Monetary Policy Tightening and SME Credit Demand Substitution [1]

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[1]The views presented in this research are those of the authors and do not necessarily represent the official views of the Central Bank of Ireland or the European System of Central Banks.

Introduction

Motivation

- Return of inflation
  - Supply-chain bottlenecks, pent-up demand, war in Ukraine
  - Policymaker response: tighten monetary policy
  - Example: ECB has increased its interest rates ten times since June 2022 - with an accumulated increase to c.4.75% in the marginal lending facility
- Policy response has financial stability implications for firms
  - Especially SMEs
  - Highly reliant on bank credit for survival and growth
  - Often unable to borrow in the corporate bond market or raise capital in the stock market
  - Other sources of finance: internal resources, trade credit, grants and subsidies, leasing and factoring

Introduction

Aims

- Assess the relationship between the ECB's monetary policy tightening since July 2022 and SME credit costs, demand and substitution behaviour
  - Examine the transmission of monetary policy shocks to SME borrowing costs
  - Investigate whether this tightening led to a decline in SME loan demand via reduced bank loan application activity
  - Investigates SME substitution behaviour away from bank borrowing towards alternative sources of financing
- Exploit the heterogeneity in bank credit substitution during monetary policy contraction across firm characteristics
  - Turnover, income/profit generation, firm-size, firm-age, credit risk
- Explore the heterogeneity in bank credit substitution during monetary policy contraction across the core and periphery EU countries

Credit Quality Core vs. Periphery

Introduction

Key Results

- Rate hikes $\Rightarrow$ higher SME loan costs (strong pass-through)
- SMEs' propensity to apply for new bank loans declined in response to the tightening
- Tightening shocks significantly increase firms' substitution from bank credit to alternative finance
- Our results are heterogeneous to various firm-level characteristics as well as core vs. periphery countries
  - Likelihood of bank credit substitution increases with respect to annual turnover, age, size, credit-quality
  - Core countries are sensitive to credit quality, while periphery countries have varied responses with regards to different categories of turnover, company size and credit-quality

Introduction

Literature Review

- SME financing behaviour, including use of alternative finance
  - Roux and Savignac (2024); Hoffmann et al. (2022); Bongini et al. (2021); Peydró et al. (2021); Bańkowska et al. (2020); De Jonghe et al. (2020); Burlon et al. (2019); Mol-Gómez-Vázquez et al. (2019); Moro et al. (2017); Casey and O'Toole (2014); Holton et al. (2014); Yang (2011); Bougheas et al. (2006); Nilsen (2002); Kashyap and Stein (2000); Petersen and Rajan (1997); Bernanke and Gertler (1995); Kashyap and Stein (1994); Schwartz (1974); Meltzer (1960)
- Monetary policy shocks
  - Ferrando et al. (2019) Jarociński (2022); Ferrando and Grazzini (2023); Jung and Uhlig (2019); Nakamura and Steinsson (2018),
- Our contribution
  - Use of alternative sources of finance for SMEs during monetary changes
  - This paper considers heterogeneous effects of monetary policy on firms
  - Our results add to the evidence base contributing the design and evaluation of future policy measures

Data

Sources

- Survey on the Access to Finance of Enterprises (SAFE)
- Euro-Area Monetary Policy Event-Study Database (EA-MPD)

Data

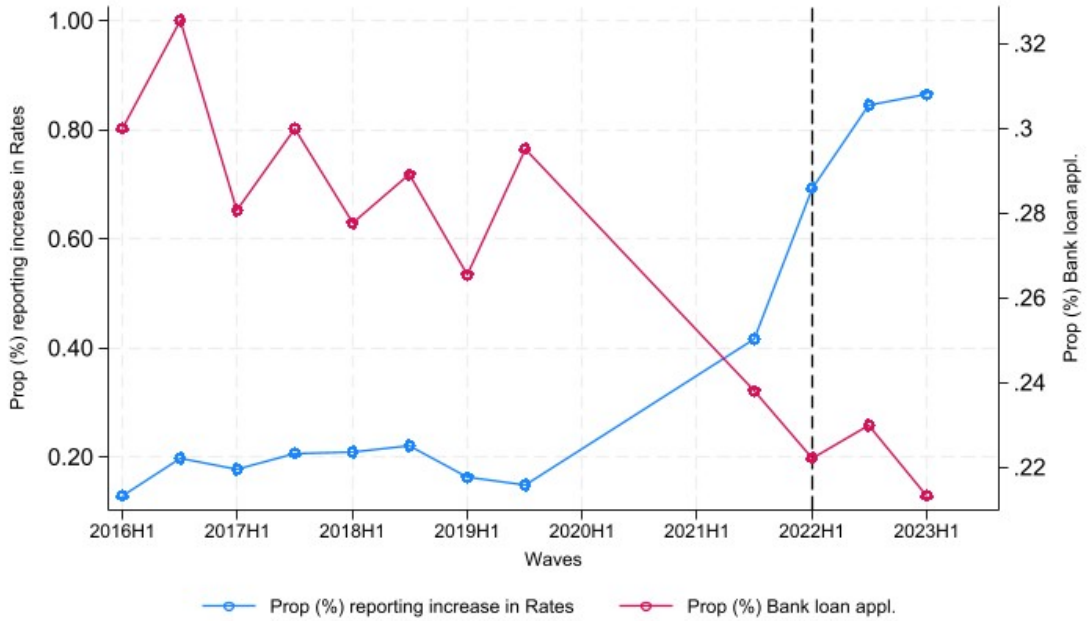
SAFE: Overview

- EU/ECB firm-level survey
  - Variables: firm characteristics (age, size, industry, ownership strcuture), financing conditions, finance needs, access to finance
  - Sectors: manufacturing, construction, trade and services
  - Coverage: EU countries
  - Semi-annual (April-September, October-March)
  - Qualitative survey responses
- Sample
  - Focus on SMEs ($<$ 250 employees)
  - April 2015 to March 2023
    - Exclude COVID-19 period (2020H1-2021H1)
    - Expansionary monetary policy period: 2015H1-2021H2
    - Contractionary monetary policy period: 2022H2-2023H1
  - Euro area countries that report every wave
    - Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, The Netherlands, Portugal, and Slovakia

Data

SAFE: Constructing the Dependent Variable

- Dependent variable: *bank credit rates and bank loan applications*
- For credit rates, dummy variable equal to 1 if:
  - the firm reports that the interest rate charged by banks increased over the past six months, and zero if it remained unchanged or decreased
- For loan applications, dummy variable equal to 1 if:
  - the firm applied for a bank loan in the past six months, and zero otherwise.



