Monetary Policy Transmission to Investment: Evidence from a Survey on Enterprise Finance

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Drivers of real investment

- In frictionless complete markets, real investment is determined by investment opportunities (fundamentals)
- In the presence of financial frictions, financial conditions may also affect investment
- How do fundamentals and financial conditions shape the transmission of monetary policy to investment?
  - ECB has shown concerns about structural factors (ECB MP account Oct 24)
  - Literature has focused on financial conditions (Ottonello and Winberry, 2020; Durante et al., 2022; Cloyne et al., 2023)

Disentangling fundamentals and financial conditions

- Traditionally, investments drivers are empirically analyzed through accounting data
- This paper proposes to analyze investment through survey based answers to needs for and availability of external funding
- Disentangle the effects of ”subjective” investment opportunities and financial conditions
  - External funding needs are linked to fundamentals
  - Availability is linked to financial conditions
- Further advantages
  - Broad coverage of large firms and SMEs
  - Investment decisions are made by irrational agents with imperfect information

New facts about investment and monetary policy transmission

1. Conditioned on internal funding, external funding needs is linked to fundamentals while availability is linked to financial conditions
    - Effects on investment of availability depending on financial constraints
    - Quasi-natural experiment with bank branches
2. Monetary policy effectiveness depends on needs and availability for external funding
    - The higher the needs, the more effective monetary policy
    - The lower the availability, the more effective monetary policy

SAFE data

- European Central Bank/European Commission Survey on the Access to Finance of Enterprises (SAFE) — Semi-annual until end of 2023
- Responses of survey participants to two key questions (paraphrased)
  - Q5: Did external financing needs increase, remain unchanged, or decrease over the past six months?
  - Q9: Has external financing availability improved, remained unchanged, or deteriorated for your enterprise over the past six months?
- Different categories: Credit lines, bank loans, trade credit, equity capital, and debt securities
- Composite needs and composite availability indicators: Average of the survey answer to each category

Accounting and monetary policy data

- Match of the SAFE survey with annual accounting data from the ORBIS database
- Baseline sample covers 2009 to 2023 with 27,439 firms
- Net investment is calculated as growth in fixed assets
- Control for internal funding: (cash flow + capital)/total assets
- Inclusion of several control variables used in the literature: SME dummy, sales growth, leverage, profitability, and liquidity
- Forward guidance surprises from Altavilla et al. (2019) captures changes in expected future rates

Interpretation of funding needs and availability

Financial constraint is linked to higher sensitivity to availability

$$I_{i,t+1} = \alpha + \beta_1 Needs_{i,t} \cdot \mathbb{1}_{i,t}(FC) + \beta_2 Avail_{i,t} \cdot \mathbb{1}_{i,t}(FC) + \Gamma Controls_{i,t} + FE + \varepsilon_{i,t+1}$$

	Size-based financial constraints		Debt-based financial constraints	
	FC=SME	FC=Low LogTA	FC=High Lev	FC=High DebtBurd
$Needs_t$	3.876***	3.652***	3.216***	3.591***
	(0.736)	(0.664)	(0.515)	(0.475)
$Avail_t$	1.734**	1.913***	2.287***	1.930***
	(0.817)	(0.508)	(0.414)	(0.443)
FC$\times$$Needs_t$	-0.770	-0.318	0.753	-0.305
	(0.762)	(0.635)	(0.811)	(0.810)
FC$\times$$Avail_t$	1.440	0.989*	1.086*	1.732**
	(0.848)	(0.573)	(0.602)	(0.680)
Observations	71,301	71,301	71,301	65,019
R-squared	0.03	0.03	0.03	0.04

A quasi-natural experiment: Bank branches in Portugal

- A vast literature arguing that bank branches closure has an effect on credit lending (Morgan et al., 2016; Nguyen, 2019)
- Bonfim et al. (2015) argues that Portugal offers an almost ideal setting
  - Bank branch closures were forced upon banks after 2012
  - Not always based on local branch quality of firms and their profitability
- Data on number of bank branches in Portugal from Portuguese Banking Association (APB) on NUTS3 level

Number of bank branches in Portugal is only linked to availability

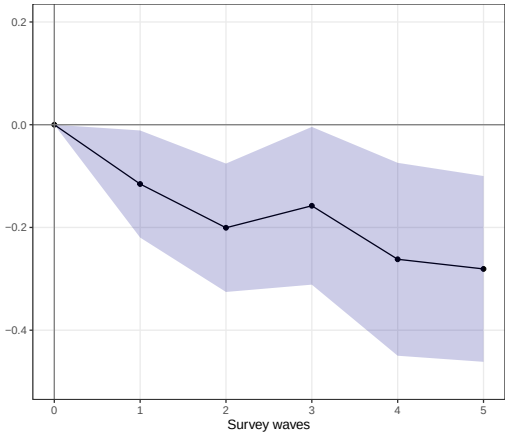
$$Needs_{r,t+1} = \alpha + \beta_1 bank_{r,t} + \beta_2 Needs_{r,t} + \Gamma Controls_{r,t} + FE + \varepsilon_{r,t+1}$$

