The Effect of Monetary Policy on Resource Reallocation

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Aim and contribution

We ask whether firms' responsiveness to monetary policy (MP) depends on their **productivity**

Combine two strands in the literature

- The reallocation effect of monetary policy
- Productivity-enhancing reallocation in recessions

Contribute by:

- A **direct** focus on firm productivity
- **High-frequency firm-level data** covering the whole population of firms and matching the frequency of monetary policy shocks
- Quantification of the effect of monetary policy on **aggregate productivity** a la Decker et al. (2020) (to do list)

Related literature

- MP has long-term impact on productivity, e.g. Jordà et al. (2024)
- Most of this productivity effect originates from the reallocation of resources btw firms (Meier and Reinelt 2024), which activates if some segment of firms is more responsive, e.g. by
  - return to capital (González et al. 2024)
  - external financing (Abo-Zaid and Zervou 2020)
  - markups (Baqaee et al. 2024, Meier and Reinelt 2024, Duval et al. 2024)
- No estimates on the reallocation effect by firm **productivity**

- The reallocation of resources over the business cycle is well-studied
  - Resources are continuously allocated from low- to high-productivity firms, creative destruction or cleansing (Caballero and Hammour 1994)
  - ... this process is stronger during recessions (Foster et al. 2016)
  - ... and has been slowing down in recent decades in the US (Decker et al. 2020) and Europe (Biondi et al. 2025)

Outline of talk

1. Data and Methods

2. Results - estimates by single outcome variable

3. Results - estimates by firm productivity bin

4. Summary

Data

- Data from Estonia, combine 3 firm-level datasets
  1. **VAT tax declarations**: VAT liable bodies report their **sales, inputs and value added** at the monthly frequency, cut-off for VAT liability 40,000 EUR yearly turnover, most firms are liable
  2. **Employment taxes declaration**: All firms report their **number of employees** and their wages at the monthly frequency
  3. **Business register**: Full population of firms reports their balance sheet, profits and background variables such as **NACE** codes at yearly frequency

- The resulting database covers almost all **non-financial corporations at a monthly frequency**, 2006M1-2025M4
  - Identify monetary policy shock at a monthly frequency a la Jarociński and Karadi (2020), baseline: poor man's sign restrictions
  - Monetary policy has a strong effect on sample country (Almgren et al. 2022), small open economy

Monetary policy shock and business cycle
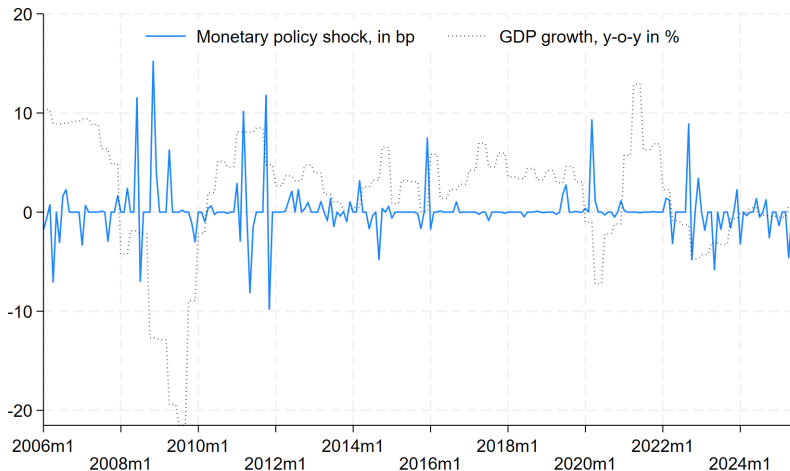
- Monetary policy shock is measured at **monthly frequency** as our microdata

Empirical specification

Following local projections (LP) approach (Jordà 2005)

$$\Delta Y_{it+h,it-1} = \alpha + \beta_h MP_t + \gamma_p \sum_{p=1}^{3} \Delta Y_{it-p} + \delta_p \sum_{p=0}^{3} \Delta X_{t-p}^k + \mu_m \sum_{m=1}^{12} D_m + \epsilon_{it+h}, \quad (1)$$

- $\Delta Y_{it+h,it-1}$ is the growth of outcome variable for firm i at month $t+h$, $h = 0(1)23$
- MP_t is monetary policy shock at month t
- X_{t-p}^k denotes control variables, GDP growth, HICP growth, 6M Euribor, change in unemployment + month and sector FE, lagged firm size
- control for past dynamics up to 3 months, $p = 3$