Data

SAFE: Constructing the Dependent Variable

- Dependent variable: *bank credit demand substitution*
- Dummy variable equal to 1 if:
  - Firm *does not use bank credit* nor *applies* (in last 6 months)
  - DESPITE bank credit *declared as relevant by the firm*
  - INSTEAD uses one (or more) *alternative sources of financing*
    - Internal resources, grants/subsidies, overdraft/credit line/credit card, trade credit, other minor sources (factoring, debt security, equity investment)
  - Includes small number of cases when firm rejects bank credit on account of it being partially approved or expensive INSTEAD uses alternative source

Data

SAFE: Bank Credit Demand Substitution

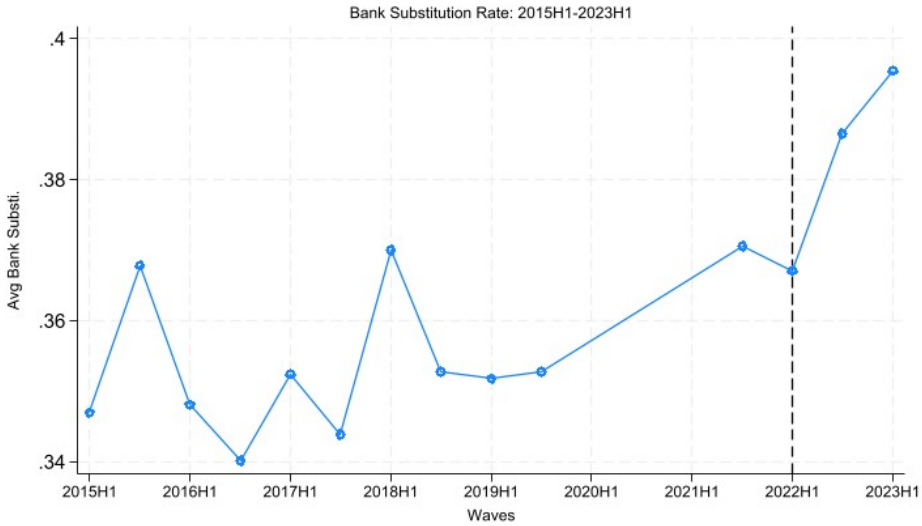


Figure: Full Sample: Bank Credit Substitution increasing post Mon Pol. announcements

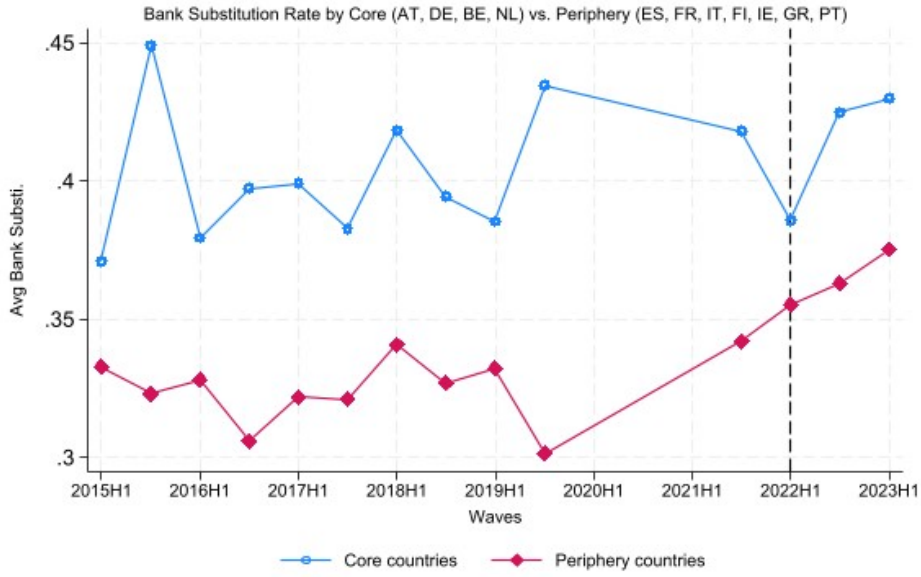


Figure: Core vs. Periphery: Bank Credit Substitution more across Core but rate of increase higher across Periphery

Data

SAFE: Summary Statistics (i)

	2015H1-2019H2		2021H2-2023H1	
	N	Mean	N	Mean
Bank Substitution	53,666	0.35	19,627	0.38
Annual Turnover				
1: <= €500k	96,247	0.30	37,253	0.28
2: >€500k &<= €1M	96,247	0.15	37,253	0.15
3: >€1M & <= €2M	96,247	0.14	37,253	0.15
4: >€2M & <= €10M	96,247	0.24	37,253	0.23
5: >€10M & <= €50M	96,247	0.15	37,253	0.15
6: >€50M	96,247	0.03	37,253	0.03
Firm Age				
1: <2 years	98,914	0.01	38,255	0.01
2: >=2 &<5 years	98,914	0.04	38,255	0.04
3: >=5 &<10 years	98,914	0.10	38,255	0.07
4: >=10 years	98,914	0.84	38,255	0.88
Company Size				
1: Micro (1-9 employees)	99,033	0.46	38,287	0.45
2: Small (10-49 employees)	99,033	0.30	38,287	0.31
3: Medium (50-249 employees)	99,033	0.24	38,287	0.24
Income/Profits				
1: Decreased/Remain Unchanged	96,736	0.70	37,197	0.76
2: Increased	96,736	0.30	37,197	0.24

Data

SAFE: Summary Statistics (ii)

	2015H1-2019H2		2021H2-2023H1	
	N	Mean	N	Mean
Bank Substitution	53,666	0.35	19,627	0.38
Labour Cost				
1: Decreased/Remain Unchanged	98,327	0.46	38,037	0.28
2: Increased	98,327	0.54	38,037	0.72
Fixed Investments				
1: Decreased/Remain Unchanged	95,299	0.72	35,830	0.75
2: Increased	95,299	0.28	35,830	0.25
Bank Financing Conditions				
1: Will Deteriorate/Remain Unchanged	57,467	0.78	21,177	0.89
2: Will Improve	57,467	0.22	21,177	0.11
Expected Loan Availability				
1: Will Deteriorate/Remain Unchanged	58,696	0.78	21,773	0.89
2: Will Improve	58,696	0.22	21,773	0.11
Credit Quality				
1: V. Safe/Safe	84,943	0.33	31,260	0.26
2: Moderate	84,943	0.38	31,260	0.36
3: Risk/ H. Risk	84,943	0.27	31,260	0.38

Data

2. Euro-Area Monetary Policy Event-Study Database (EA-MPD)

- Key explanatory variable: monetary policy shocks
  - Nakamura and Steinsson (2018)
  - First principal component of the 1-,3-, 6-month and 1-, 2-, 5-, 10-year Overnight Index Swap (OIS) rate change (in the 10 minute windows before the press release and after the press conference)
  - Jung and Uhlig (2019); Jarociński (2022); Ferrando and Grazzini (2023) using EA-MPD by Altavilla et al. (2019)
- Why this measure?
  - Changes in the interest rate around these short windows results from the unexpected component of the council meetings
  - Captures both conventional and unconventional monetary policy shocks

