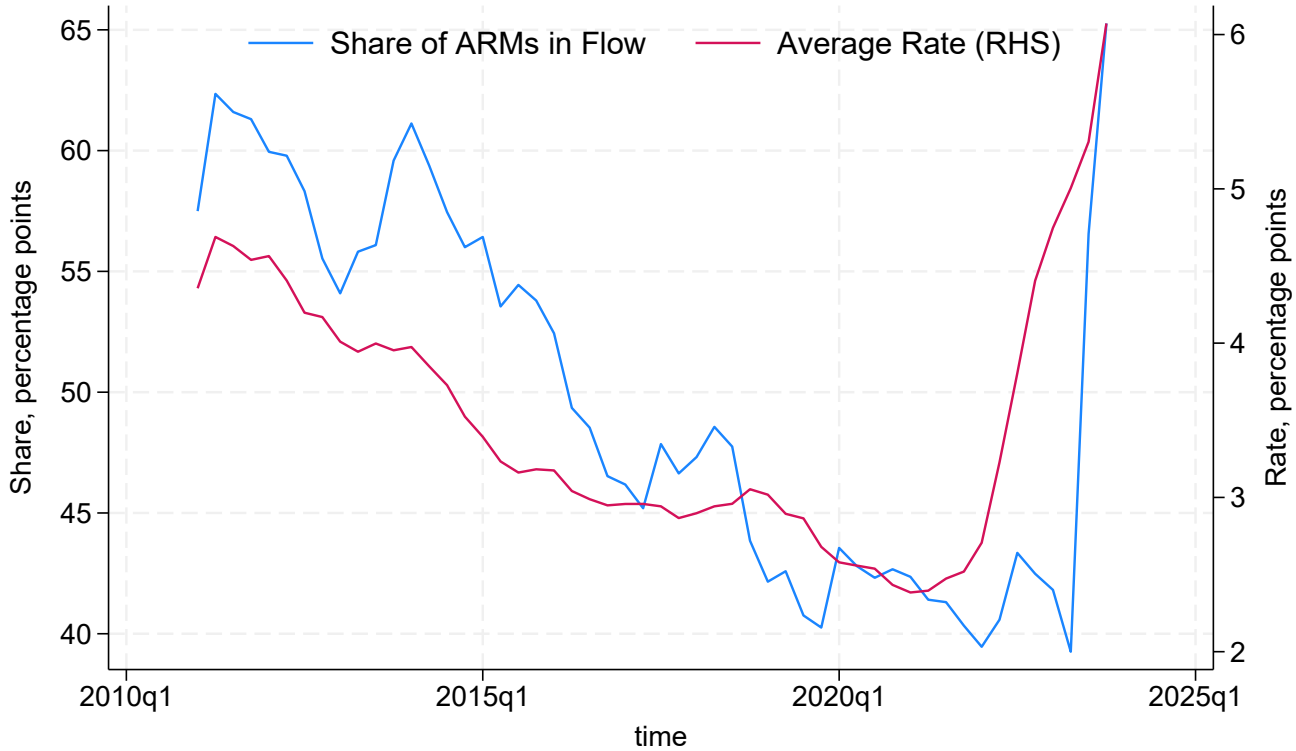
A global tightening cycle following a decade close to ZLB



Average policy rate, EOP. Average is measured across 35 advanced and emerging market economies. Source: Bloomberg

Share of ARMs in new originations broadly tracks mortgage borrowing costs



ARMs as a share of new mortgage originations, average across 26 advanced economies and emerging-markets. Source: National central Banks' data.

This paper: path and state-dependent effects of monetary policy

- How does MP affect the relative share of ARM/FRM originations today?
- How does the relative prevalence of FRMs in the *stock* of outstanding loans affect monetary policy transmission going forward?
- New data: Evolution of FRM/ARM share within and across countries (quarterly panel: 35 countries, avg span of 15 years)

Relation to existing literature

1. What drives mortgage choice? Risk premia, cost minimization, expectations? (Koijen et al., 2009; Badarinza et al., 2018, Albertazzi et al., 2024, Andersen et al., 2023)
2. State dependent effects of MP: FRMs dampen transmission (Calza et al., 2013; Pica, 2021; Corsetti et al., 2022; Di Maggio et al., 2017; Flodén et al., 2021; Berger et al., 2021; Eichenbaum et al., 2022).