Add interaction with firms' past **relative productivity** over 12 months

$$\Delta L_{it+h,it-1} = \alpha + \beta_h^1 MP_t + \beta_h^2 Prod_{it-2} + \beta_h^3 MP_t \times Prod_{it-2}$$
$$+ \gamma_p \sum_{p=1}^{3} \Delta L_{it-p} + \delta_p \sum_{p=0}^{3} \Delta X_{t-p}^k + \mu_m \sum_{m=1}^{12} D_m + \epsilon_{it+h}, \quad (2)$$

- where $Prod_{it-2}$ is the firm's relative productivity to its industry's average

Descriptive statistics, 2006M1-2025M4

Labour productivity: 113,400 firms & TFP: 74,282 firms

Variable	Mean	SD	Median
Employment growth, 12M	-0.0079	0.3986	0.0000
Employment	330.7	767.1	43.0
Value added, th EUR	1532.5	9307.0	61.5
Labour productivity, th EUR	50.0	610.3	17.0
TFP (Levinsohn and Petrin 2003), th EUR	19.7	760.6	0.0034
Monetary policy shock	0.0025	0.0320	0.0000
Relative labour productivity	0.0072	1.0389	0.0654
Relative TFP	-0.0046	1.4471	0.0082
GDP growth	0.0001	0.0021	0.0002
HICP growth	0.0036	0.0070	0.0029
6-months Euribor	1.1679	1.7261	0.3604
Change in unemployment	0.0144	0.4570	0.0000

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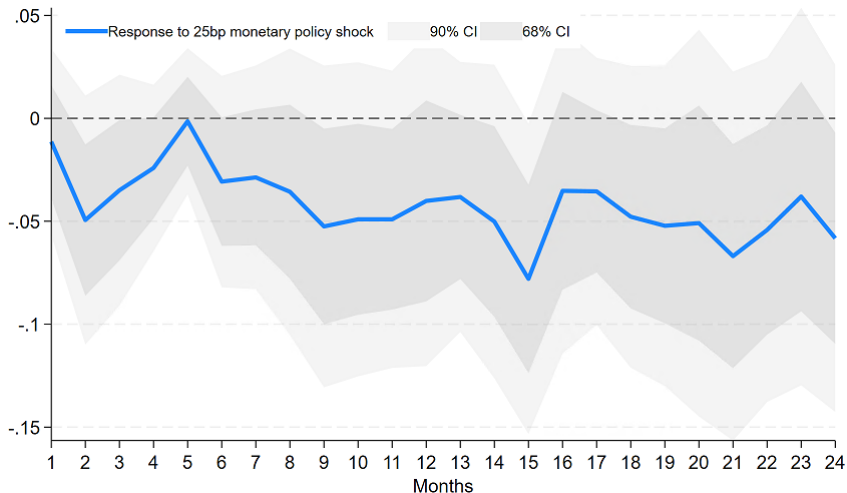# The effect of monetary policy on employment