Data

EA-MPD: Pure Monetary Policy Shocks

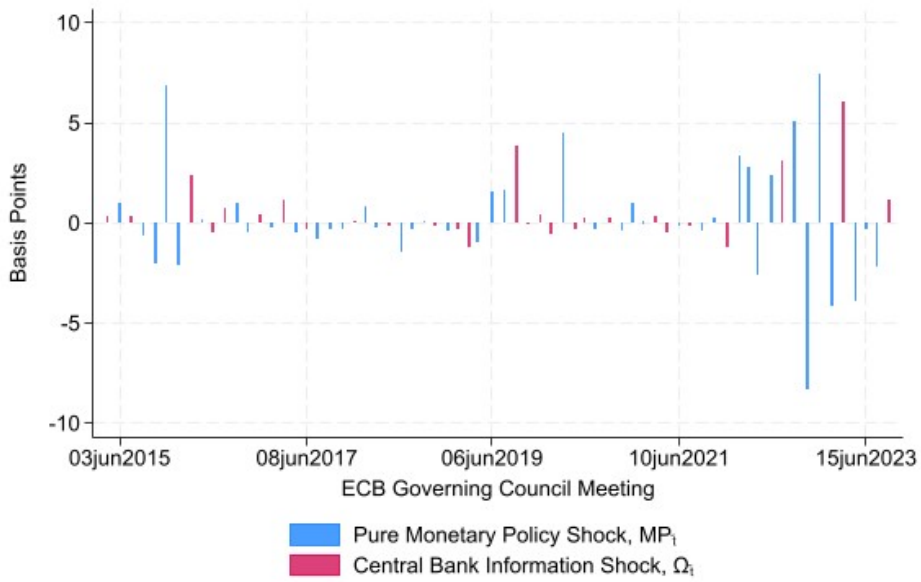


Figure: Monetary Policy Shocks

- Extract *pure* monetary policy shock ($MP_{\tilde{t}}$: -vely correlated to STOXX50) from Central Bank *information shock* (+vely correlated with STOXX50)
- $MP_{\tilde{t}}$ driven by the gap between the governing council decision and what markets expected (i.e. the surprise)
- Example: ECB base rate ↑
  - *Contractionary* monetary policy shock if *higher* than priced in market expectations
  - *Expansionary* monetary policy shock if *lower* than priced in market expectations

Methodology

Econometric Specification (i)

$$Y_{i,j,t} = \alpha_{i,j,t} + \beta MP_{t-1} + \gamma MP_{t-2} + \theta Firm_{i,j,t} + \delta Bank_{j,t} + \phi Econ_{j,t} + \pi_{j,t} + \epsilon_{i,j,t} \quad (1)$$

- Where for firm i in country j and wave t
  - $Y_{i,j,t}$: bank credit rate changes, bank loan application activity, bank credit substitution
  - MP_t and MP_{t-1}: contemporaneous and lagged pure monetary policy shock
  - $Firm_{i,j,t}$: annual turnover, income/profit generation, firm-size, firm-age, credit risk
  - $Bank_{j,t}$: rate of change in bank lending to NFCs, net interest income, return on equity
  - $Econ_{j,t}$: unemployment rate, inflation
  - $\pi_{j,t}$: country-time fixed effects
- Coefficient of interest: β
- Use linear probability model

Methodology

Econometric Specification (ii)

$$Y_{i,j,t} = \alpha_{i,j,t} + \beta MP_{t-1} + \gamma MP_{t-2} + \tau MP_{t-2} \times Firm_{i,j,t} + \gamma MP_t + \theta Firm_{i,j,t} + \delta Bank_{j,t} + \phi Econ_{j,t} + \pi_{j,t} + \epsilon_{i,j,t} \quad (2)$$

- Exploit heterogeneity in bank credit substitution during monetary policy contraction
- Coefficient of interest: τ

Results

Monetary policy transmission to bank credit rates

Table: Monetary Policy Tightening and Bank Credit Rates

	Credit Rates (1)	Credit Rates (2)	Credit Rates (3)	Credit Rates (4)	Credit Rates (5)
MP_{t-2}	0.208***	0.253***	0.253***	0.241***	0.297***
	(0.003)	(0.001)	(0.003)	(0.003)	(0.002)
MP_{t-1}	0.037***	0.050***	0.051***	0.045***	0.059***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Turnover 2: >€500k & <=€1M	-0.025*		-0.019	-0.019	-0.017
	(0.012)		(0.013)	(0.011)	(0.012)
Turnover 3: >€1M & <=€2M	-0.028***		-0.019*	-0.017	-0.018*
	(0.007)		(0.010)	(0.011)	(0.009)
Turnover 4: >€2M & <=€10M	-0.043**		-0.025	-0.024	-0.017
	(0.014)		(0.017)	(0.014)	(0.015)
Turnover 5: >€10M & <=€50M	-0.056**		-0.030	-0.028	-0.020
	(0.019)		(0.021)	(0.017)	(0.014)
Turnover 6: >€50M	-0.046**		-0.016	-0.014	-0.003
	(0.016)		(0.016)	(0.013)	(0.012)
Income profit (1:↑, 0 :↓ / *Same*)		-0.038**	-0.037**	0.015**	0.015*
		(0.012)	(0.012)	(0.005)	(0.008)
Firm size 2: Small		-0.024***	-0.013	-0.013	-0.022**
		(0.006)	(0.009)	(0.009)	(0.010)
Firm Size 3: Medium		-0.039***	-0.025**	-0.023*	-0.031**
		(0.011)	(0.011)	(0.010)	(0.010)
Firm Age 2: 2-5 years	-0.014	-0.008	-0.013	-0.042***	-0.049**
	(0.010)	(0.012)	(0.012)	(0.007)	(0.016)
Firm Age 3: 5-10 years	0.007	0.010	0.005	-0.022	-0.034
	(0.035)	(0.035)	(0.036)	(0.032)	(0.041)
Firm Age 4: Over 10 years	0.021	0.021	0.018	-0.015	-0.032
	(0.025)	(0.027)	(0.026)	(0.023)	(0.035)
Credit Risk 2: Moderate				-0.066***	-0.059***
				(0.014)	(0.012)
Credit Risk 2: Safe/V.Safe				-0.092***	-0.081***
				(0.013)	(0.010)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Labour Cost	No	No	No	No	Yes
Fixed Investment	No	No	No	Yes	Yes
Expected Bank Financing (+6 Months)	No	No	No	No	Yes
Bank Controls (t-1)	Yes	Yes	Yes	Yes	Yes
Econ. Controls (t)	Yes	Yes	Yes	Yes	Yes
Country*Wave	Yes	Yes	Yes	Yes	Yes
Observations	33,044	32,919	32,537	30,568	27,045
R-squared	0.286	0.284	0.287	0.292	0.303
Clustered SE on country in parenthesis *** p<0.01 ** p<0.05 * p<0.1.					