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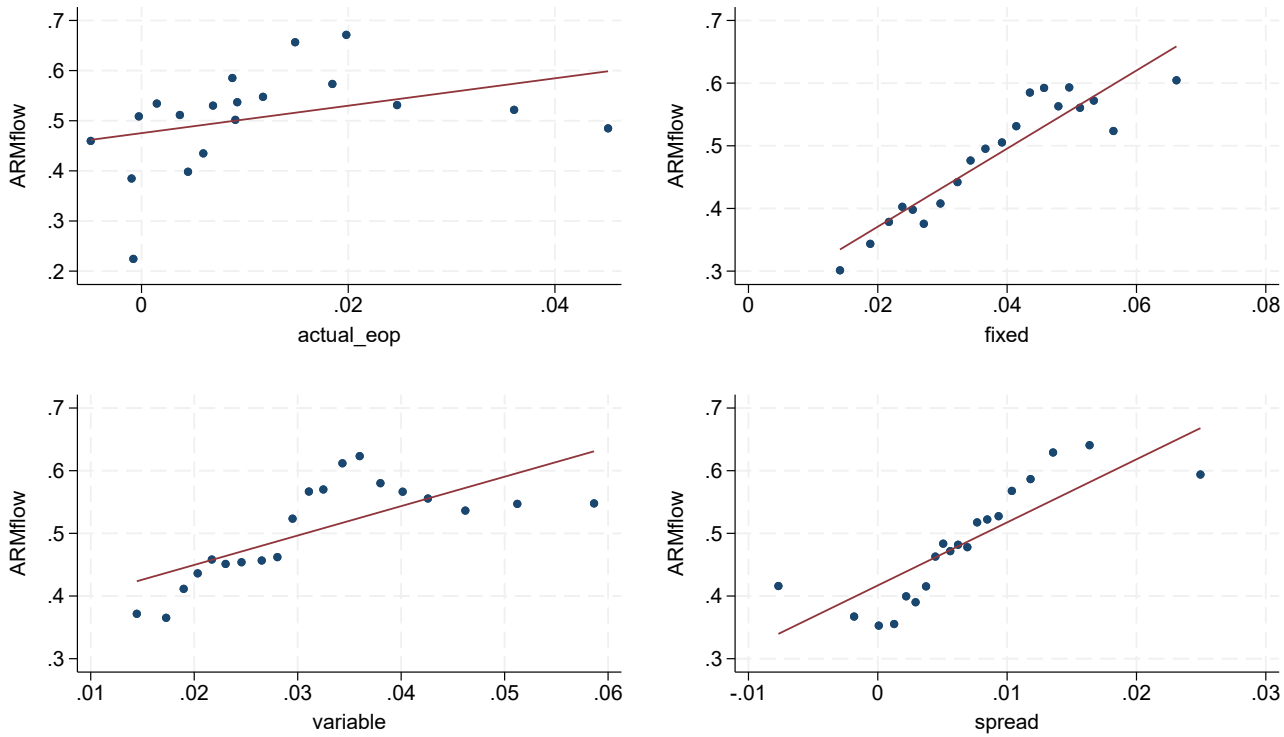
Contribution

- Show that FRM originations depend on monetary policy cycle: loosening increases share of FRMs, and vice versa (path dependency)
- Quantify role of changing composition of the ARM/FRM stock in determining strength of transmission (state dependency)
- Bonus: new dataset covering up to 35 AEs and EMEs; composition of mortgage flows and *stock* at a quarterly frequency over the past 15 years

Interest Rates and Mortgage Choice

ARM originations positively correlated to level of borrowing costs and FRM-ARM spread



Charts display the average correlation of within country changes in the share of ARMs in new originations and changes in interest rates. Clockwise: EOP policy rate; rates on new FRMs; spread between FRM and ARM; rates on new ARMs