2006M1-2025M4
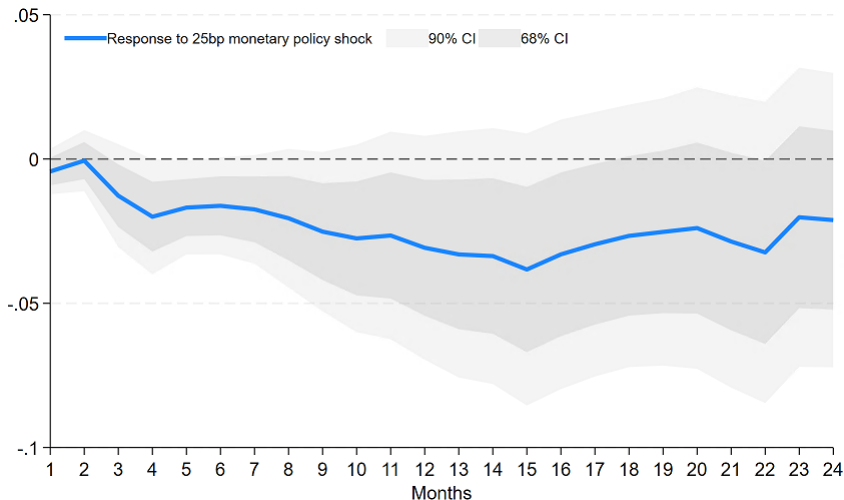
- Sluggish reaction in employment (e.g. Buda et al. 2025), peak effect by M15
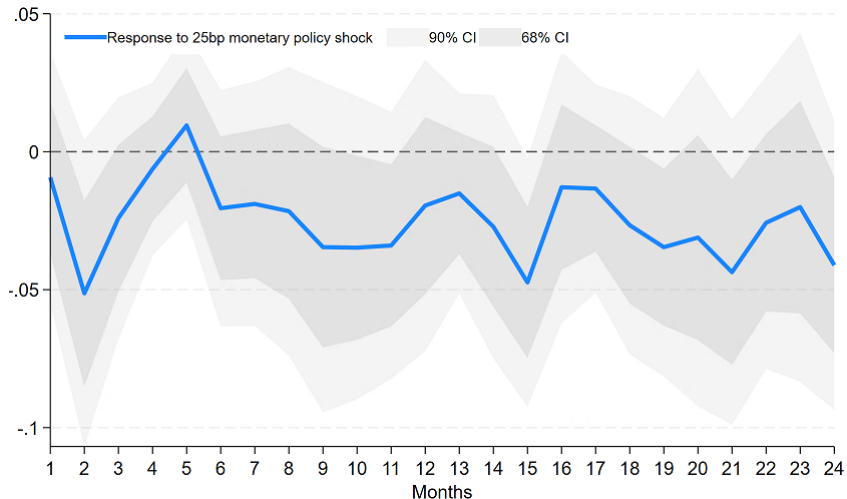
The effect of monetary policy on value added

2006M1-2025M4

- Fast reaction in first months, by M2, (Buda et al. 2025), peak effect by M15

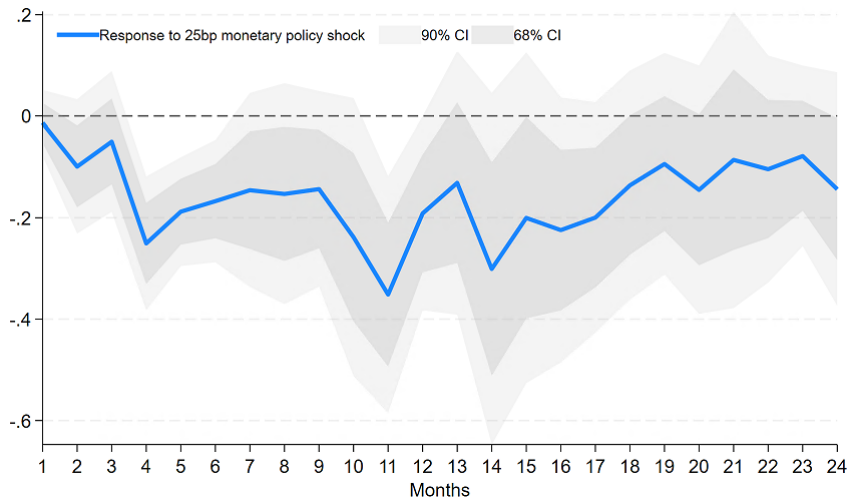# The effect of monetary policy on labour productivity

2006M1-2025M4

- Value added moves faster than employment, peak effect in the first months

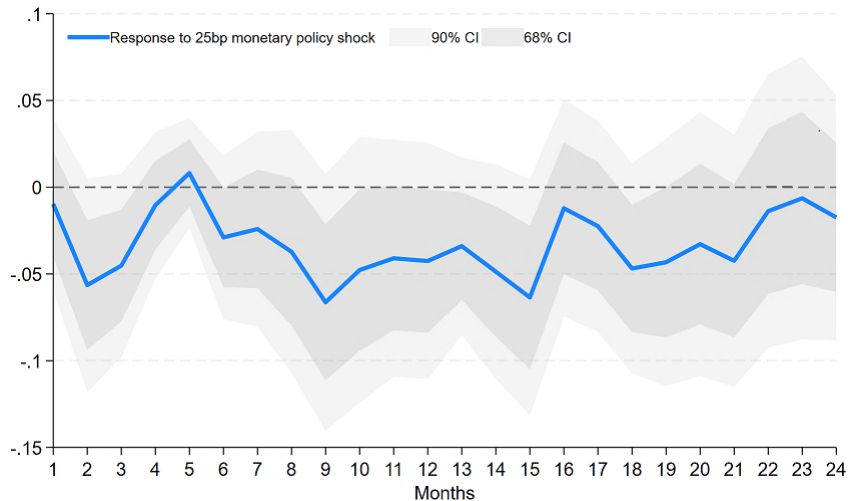# The effect of monetary policy on investments