Results

Monetary policy tightening and bank loan applications

Table: Monetary Policy Tightening and Bank Loan Applications

	Loan Applications (1)	Loan Applications (2)	Loan Applications (3)	Loan Applications (4)	Loan Applications (5)
MP_{t-2}	-0.043***	-0.064***	-0.050***	-0.068***	-0.107***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
MP_{t-1}	-0.013***	-0.031***	-0.021***	-0.048***	-0.082***
	(0.001)	(0.002)	(0.002)	(0.004)	(0.004)
Turnover 2: >€500k & <=€1M	0.054***		0.045***	0.045***	0.043***
	(0.008)		(0.006)	(0.006)	(0.006)
Turnover 3: >€1M & <=€2M	0.080***		0.059***	0.057***	0.056***
	(0.014)		(0.012)	(0.013)	(0.013)
Turnover 4: >€2M & <=€10M	0.147***		0.110***	0.113***	0.114***
	(0.015)		(0.012)	(0.012)	(0.012)
Turnover 5: >€10M & <=€50M	0.205***		0.156***	0.157***	0.159***
	(0.022)		(0.018)	(0.020)	(0.021)
Turnover 6: >€50M	0.262***		0.208***	0.209***	0.211***
	(0.016)		(0.021)	(0.024)	(0.024)
Income profit (1:↑, 0 :↓ /*Same*)		0.011**	0.005	0.078***	0.081***
		(0.005)	(0.006)	(0.007)	(0.006)
Firm size 2: Small		0.091***	0.037***	0.027**	0.028**
		(0.016)	(0.011)	(0.009)	(0.009)
Firm Size 3: Medium		0.166***	0.057***	0.041***	0.038**
		(0.017)	(0.012)	(0.011)	(0.012)
Firm Age 2: 2-5 years	-0.037	-0.040	-0.032	-0.027	-0.024
	(0.034)	(0.029)	(0.030)	(0.019)	(0.020)
Firm Age 3: 5-10 years	-0.018	-0.014	-0.012	-0.006	-0.004
	(0.030)	(0.026)	(0.028)	(0.021)	(0.021)
Firm Age 4: Over 10 years	-0.025	-0.018	-0.022	-0.010	-0.008
	(0.026)	(0.022)	(0.024)	(0.016)	(0.017)
Credit Risk 2: Moderate				-0.072***	-0.073***
				(0.005)	(0.005)
Credit Risk 2: Safe/V.Safe				-0.150***	-0.152***
				(0.014)	(0.014)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Labour Cost	No	No	No	No	Yes
Fixed Investment	No	No	No	Yes	Yes
Expected Bank Financing (+6 Months)	No	No	No	No	Yes
Bank Controls (t-1)	Yes	Yes	Yes	Yes	Yes
Econ. Controls (t)	Yes	Yes	Yes	Yes	Yes
Country*Wave	Yes	Yes	Yes	Yes	Yes
Observations	82,148	82,004	80,643	72,825	69,501
R-squared	0.058	0.052	0.059	0.085	0.085
Clustered SE on country in parenthesis *** p<0.01 ** p<0.05 * p<0.1.					

Results

Monetary policy tightening and SME credit demand substitution

Table: Monetary Policy and Bank Credit Demand Substitution

	Bank Subst. (1)	**Bank Subst.** (2)	**Bank Subst.** (3)	**Bank Subst.** (4)	**Bank Subst.** (5)
MP_{t-2}	0.131***	0.104***	0.126***	0.106***	0.140***
	(0.000)	(0.000)	(0.001)	(0.003)	(0.002)
MP_{t-1}	0.098***	0.075***	0.095***	0.074***	0.111***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Turnover 2: >€500k & <=€1M	0.005		0.005	0.001	0.004
	(0.006)		(0.006)	(0.006)	(0.007)
Turnover 3: >€1M & <=€2M	0.005		0.009	0.005	0.007
	(0.008)		(0.007)	(0.006)	(0.006)
Turnover 4: >€2M & <=€10M	-0.016		-0.010	-0.022**	-0.021*
	(0.011)		(0.010)	(0.009)	(0.010)
Turnover 5: >€10M & <=€50M	-0.038**		-0.033**	-0.043***	-0.040***
	(0.016)		(0.014)	(0.012)	(0.011)
Turnover 6: >€50M	-0.070***		-0.066***	-0.074***	-0.068***
	(0.022)		(0.019)	(0.017)	(0.017)
Income profit (1:↑, 0 :↓ / *Same*)		0.016**	0.016**	-0.019***	-0.011*
		(0.005)	(0.006)	(0.005)	(0.006)
Firm size 2: Small		-0.016	-0.012	-0.009	-0.005
		(0.009)	(0.007)	(0.008)	(0.008)
Firm Size 3: Medium		-0.035**	-0.009	-0.005	-0.003
		(0.014)	(0.007)	(0.007)	(0.006)
Firm Age 2: 2-5 years	0.024	0.037	0.025	0.018	0.014
	(0.025)	(0.030)	(0.029)	(0.025)	(0.032)
Firm Age 3: 5-10 years	0.053*	0.068**	0.055*	0.048**	0.041
	(0.024)	(0.030)	(0.028)	(0.020)	(0.025)
Firm Age 4: Over 10 years	0.038	0.053*	0.041	0.033	0.028
	(0.022)	(0.029)	(0.026)	(0.022)	(0.025)
Credit Risk 2: Moderate				0.009	0.015**
				(0.005)	(0.005)
Credit Risk 2: Safe/V.Safe				0.065***	0.073***
				(0.008)	(0.009)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Labour Cost	No	No	No	Yes	Yes
Fixed Investment	No	No	No	Yes	Yes
Expected Bank Financing (+6 Months)	No	No	No	No	Yes
Bank Controls (t-1)	Yes	Yes	Yes	Yes	Yes
Econ. Controls (t)	Yes	Yes	Yes	Yes	Yes
Country*Wave	Yes	Yes	Yes	Yes	Yes
Observations	71,837	71,617	70,442	61,447	57,202
R-squared	0.022	0.022	0.022	0.034	0.042
Clustered SE on country in parenthesis *** p<0.01 ** p<0.05 * p<0.1.					