Monetary policy and composition of mortgage flows: methodology

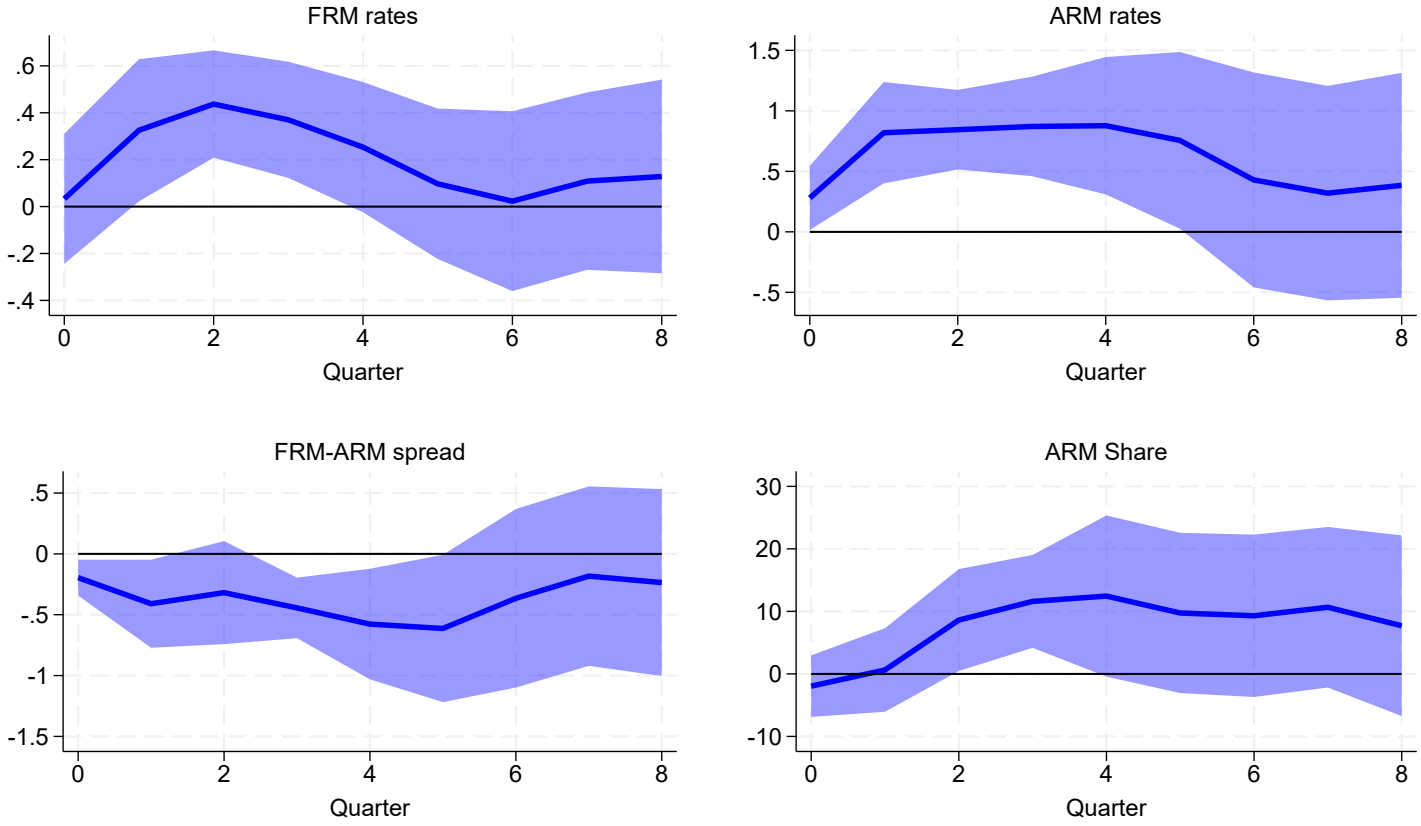
IV-LP a la Jordà et al., 2015:

$$y_{c,t+h} - y_{c,t-1} = \alpha^h + \beta_1^h \widehat{Deltarate_{c,t}} + \sum_{l=0}^{3} \beta_l^h \Delta X_{c,t-l} + \sum_{l=1}^{4} \rho_l^h \Delta y_{c,t-l} + \theta_t^h + \gamma_c^h + \varepsilon_{c,t+h}^h$$

- $y_{c,t+h} - y_{c,t-1}$ is the cumulative change in outcomes between $t-1$ and quarter $h = 0, ..., 8$
- $Deltarate_{c,t}$ is the quarterly change in country c's policy rate; this is instrumented with country-specific **monetary policy shocks** cleaned of information effects MP Shocks
- X and $y_{c,t-l}$ controls for 4 lags of changes in GDP, CPI, House prices, HH credit and real private consumption; as well as four lag of changes in the dependent variable

Effects of 100bpp policy rate change: new loans and rates

$$y_{c,t+h} - y_{c,t-1} = \alpha^h + \beta_1^h \widehat{Deltarate}_{c,t} + \sum_{l=0}^{3} \beta_l^h \Delta X_{c,t-l} + \sum_{l=1}^{4} \rho_l^h \Delta y_{c,t-l} + \theta_t^h + \gamma_c^h + \varepsilon_{c,t+h}^h$$



Shaded areas represent 90 percent CIs, computed using Driscoll-Kraay standard errors with 3 lags.