2006M1-2025M4

- Investments move also fast, peak effect by M11

The effect of monetary policy on TFP

2006M1-2025M4

- Inputs move fast (capital, material inputs) and slow (employment), short- and long-term impact on TFP

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Responsiveness to monetary policy by labour productivity

Dependent: ΔL	1st month	2nd month	3rd month	4th month	5th month	6th month
MP_t	-0.013	0.006	-0.033	-0.065	-0.056	-0.052
	(0.023)	(0.029)	(0.044)	(0.050)	(0.045)	(0.043)
Labour productivity$_{it-2}$	0.004***	0.007***	0.010***	0.013***	0.015***	0.017***
	(0.0005)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$MP_t \times$ Labour productivity$_{it-2}$	0.005	0.009	0.018**	0.015	0.012	0.013
	(0.007)	(0.010)	(0.008)	(0.013)	(0.017)	(0.017)
Log(Employment)$_{it-1}$	✓	✓	✓	✓	✓	✓
$\Sigma_{p=1}^{3}\Delta L_{it-p}$	✓	✓	✓	✓	✓	✓
$\Sigma_{k=0}^{5}$Macro controls$_{t-p}$	✓	✓	✓	✓	✓	✓
Sector fixed effects	✓	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓	✓
R^2	0.056	0.053	0.054	0.056	0.058	0.055
No of observations	8,477,109	8,329,379	8,240,456	8,122,192	8,012,446	7,908,334

- Interaction term is positive, low-productivity firms are more responsive

Responsiveness to monetary policy by TFP

| Dependent: ΔL	1st month	2nd month	3rd month	4th month	5th month	6th month
MP_t	-0.017	0.001	-0.044	-0.072	-0.065*	-0.065
	(0.019)	(0.025)	(0.042)	(0.047)	(0.038)	(0.040)
TFP_{it-2}	0.001***	0.002***	0.003***	0.004***	0.004***	0.005***
	(0.0005)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$MP_t \times TFP_{it-2}$	-0.004	-0.006	0.004	0.002	0.004	0.003
	(0.010)	(0.011)	(0.017)	(0.022)	(0.023)	(0.023)
$Log(Employment)_{it-1}$	✓	✓	✓	✓	✓	✓
$\Sigma_{k=1}^{3}\Delta L_{it-p}$	✓	✓	✓	✓	✓	✓
$\Sigma_{k=0}^{3}$Macro controls$_{t-p}$	✓	✓	✓	✓	✓	✓
Sector fixed effects	✓	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓	✓
R^2	0.052	0.046	0.046	0.047	0.047	0.044
No of observations	4,962,671	4,909,066	8,873,650	4,821,894	4,772,302	4,724,259

- Interaction term is mostly positive, but never statistically significant

Responsiveness to monetary policy, sign asymmetry

Dependent: ΔL	1st month	2nd month	3rd month	4th month	5th month	6th month
$MP_t < 0$	-0.070	-0.023	0.025	-0.045	-0.090	-0.082
	(0.053)	(0.054)	(0.061)	(0.081)	(0.094)	(0.094)
$MP_t > 0$	0.012	0.019	-0.058	-0.073	-0.043	-0.040
	(0.024)	(0.038)	(0.063)	(0.068)	(0.058)	(0.057)
Labour productivity$_{it-2}$	0.004***	0.007***	0.010***	0.013***	0.015***	0.017***
	(0.0005)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$MP_t < 0 \times$Labour productivity$_{it-2}$	-0.012	-0.010	0.012	-0.005	-0.025	-0.026
	(0.017)	(0.016)	(0.020)	(0.026)	(0.032)	(0.034)
$MP_t > 0 \times$Labour productivity$_{it-2}$	0.012*	0.017	0.021**	0.024	0.027	0.029
	(0.006)	(0.011)	(0.007)	(0.015)	(0.019)	(0.019)
Log(Employment)$_{it-1}$	✓	✓	✓	✓	✓	✓
$\Sigma_{k=1}^{3}\Delta L_{it-p}$	✓	✓	✓	✓	✓	✓
$\Sigma_{k=0}^{3}$Macro controls$_{t-p}$	✓	✓	✓	✓	✓	✓
Sector fixed effects	✓	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓	✓
R^2	0.056	0.053	0.054	0.056	0.058	0.055
No of observations	8,477,109	8,329,379	8,240,456	8,122,192	8,012,446	7,908,334