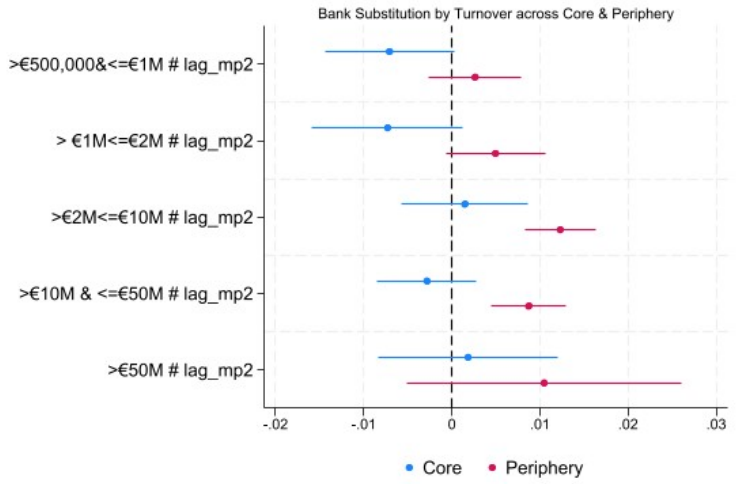
Table: Monetary Policy and Bank Credit Substitution: Firm-level Heterogeneous Analysis

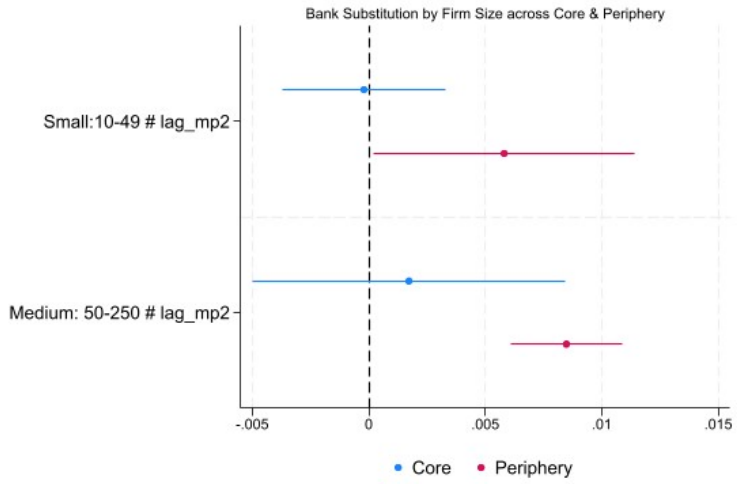
Turnover		Income/Profits		Size		Age (Years)		Cr. Quality	
Var.	Bank Subst.	Var.	Bank Subst.	Var.	Bank Subst.	Var.	Bank Subst.	Var.	Bank Subst.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MP_{t-2}	0.136***	MP_{t-2}	0.111***	MP_{t-2}	0.142***	MP_{t-2}	0.119***	MP_{t-2}	0.114***
	(0.003)		(0.002)		(0.002)		(0.004)		(0.004)
MP_{t-1}	0.112***	MP_{t-1}	0.079***	MP_{t-1}	0.124***	MP_{t-1}	0.087***	MP_{t-1}	0.082***
	(0.004)		(0.003)		(0.003)		(0.004)		(0.005)
>500k&<=1M	0.004	Income	0.025***	Small	-0.006	2-5	0.018	Moderate	0.007
	(0.006)		(0.004)		(0.007)		(0.040)		(0.006)
>1M&<=2M	0.004	MP_{t-2}*(Income)	-0.000	Medium	-0.004	5-10	0.045	Safe/V.Safe	0.055***
	(0.005)		(0.001)		(0.006)		(0.034)		(0.009)
>2M&<=10M	-0.028***			MP_{t-2}*Small	0.004*	>10	0.025	MP_{t-2}*Moderate	0.003
	(0.009)				(0.002)		(0.004)		(0.002)
>10M&<=50M	-0.044***			MP_{t-2}*Medium	0.006***	MP_{t-2}*2-5	-0.002	MP_{t-2}*Safe/V.Safe	0.005*
	(0.013)				(0.002)		(0.004)		(0.002)
>50M	-0.075***					MP_{t-2}*5-10	0.006		
	(0.020)						(0.006)		
MP_{t-2}*(>500k&<=1M)	0.000					MP_{t-2}*>10	0.003		
	(0.003)						(0.005)		
MP_{t-2}*(>1M&<=2M)	0.002								
	(0.003)								
MP_{t-2}*(>2M&<=10M)	0.010***								
	(0.002)								
MP_{t-2}*(>10M&<=50M)	0.006**								
	(0.002)								
MP_{t-2}*(>50M)	0.009*								
	(0.005)								
Industry dummy	Yes	Industry dummy	Yes	Industry dummy	Yes	Industry dummy	Yes	Industry dummy	Yes
Firm Controls (t)	Yes	Firm Controls (t)	Yes	Firm Controls (t)	Yes	Firm Controls (t)	Yes	Firm Controls (t)	Yes
Bank Controls (t-1)	Yes	Bank Controls (t-1)	Yes	Bank Controls (t-1)	Yes	Bank Controls (t-1)	Yes	Bank Controls (t-1)	Yes
Econ. Controls (t)	Yes	Econ. Controls (t)	Yes	Econ. Controls (t)	Yes	Econ. Controls (t)	Yes	Econ. Controls (t)	Yes
Country*Wave	Yes	Country*Wave	Yes	Country*Wave	Yes	Country*Wave	Yes	Country*Wave	Yes
Constant	2.293***	Constant	2.166***	Constant	2.401***	Constant	1.904***	Constant	1.779***
	(0.070)		(0.042)		(0.062)		(0.055)		(0.047)
Observations	57,296	Observations	63,337	Observations	59,390	Observations	60,859	Observations	59,244
R-squared	0.042	R-squared	0.032	R-squared	0.039	R-squared	0.031	R-squared	0.033

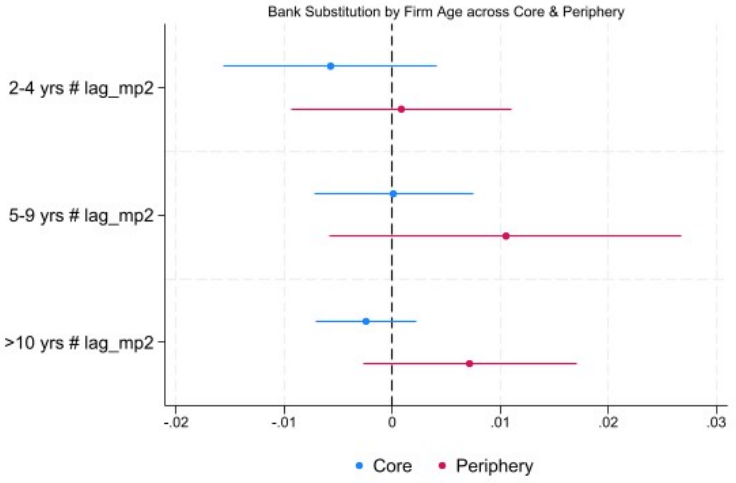
Clustered SE on country in parenthesis *** p<0.01 ** p<0.05 * p<0.1.