Other outcomes | OLS | Surprises

Tightening cycles are associated with rising shares of ARMs, and vice versa

Tightening increases share of ARMs even if FRM-ARM spread *declines*

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Tightening increases share of ARMs even if FRM-ARM spread *declines*

1. **Expectations of future rates**: if consumers see tightening as temporary, ARMs become more appealing even if they become relatively more expensive (avoid lock-in on a high-rate FRM)
2. **Short run cost minimization/budget constraints**: spread FRM-ARM is not the main driver of mortgage choice: rather level of borrowing costs is what matters. As FRM rates often higher than ARM rates, people prefer ARMs when borrowing costs rise

TBD: tease out which mechanism dominates empirically

Long run effects: over time, monetary policy changes the composition of the mortgage stock

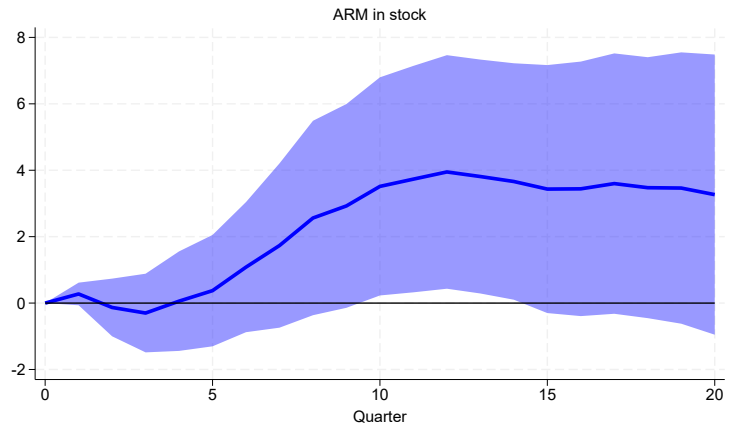


Figure: IV-LP: share of ARM stock response to 100bpp tightening in policy rates

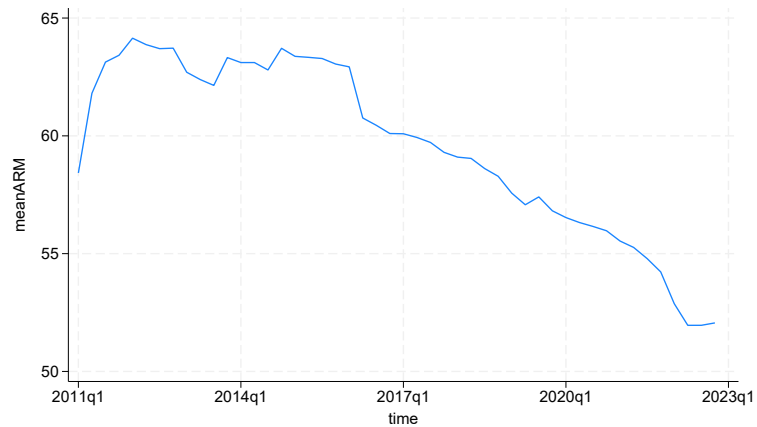


Figure: Average share of ARMs in stock: 35 countries, 2011-2023

- What does this mean for monetary transmission?

State-dependent effects of MP: methodology

IV-LP a la Jordà et al., 2015:

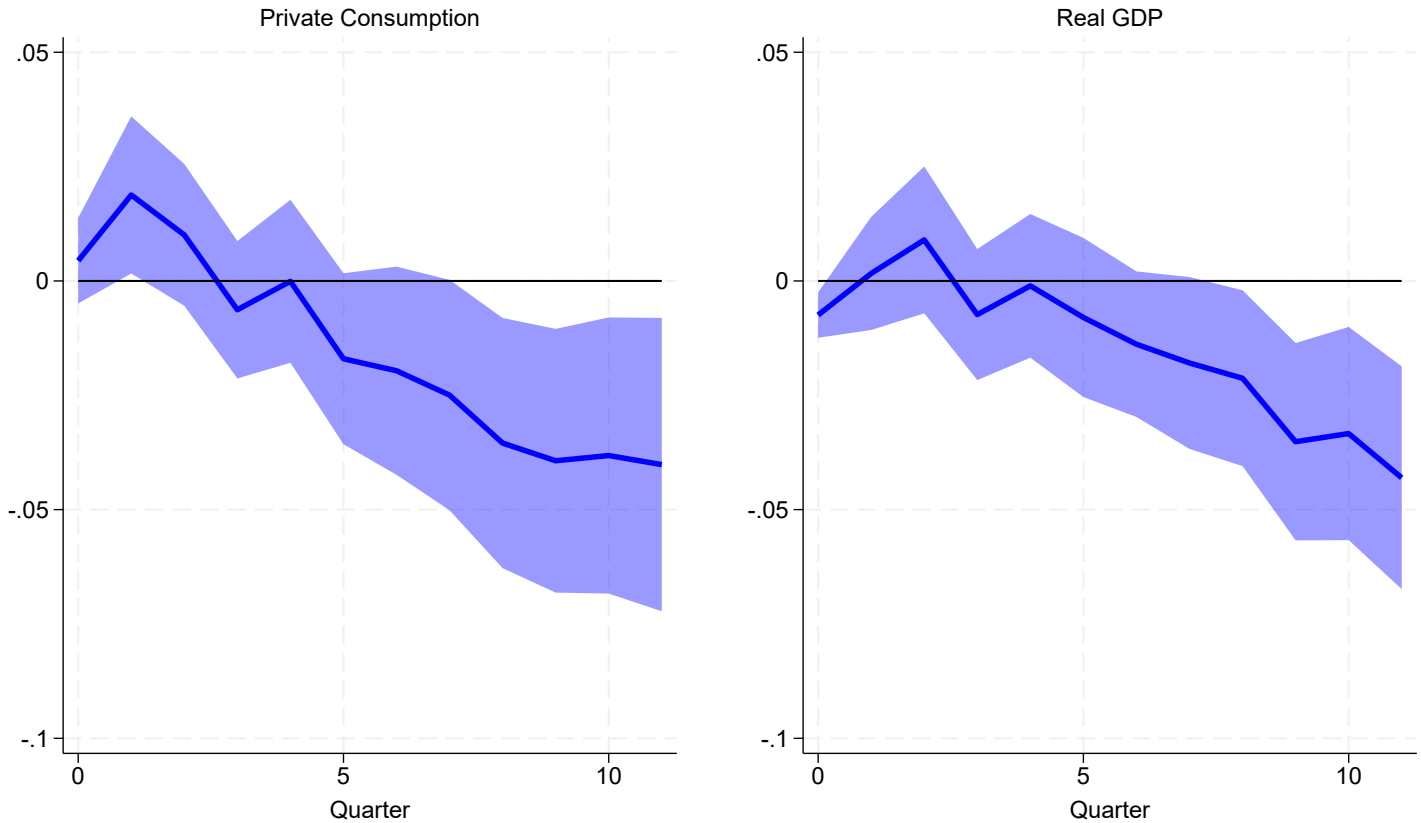
$$y_{c,t+h} - y_{c,t-1} = \alpha^h + \beta_1^h \widehat{Deltarate_{c,t} \times ARM_{c,t-1}} + \beta_2^h \widehat{Deltarate_{c,t}} + \beta_3^h ARM_{c,t-1} + \sum_{l=4}^{1} \beta_l^h X_{c,t-l} + \theta_t^h + \gamma_c^h + \varepsilon_{c,t+h}^h$$

Where:

- $Deltarate_{c,t}$ is the quarterly change in country c's policy rate; this is instrumented with country-specific **monetary policy shocks** cleaned of information effects MP Shocks
- $ARM_{c,t-1}$ is the ex-ante share of adjustable-rate mortgages, expressed as a proportion of the mortgage stock
- β_1^h is the coefficient of interest, measuring the differential effect of 1p.p. change in policy rates for a 1 unit increase in the share of ARM in stock
- We test different versions of this model, including double interaction between ARM share and HH debt outstanding; and rescaling ARMs by the share of debt to GDP

State-dependent effects: real private consumption declines more the larger the share of ARMs in stock

$$y_{c,t+h} - y_{c,t-1} = \alpha^h + \beta_1^h \widehat{Deltarate_{c,t} \times ARM_{c,t-1}} + \beta_2^h \widehat{Deltarate_{c,t}} + \beta_3^h ARM_{c,t-1} + \sum_{l=4}^{1} \beta_l^h X_{c,t-l} + \theta_t^h + \gamma_c^h + \varepsilon_{c,t+h}^h$$



Shaded areas represent 90 percent CIs, computed using Driscoll-Kraay standard errors with 3 lags.

Conclusions

FRMs induce **path-dependence** and **state-dependence** in monetary policy transmission:

1. Loosening (tightening) cycles reduce (increase) the share of ARMs in the stock of debt
2. A larger stock of ARMs aids MP transmission to the real economy (after 6 quarters, the consumption response to 1pp change in rates is 5pp larger in a setting with only ARMs relative to one with only FRMs)

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Policy implications: transmission of tightening impulse after long period of low rates may be impaired:
share of FRMs in stock is higher and refinancing incentives weak (Berger et al., 2021), (Eichenbaum et al., 2022).