	Needs	Needs	Ch Needs	Avail	Avail	Ch Avail
Bank branches	−0.02			0.08**		
	(0.03)			(0.04)		
Lag Bank branches		−0.01			0.08*	
		(0.05)			(0.05)	
Ch Bank branches			−0.09			0.07**
			(0.09)			(0.04)
Observations	132	121	121	132	121	121
R^2	0.49	0.47	0.63	0.81	0.79	0.48

Monetary policy transmission

Local projection of monetary policy on investment

$$I_{i,t+j} = \alpha + \beta \cdot mps_t + \Gamma Controls_{i,t-1} + FE + \varepsilon_{i,t+1}$$



Local projection: Monetary policy effectiveness depending on past needs and availability

$$I_{i,t+j} = \alpha + \beta \cdot mps_t \cdot X_{i,t-1} + \Gamma\, Controls_{i,t-1} + FE + \varepsilon_{i,t+1}$$

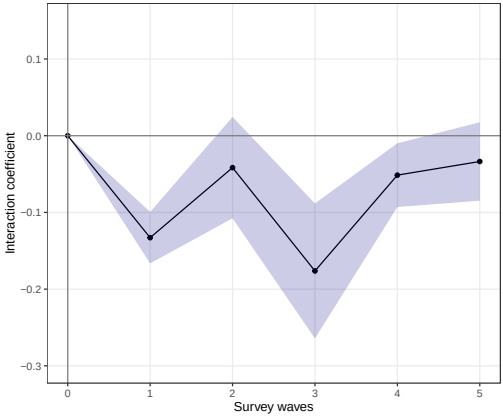


Figure: β_{Needs}

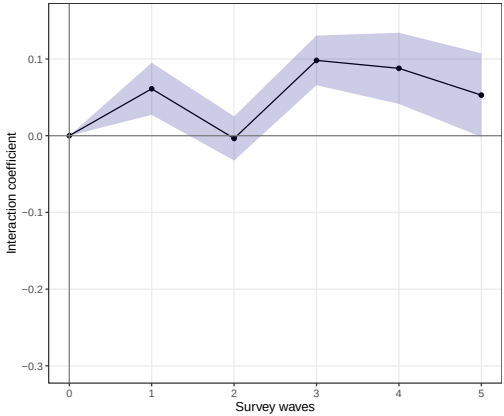


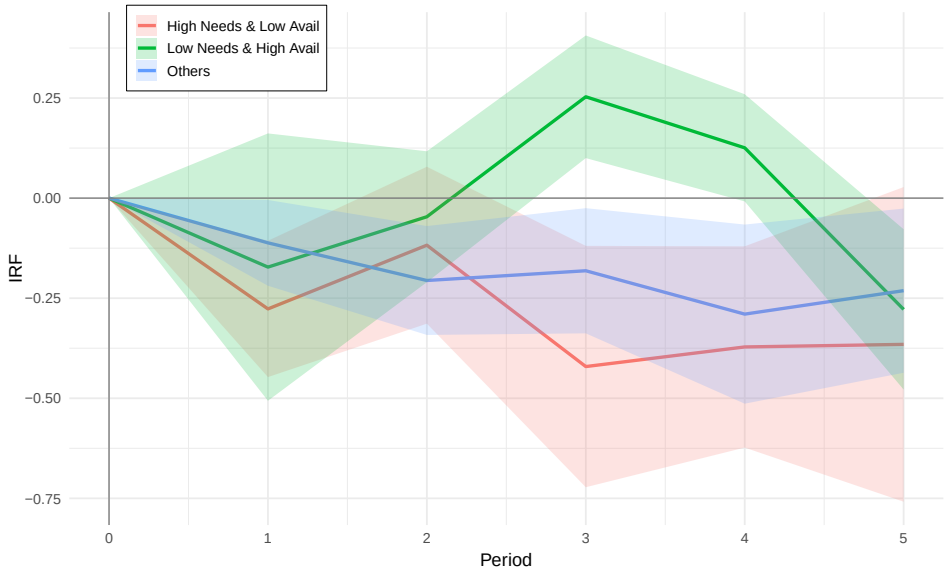
Figure: $\beta_{\text{Availability}}$

Joint response of needs and availability

- How do firms that have high needs and low availability and vice-versa respond to monetary policy?
- Create two dummies:
  - Firms with high needs and low availability: $\mathbb{1}^{H}_{i,t}$(Needs > 0 and Availability < 0)
  - Firms with low needs and high availability: $\mathbb{1}^{L}_{i,t}$(Needs < 0 and Availability > 0)
- Local projection:

$$I_{i,t+j} = \alpha + \beta_0 \cdot mps_t + \beta_1 \cdot mps_t \cdot \mathbb{1}^{H}_{i,t-1} + \beta_2 \cdot mps_t \cdot \mathbb{1}^{L}_{i,t-1} + \Gamma\, Controls_{i,t-1} + FE + \varepsilon_{i,t+1}$$

Monetary policy transmission to different groups



Test of needs and low availability jointly

	wave = 1	wave = 2	wave = 3	wave = 4	wave = 5
FG	−0.11**	−0.21***	−0.18**	−0.29**	−0.23**
	(0.05)	(0.07)	(0.08)	(0.11)	(0.10)
FG*𝟙(High needs & low avail)	−0.17***	0.09	−0.24***	−0.08**	−0.13
	(0.06)	(0.05)	(0.08)	(0.04)	(0.10)
FG*𝟙(Low needs & high avail)	−0.06	0.16***	0.43***	0.42***	−0.05
	(0.13)	(0.05)	(0.03)	(0.06)	(0.03)
Observations	87,631	73,212	62,763	53,203	43,883
R^2	0.01	0.01	0.01	0.01	0.01

Interpretation through the credit channel

- Easing facilitates borrowing through the balance sheet channel and bank lending channel
- If structural weaknesses — such as overregulation and economic uncertainty — keep credit demand low, these channels, will do little to stimulate investment
- If financial conditions are excessively tight, easing should lead to increased investment, particularly for financially constrained firms

Conclusion

- Firms' perceived investment opportunities and financial conditions affect investment
  - Needs are more linked to fundamentals and availability to financial conditions
- Monetary policy effectiveness relies on economic fundamentals driving needs
  - Support of the ECB narrative on monetary policy effectiveness (see MP accounts from 16-17 October)
- Monetary policy is more effective for firms with tighter financial conditions
  - Consistent with previous results from the literature (Durante et al., 2022; Cloyne et al., 2023)

Appendix

Literature review

- Drivers of investment: Fazzari, Hubbard, Petersen (1988), Gilchrist and Himmelberg (1993), Gertler and Gilchrist (1994), Kaplan and Zingales (1997), Gilchrist and Himmelberg (1999), Fazzari, Hubbard, Petersen (2000), Love and Zichinno (2005)
- Monetary policy transmission to real investment: Gertler and Gilchrist (1994), Ontonello and Winberry (2020), Cloyne et al. (2022), Durante, Ferrando, Vermeulen (2022), Jeenas (2024)
- Survey data and investment: Ferrando and Preuss (2018), Ferrando, Pal and Durante (2019)

Question on needs for external financing

Q5. For each of the following types of external financing, please indicate if your needs increased, remained unchanged or decreased over the past six months. [(1) Increased, (2) Remained unchanged, (3) Decreased, (7) not applicable, (9), DK]

- Bank loans (excluding overdraft and credit lines)
- Trade credit
- Equity capital
- Debt securities issued
- Leasing or hire-purchase
- Other loan, for example from family and friends, a related enterprise or shareholders, excluding trade credit

Question on availability for external financing

Q9. For each of the following types of financing, would you say that their availability has improved, remained unchanged or deteriorated for your enterprise over the past six months? [(1) Improved, (2) Remained unchanged, (3) Deteriorated, (7) not applicable, (9), DK]

- Bank loans (excluding overdraft and credit lines)
- Trade credit
- Equity capital
- Debt securities issued
- Leasing or hire-purchase
- Other loan, for example from family and friends, a related enterprise or shareholders, excluding trade credit

Further details to the matching process

- Orbis is annual, SAFE semi-annual, and monetary policy surprises are daily
- SAFE is conducted during Q2 and Q3 (summer wave) and during Q1 and Q4 (winter wave)
- For the summer wave, we use a linear interpolation to match investment from one and two periods ahead to the wave
- For the winter wave we use investment one period ahead
- Monetary policy surprises are aggregated to semi-annual by summing all surprises within the same wave (Bauer and Swanson, 2023)