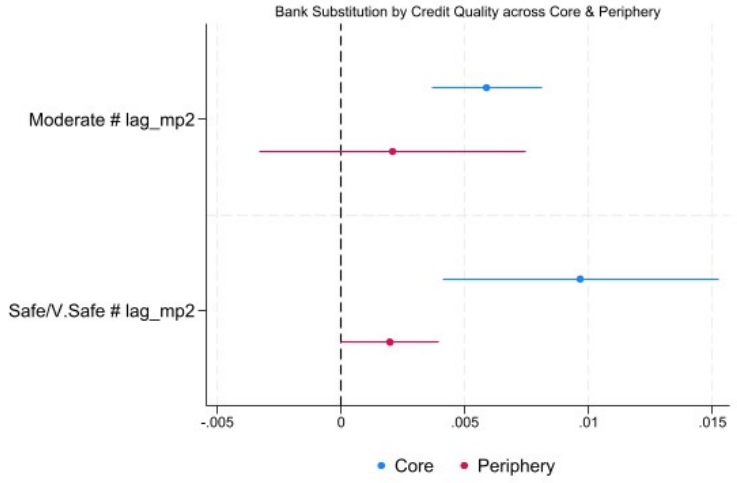
Results

Core vs. Periphery Country-Level Analysis









Robustness Checks

1. Instrumental variable (IV) approach using two-stage least squares (IV 2SLS), where the main monetary policy variable is the change in short-term money market rates specifically the difference in the EONIA or €STR rate between wave t and $t-1$.
2. Alternative measure of bank credit demand substitution: includes SMEs that did not use bank credit or applied for the bank credit in the past six months, despite bank credit declared as relevant by the firm; instead, used internal sources of funds or hire purchase or leasing (or a combination of these).

Concluding Comments

- We find a positive and statistically significant relationship between contractionary monetary policy shocks and the likelihood of firms to substitute bank credit for alternative sources of financing
- Our results are heterogeneous to various firm-level characteristics
  - Likelihood of bank credit substitution increases with respect to annual turnover, income/profits, age, size, credit-quality
- We show that different firm-level characteristics determine the probability of bank credit substitution in core versus periphery countries
  - Core countries sensitive to turnover and firm-age
  - Periphery countries have varied responses with regards to different categories of turnover, company size and credit-quality

References I

Altavilla, C., Brugnolini, L., Gürkaynak, R. S., Motto, R., and Ragusa, G. (2019). Measuring euro area monetary policy. *Journal of Monetary Economics*, 108:162–179.

Bańkowska, K., Ferrando, A., and Garcia, J. (2020). Access to finance for small and medium-sized enterprises since the financial crisis: Evidence from survey data. *ECB Economic Bulletin*, 4:104–125.

Bernanke, B. S. and Gertler, M. (1995). Inside the black box: the credit channel of monetary policy transmission. *Journal of Economic perspectives*, 9(4):27–48.

Bongini, P., Ferrando, A., Rossi, E., and Rossolini, M. (2021). Sme access to market-based finance across eurozone countries. *Small Business Economics*, 56(4):1667–1697.

Bougheas, S., Mizen, P., and Yalcin, C. (2006). Access to external finance: Theory and evidence on the impact of monetary policy and firm-specific characteristics. *Journal of Banking & Finance*, 30(1):199–227.

Burlon, L., Köhler-Ulbrich, P., Drahonsky, A.-C., and Dimou, M. (2019). What does the bank lending survey tell us about credit conditions for euro area firms? *Economic Bulletin Articles*, 8.

Calabrese, R., Girardone, C., and Sclip, A. (2021). Financial fragmentation and smes' access to finance. *Small Business Economics*, 57(4):2041–2065.

Campos, N. F. and Macchiarelli, C. (2021). The dynamics of core and periphery in the european monetary union: A new approach. *Journal of International Money and Finance*, 112:102325.

Casey, E. and O'Toole, C. M. (2014). Bank lending constraints, trade credit and alternative financing during the financial crisis: Evidence from european smes. *Journal of Corporate Finance*, 27:173–193.

De Jonghe, O., Dewachter, H., Mulier, K., Ongena, S., and Schepens, G. (2020). Some borrowers are more equal than others: Bank funding shocks and credit reallocation. *Review of Finance*, 24(1):1–43.

Ferrando, A. and Grazzini, C. F. (2023). Monetary policy shocks and firms' bank loan expectations.

Ferrando, A., Popov, A., and Udell, G. F. (2019). Do smes benefit from unconventional monetary policy and how? microevidence from the eurozone. *Journal of Money, Credit and Banking*, 51(4):895–928.

Hoffmann, M., Maslov, E., and Sørensen, B. E. (2022). Small firms and domestic bank dependence in europe's great recession. *Journal of International Economics*, 137:103623.

References II

Holton, S., Lawless, M., and McCann, F. (2014). Firm credit in the euro area: a tale of three crises. *Applied economics*, 46(2):190–211.

Jarociński, M. (2022). Central bank information effects and transatlantic spillovers. *Journal of International Economics*, 139:103683.

Jung, A. and Uhlig, H. (2019). Monetary policy shocks and the health of banks. *Available at SSRN 3429629*.

Kashyap, A. K. and Stein, J. C. (1994). Monetary policy and bank lending. In *Monetary policy*, pages 221–261. The University of Chicago Press.

Kashyap, A. K. and Stein, J. C. (2000). What do a million observations on banks say about the transmission of monetary policy? *American Economic Review*, 90(3):407–428.

Meltzer, A. H. (1960). Mercantile credit, monetary policy, and size of firms. *The review of Economics and Statistics*, pages 429–437.

Mol-Gómez-Vázquez, A., Hernández-Cánovas, G., and Koëter-Kant, J. (2019). Bank market power and the intensity of borrower discouragement: analysis of smes across developed and developing european countries. *Small Business Economics*, 53:211–225.

Moro, A., Wisniewski, T. P., and Mantovani, G. M. (2017). Does a manager's gender matter when accessing credit? evidence from european data. *Journal of banking & finance*, 80:119–134.

Nakamura, E. and Steinsson, J. (2018). High-frequency identification of monetary non-neutrality: the information effect. *The Quarterly Journal of Economics*, 133(3):1283–1330.

Nilsen, J. H. (2002). Trade credit and the bank lending channel. *Journal of Money, credit and Banking*, pages 226–253.

Petersen, M. A. and Rajan, R. G. (1997). Trade credit: theories and evidence. *The review of financial studies*, 10(3):661–691.

Peydró, J.-L., Polo, A., and Sette, E. (2021). Monetary policy at work: Security and credit application registers evidence. *Journal of Financial Economics*, 140(3):789–814.

Roux, S. and Savignac, F. (2024). SMEs' financing in the aftermath of the financial and sovereign debt crises: A comparison across euro area countries. *Journal of International Money and Finance*, page 103020.

Schwartz, R. A. (1974). An economic model of trade credit. *Journal of financial and quantitative analysis*, 9(4):643–657.

Yang, X. (2011). Trade credit versus bank credit: Evidence from corporate inventory financing. *The Quarterly Review of Economics and Finance*, 51(4):419–434.