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MP shocks

1. Compile average forecast errors $(r_a - \mathbb{E}r_a)$ on expected policy rates from professional forecasters (Bloomberg); submitted up to one day before announcement; country/announcement-specific
2. To account for CB information effects, we follow Bauer and Swanson (2023) and regress forecast errors on:

$$r_a^c - \mathbb{E}r_a^c = \alpha^c + \sum_{j=1}^{2} \beta_j^c \left(RGDP_{a,-j}^c - \mathbb{E}RGDP_{a,-j}^c \right) + \sum_{j=1}^{6} \gamma_j^c \left(\pi_{a,-j}^c - \mathbb{E}\pi_{a,-j}^c \right) + \delta S_{a-181,a-1}^c + \epsilon_a^c$$

- vector $\sum_{j=1}^{2} \beta_j^c$ controls for surprises prior to announcement a in RGDP growth, from Bloomberg
- $\sum_{j=1}^{6} \gamma_j^c$ controls for surprises prior to announcement a in monthly inflation, also from Bloomberg
- and $S_{a-181,a-1}$ is the change in the national stock price index in the prior 180 days
- Residual ϵ_a^c is the country-announcement specific **monetary policy shock**, used to instrument the change in policy rates

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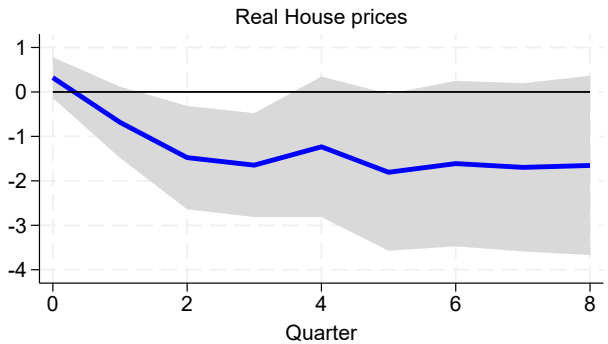
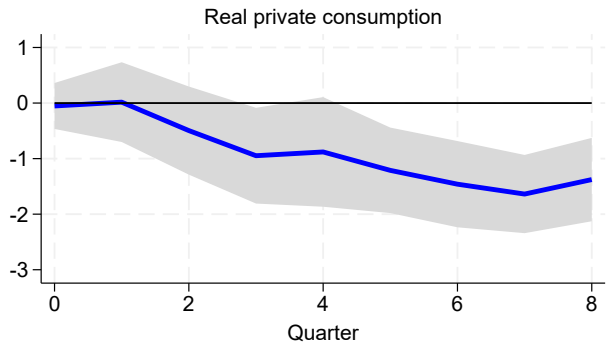
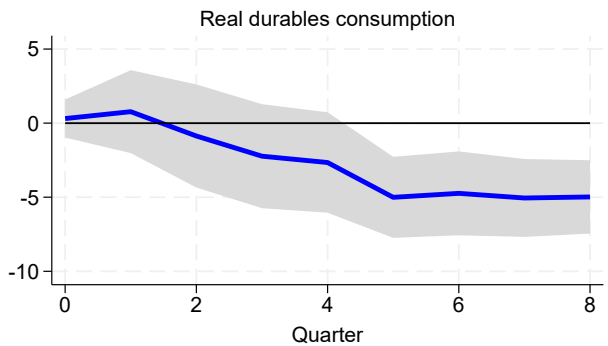
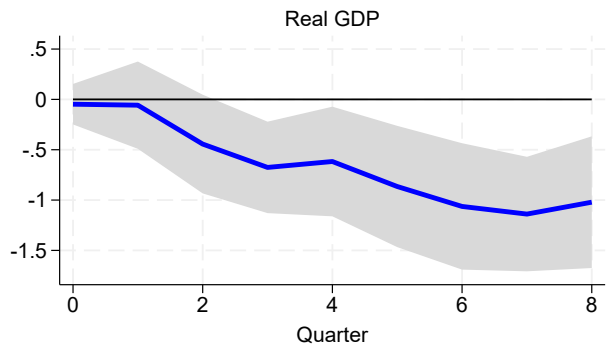
Baseline: Other outcomes









Notes:

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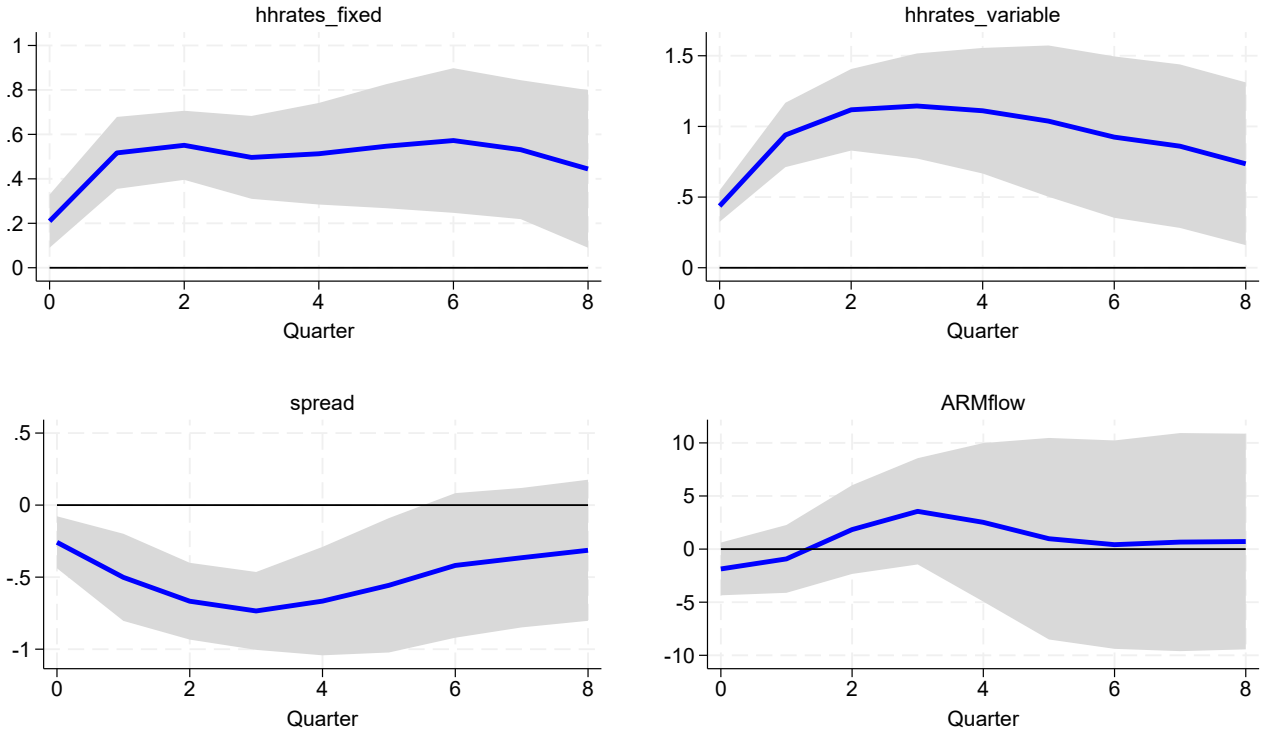
Baseline: OLS



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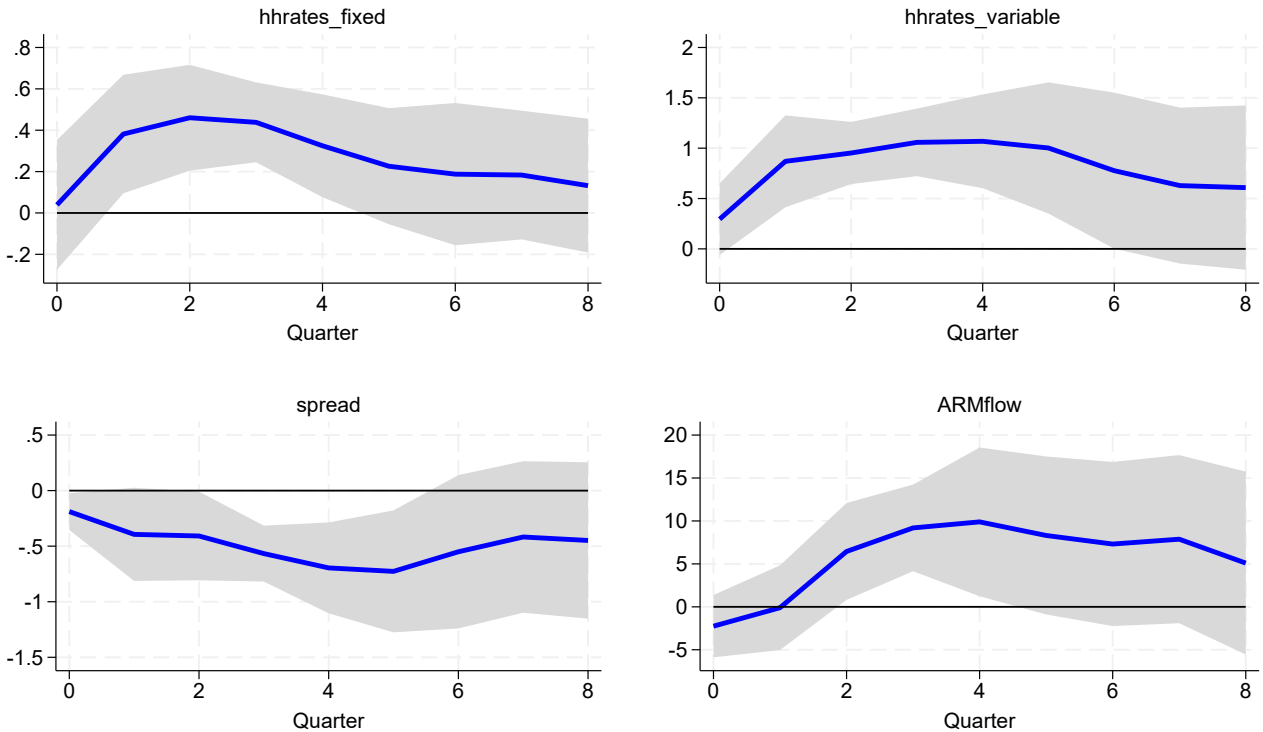
Baseline: Non-orthogonalized surprises