- Low-productivity firms more responsive to contractionary shocks

Responsiveness is concentrated around the median, LP
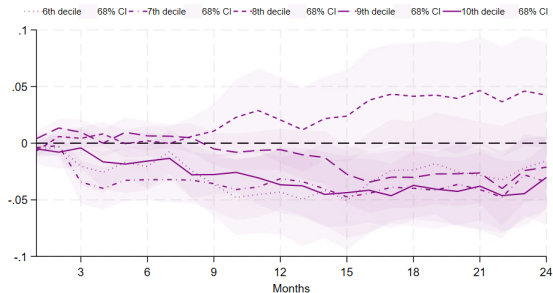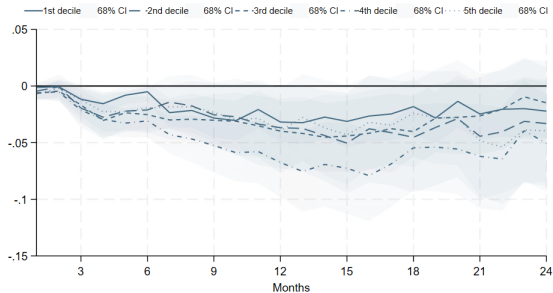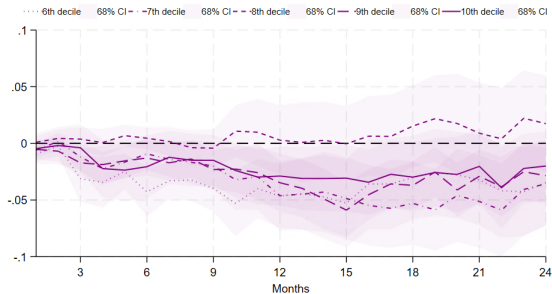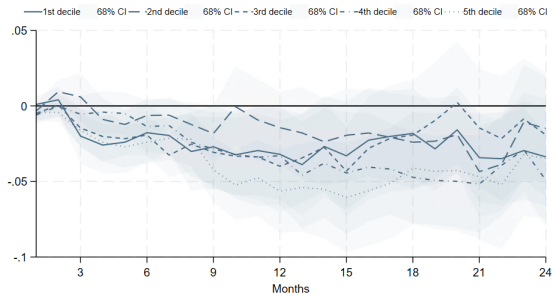
Responsiveness is concentrated around the median, TFP

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Summary

1. Confirm the story of short lags of monetary policy
   - Output and some inputs like investments move fast after monetary policy shock
   - Employments moves slowly
   - The combined effect on productivity is usually fast in first months due to rigid employment

2. Low-productivity firms are more responsive to monetary policy
   - The effects are stronger for labour productivity than for TFP
   - The most strongly affected segment of firms is around the median productivity
   - The effects are coming from contractionary shocks
   - Monetary policy has similar "cleansing" effects like recessions

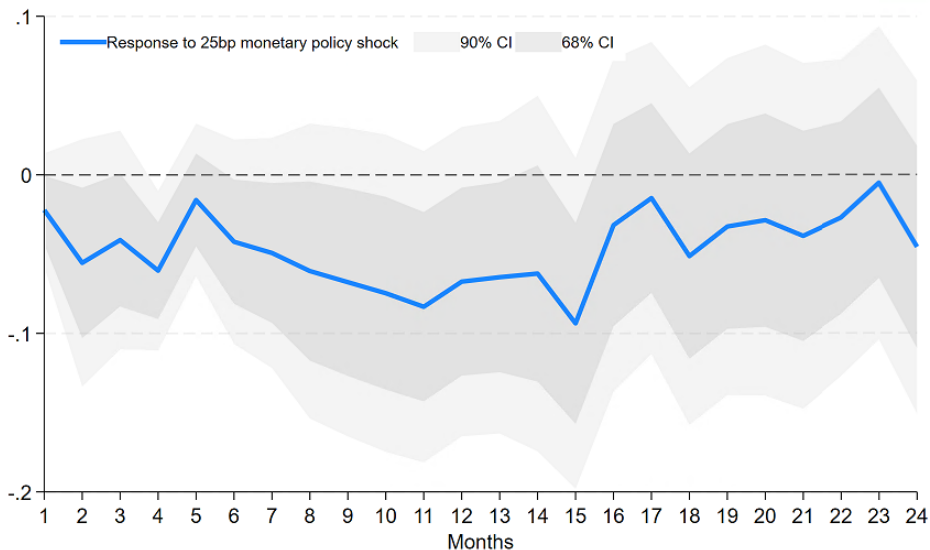- To-do list: firm entry and exit, aggregate implications