Appendix

Credit Quality

- Based on Calabrese et al. (2021)
  - Uses information on income/profits and leverage
  - Three categories: risky, moderate, safe
- Risky
  - Income/profit remain unchanged/decreased and leverage increased
  - *OR* income/profit generation decreased and leverage unchanged
- Moderate
  - Both income/profit and leverage increased
  - *OR* both income/profit and leverage decreased
  - *OR* both income/profit and leverage stayed the same
- Risky
  - Income/profit remain unchanged/decreased and leverage increased
  - *OR* income/profit decreased and leverage unchanged

back

Core vs. Periphery

- Follow Campos and Macchiarelli (2021)
- Core
  - Austria, Belgium, Germany, the Netherlands
- Extended periphery
  - Finland, Ireland, Norway, Portugal, Switzerland, Sweden, Greece
- Intermediate group
  - Denmark, Spain, UK, France, Italy
- Combine extended periphery and intermediate countries into a single periphery group
- Exclude Norway, Switzerland and UK

back

Results

Robustness 1

Table: Robustness 1 (IV2SLS): Monetary Policy Tightening and Bank Credit Rates

	Credit Rates (1)	**Credit Rates** (2)	**Credit Rates** (3)	**Credit Rates** (4)	**Credit Rates** (5)
Instrument	0.005***	0.005***	0.005***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Turnover 2: >€500k & <=€1M	-0.025*		-0.019	-0.019	-0.017
	(0.012)		(0.013)	(0.011)	(0.012)
Turnover 3: >€1M & <=€2M	-0.028***		-0.019*	-0.017	-0.018*
	(0.007)		(0.010)	(0.011)	(0.009)
Turnover 4: >€2M & <=€10M	-0.043**		-0.025	-0.024	-0.017
	(0.014)		(0.017)	(0.014)	(0.015)
Turnover 5: >€10M & <=€50M	-0.056**		-0.030	-0.028	-0.020
	(0.019)		(0.021)	(0.017)	(0.014)
Turnover 6: >€50M	-0.046**		-0.016	-0.014	-0.003
	(0.016)		(0.016)	(0.013)	(0.012)
Income profit (1:↑, 0 :↓ /*Same*)		-0.038**	-0.037**	0.015**	0.015*
		(0.012)	(0.012)	(0.005)	(0.008)
Firm size 2: Small		-0.024***	-0.013	-0.013	-0.022**
		(0.006)	(0.009)	(0.009)	(0.010)
Firm Size 3: Medium		-0.039***	-0.025**	-0.023*	-0.031**
		(0.011)	(0.011)	(0.010)	(0.010)
Firm Age 2: 2-5 years	-0.014	-0.008	-0.013	-0.042***	-0.049**
	(0.010)	(0.012)	(0.012)	(0.007)	(0.016)
Firm Age 3: 5-10 years	0.007	0.010	0.005	-0.022	-0.034
	(0.035)	(0.035)	(0.036)	(0.032)	(0.041)
Firm Age 4: Over 10 years	0.021	0.021	0.018	-0.015	-0.032
	(0.025)	(0.027)	(0.026)	(0.023)	(0.035)
Credit Risk 2: Moderate				-0.066***	-0.059***
				(0.014)	(0.012)
Credit Risk 2: Safe/V.Safe				-0.092***	-0.081***
				(0.013)	(0.010)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Labour Cost	No	No	No	No	Yes
Fixed Investment	No	No	No	Yes	Yes
Expected Bank Financing (+6 Months)	No	No	No	No	Yes
Bank Controls (t-1)	Yes	Yes	Yes	Yes	Yes
Econ. Controls (t)	Yes	Yes	Yes	Yes	Yes
Country*Wave	Yes	Yes	Yes	Yes	Yes
Observations	33,044	32,919	32,537	30,568	27,045
R-squared	0.286	0.284	0.287	0.292	0.303
Clustered SE on country in parenthesis *** p<0.01 ** p<0.05 * p<0.1.					

Table: Robustness 1 (IV2SLS): Monetary Policy Tightening and Bank Loan Applications

	Loan Applications (1)	Loan Applications (2)	Loan Applications (3)	Loan Applications (4)	Loan Applications (5)
Instrument	-0.002***	-0.002***	-0.002***	-0.002***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Turnover 2: >€500k & <=€1M	0.054***		0.045***	0.045***	0.043***
	(0.008)		(0.006)	(0.006)	(0.006)
Turnover 3: >€1M & <=€2M	0.080***		0.059***	0.057***	0.056***
	(0.014)		(0.012)	(0.013)	(0.013)
Turnover 4: >€2M & <=€10M	0.147***		0.110***	0.113***	0.114***
	(0.015)		(0.012)	(0.012)	(0.012)
Turnover 5: >€10M & <=€50M	0.205***		0.156***	0.157***	0.159***
	(0.022)		(0.018)	(0.020)	(0.021)
Turnover 6: >€50M	0.262***		0.208***	0.209***	0.211***
	(0.016)		(0.021)	(0.024)	(0.024)
Income profit (1:↑, 0 :↓ /*Same*)		0.011**	0.005	0.078***	0.081***
		(0.005)	(0.006)	(0.007)	(0.006)
Firm size 2: Small		0.091***	0.037***	0.027**	0.028**
		(0.016)	(0.011)	(0.009)	(0.009)
Firm Size 3: Medium		0.166***	0.057***	0.041***	0.038**
		(0.017)	(0.012)	(0.011)	(0.012)
Firm Age 2: 2-5 years	-0.037	-0.040	-0.032	-0.027	-0.024
	(0.034)	(0.029)	(0.030)	(0.019)	(0.020)
Firm Age 3: 5-10 years	-0.018	-0.014	-0.012	-0.006	-0.004
	(0.030)	(0.026)	(0.028)	(0.021)	(0.021)
Firm Age 4: Over 10 years	-0.025	-0.018	-0.022	-0.010	-0.008
	(0.026)	(0.022)	(0.024)	(0.016)	(0.017)
Credit Risk 2: Moderate				-0.072***	-0.073***
				(0.005)	(0.005)
Credit Risk 2: Safe/V.Safe				-0.150***	-0.152***
				(0.014)	(0.014)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Labour Cost	No	No	No	No	Yes
Fixed Investment	No	No	No	Yes	Yes
Expected Bank Financing (+6 Months)	No	No	No	No	Yes
Bank Controls (t-1)	Yes	Yes	Yes	Yes	Yes
Econ. Controls (t)	Yes	Yes	Yes	Yes	Yes
Country*Wave	Yes	Yes	Yes	Yes	Yes
Observations	82,148	82,004	80,643	72,825	69,501
R-squared	0.058	0.052	0.059	0.085	0.085

Clustered SE on country in parenthesis *** p<0.01, ** p<0.05, * p<0.1

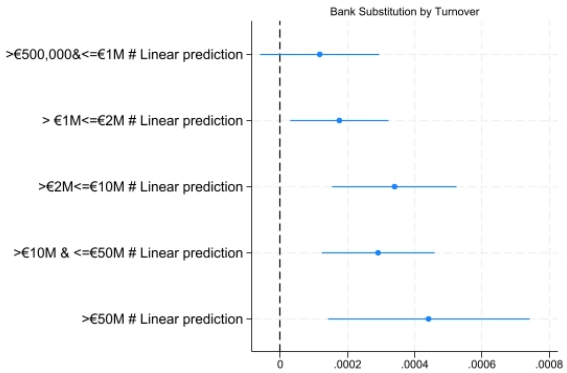
Table: Robustness 1 (IV2SLS): Monetary Policy and Bank Credit Demand Substitution