Further details to pre-processing

- Accounting variables are winsorized at the 1st and 99th percentiles
- We exclude discouraged firms — Firms that despite their funding needs, do not apply due to fear of rejection (around 5% of the sample)
- Issue for dynamic regressions: SAFE survey data is sparse due to higher rotation of firms being interviewed
- Solution:
  1. We categorize firms in groups based on the SME dummy, industry, and country
  2. For each wave, we calculate the lagged average of needs and availability for each group
  3. For firms with missing lagged data, we use the group's average lagged needs and availability to fill in the missing values

Further details to empirical analysis and econometrics

- Accounting variables are standardized
- Survey financing obstacles dummy is constructed based on survey question 22: ”What do you see as the most important limiting factor to get bank financing?”
- The dummy is equal to 0 if there are no obstacles, and 1 otherwise.
- Empirical analysis is conducted using weighted least squares, where weights are proportional to the number of employees of each firm relative to the population in each sector, country, and wave

Summary statistics table of Orbis

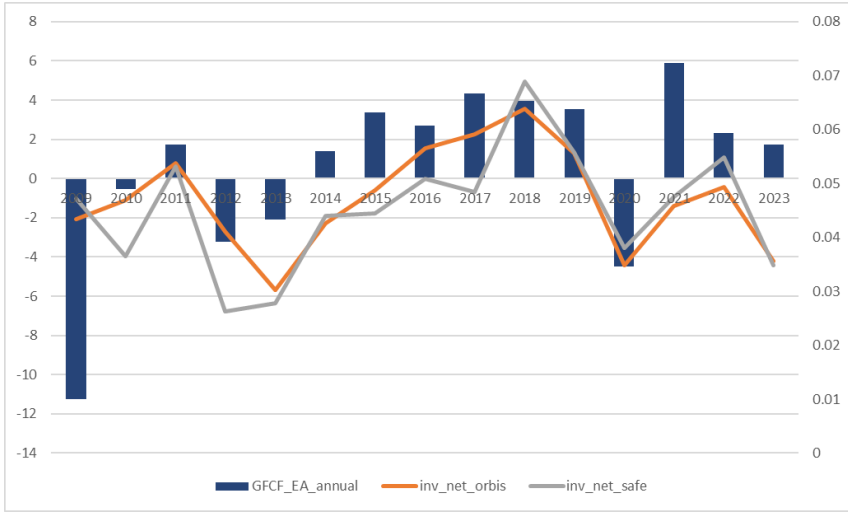
Variable	Mean	SD	p25	p50	p75	Min	Max	N
Needs_t	0.09	0.49	0.00	0.00	0.33	-1.00	1.00	71301
Avail_t	0.12	0.48	0.00	0.00	0.33	-1.00	1.00	71301
Investment_{t+1}	0.05	0.28	-0.07	-0.00	0.11	-0.93	1.23	71301
Leverage_t	0.21	0.21	0.02	0.16	0.33	0.00	1.38	71301
ROE_t	0.09	0.39	0.01	0.08	0.18	-1.61	1.69	71301
Internal fund_t	0.17	0.17	0.07	0.14	0.23	-0.41	1.25	71301
Liquidity_t	1.48	1.47	0.68	1.08	1.65	0.03	8.10	71301
Sales growth_t	0.05	0.30	-0.06	0.03	0.12	-0.84	1.73	71301
SME	0.58	0.49	0.00	1.00	1.00	0.00	1.00	71301
Size_t	15.99	2.40	14.12	16.13	17.78	6.33	24.63	71301
Debt burden_t	0.18	0.17	0.03	0.11	0.29	0.00	0.61	65026

How do needs and availability relate to accounting variables?

	Needs_t	Avail_t
Needs_t		-0.04^{***}
Leverage_t	0.15^{***}	-0.07^{***}
ROE_t	-0.02^{***}	0.06^{***}
Internal fund_t	-0.15^{***}	0.12^{***}
Liquidity_t	-0.02^{***}	0.00
Sales growth_t	0.03^{**}	0.10^{***}
Debt burden_t	0.22^{***}	-0.38^{***}

- Correlation of availability and measures of asset-and earnings based-collateral is consistent with availability being a proxy for financial conditions
- Needs are negatively correlated with internal funding and positively correlated with leverage

Aggregate investment



Account of the monetary policy meeting of the Governing Council, 16-17 October 2024

”(...) investment typically hinged to a large extent on prospects for demand, and demand was seen as remaining particularly subdued at a time when geopolitical and structural factors were increasing uncertainty for exports and the manufacturing sector. (...) **This also meant that monetary policy easing alone would not lead to a decisive turnaround, especially if the root causes were structural**, such as overregulation, or related to political uncertainty.”