THANK YOU!

Comments and questions:
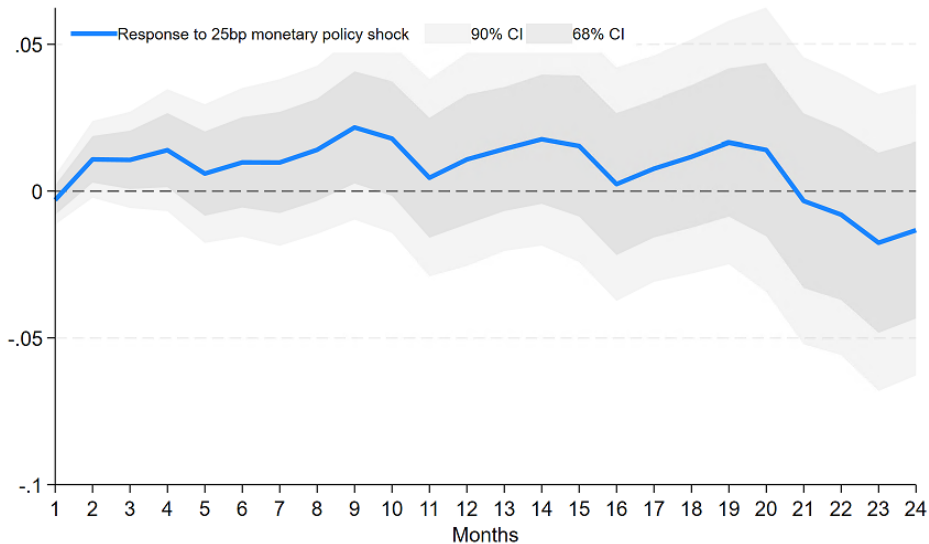
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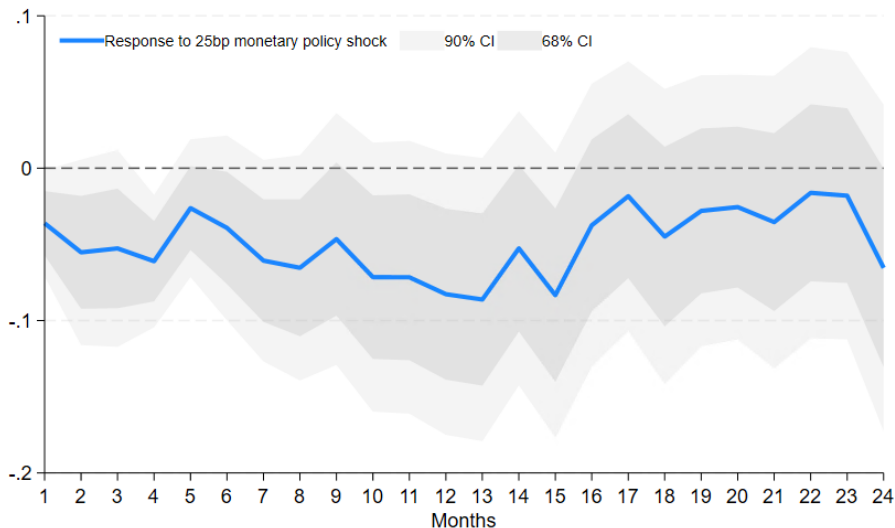
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The effect of monetary policy on turnover, 2006M1-2025M4

The effect of monetary policy on capital, 2006M1-2025M4

The effect of monetary policy on intermediate inputs, 2006M1-2025M4

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