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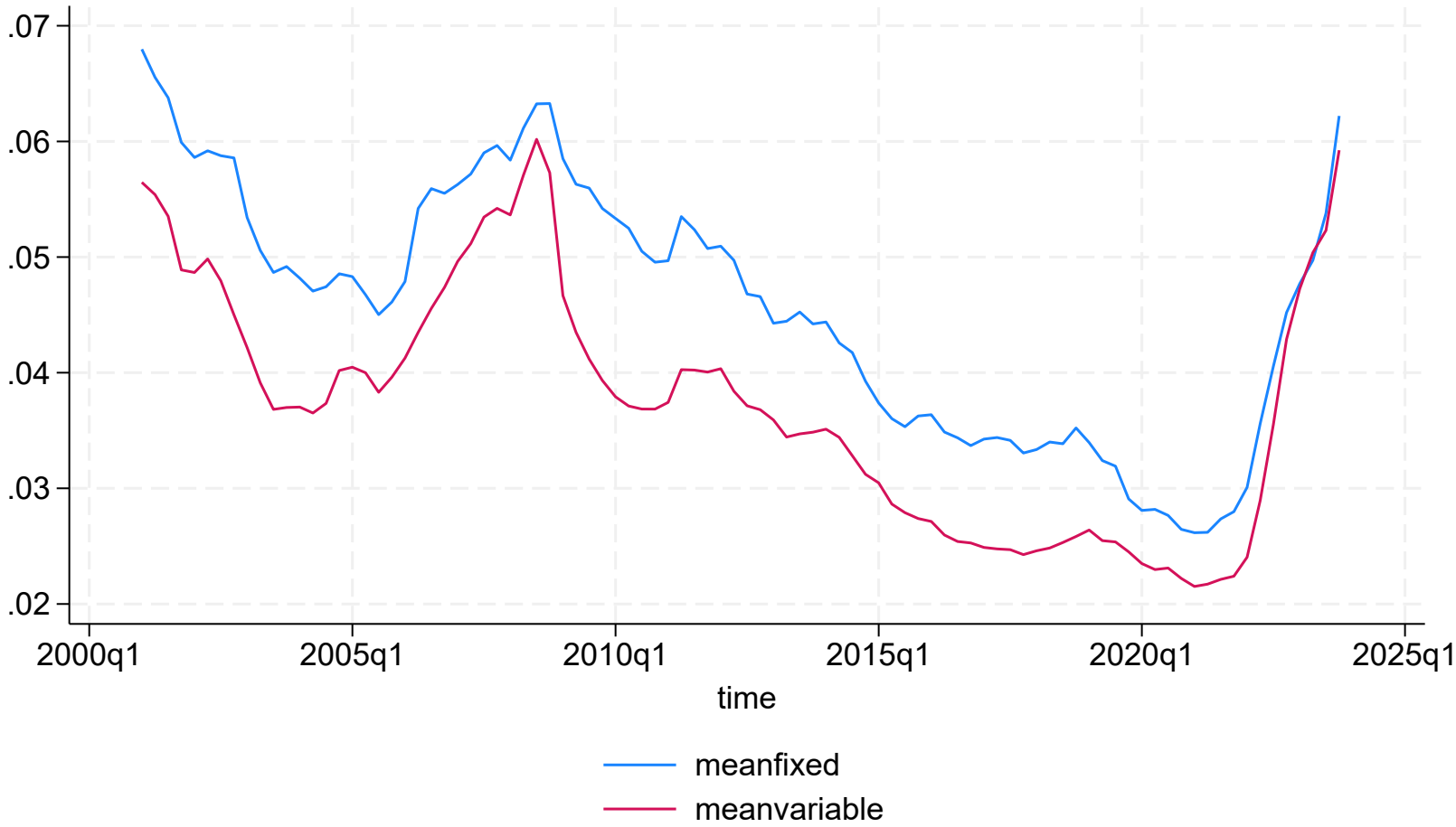
Spread FRM ARM over time: average



Notes: Average rate on newly originated FRM and ARMs across the sample, quarterly.

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