	Bank Subst. (1)	Bank Subst. (2)	Bank Subst. (3)	Bank Subst. (4)	Bank Subst. (5)
Instrument	0.004***	0.004***	0.004***	0.003***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Turnover 2: >€500k & <=€1M	0.005		0.005	0.001	0.004
	(0.006)		(0.006)	(0.006)	(0.007)
Turnover 3: >€1M & <=€2M	0.005		0.009	0.005	0.007
	(0.008)		(0.007)	(0.006)	(0.006)
Turnover 4: >€2M & <=€10M	-0.016		-0.010	-0.022**	-0.021*
	(0.011)		(0.010)	(0.009)	(0.010)
Turnover 5: >€10M & <=€50M	-0.038**		-0.033**	-0.043***	-0.040***
	(0.016)		(0.014)	(0.012)	(0.011)
Turnover 6: >€50M	-0.070***		-0.066***	-0.074***	-0.068***
	(0.022)		(0.019)	(0.017)	(0.017)
Income profit (1:↑, 0 :↓ /*Same*)		0.016**	0.016**	-0.019***	-0.011*
		(0.005)	(0.006)	(0.005)	(0.006)
Firm size 2: Small		-0.016	-0.012	-0.009	-0.005
		(0.009)	(0.007)	(0.008)	(0.008)
Firm Size 3: Medium		-0.035**	-0.009	-0.005	-0.003
		(0.014)	(0.007)	(0.007)	(0.006)
Firm Age 2: 2-5 years	0.024	0.037	0.025	0.018	0.014
	(0.025)	(0.030)	(0.029)	(0.025)	(0.032)
Firm Age 3: 5-10 years	0.053*	0.068**	0.055*	0.048**	0.041
	(0.024)	(0.030)	(0.028)	(0.020)	(0.025)
Firm Age 4: Over 10 years	0.038	0.053*	0.041	0.033	0.028
	(0.022)	(0.029)	(0.026)	(0.022)	(0.025)
Credit Risk 2: Moderate				0.009	0.015**
				(0.005)	(0.005)
Credit Risk 2: Safe/V.Safe				0.065***	0.073***
				(0.008)	(0.009)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Interest Expense	No	No	No	Yes	Yes
Labour Cost	No	No	No	Yes	Yes
Fixed Investment	No	No	No	Yes	Yes
Bank Financed Conditions (−6 Months)	No	No	No	No	Yes
Expected Bank Financing (+6 Months)	No	No	No	No	Yes
Bank Controls (t-1)	Yes	Yes	Yes	Yes	Yes
Econ. Controls (t)	Yes	Yes	Yes	Yes	Yes
Country*Wave	Yes	Yes	Yes	Yes	Yes
Observations	71,837	71,617	70,442	61,447	57,202
R-squared	0.022	0.022	0.022	0.034	0.042

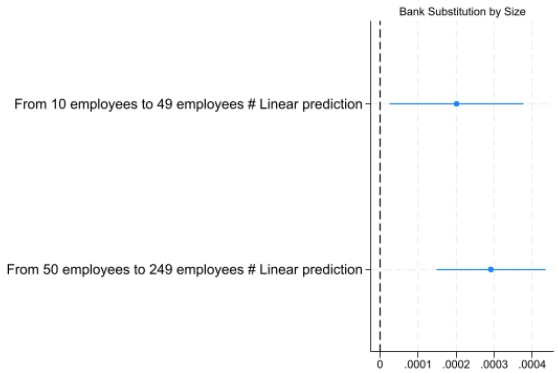
Results

Robustness 1

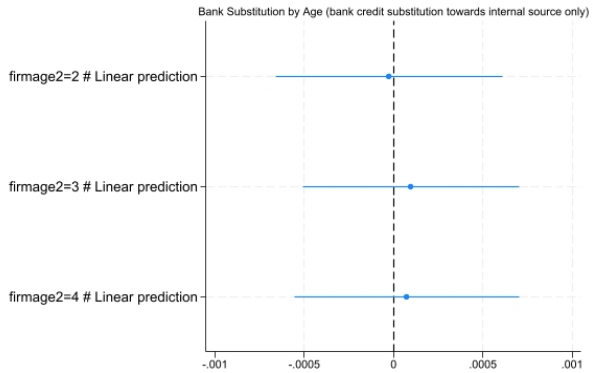
(a) Turnover



(b) Company Size



(c) Firm Age



(d) Credit Risk

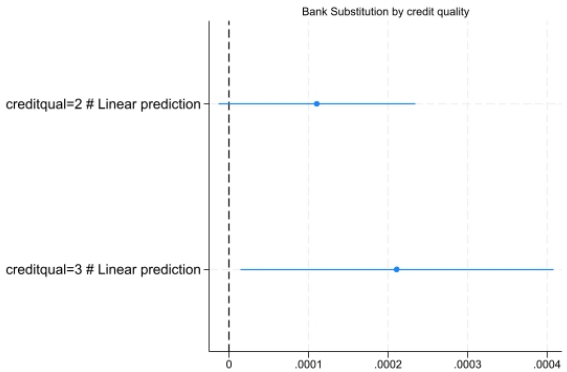


Table: Robustness 2 (Internal sources of finance only): Monetary Policy and Bank Credit Demand Substitution

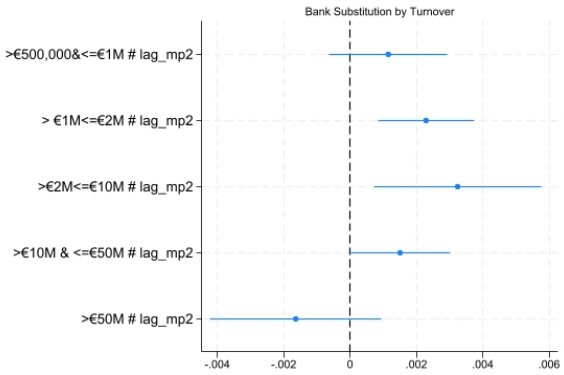
	Bank Subst. (1)	**Bank Subst.** (2)	**Bank Subst.** (3)	**Bank Subst.** (4)	**Bank Subst.** (5)
MP_{t-2}	0.022***	0.033***	0.031***	0.024***	0.020***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
MP_{t-1}	0.012***	0.026***	0.022***	0.021***	0.012***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Turnover 2: >€500k & <=€1M	0.017***		0.014***	0.012***	0.014**
	(0.004)		(0.004)	(0.004)	(0.005)
Turnover 3: >€1M & <=€2M	0.021***		0.016**	0.015*	0.015*
	(0.006)		(0.007)	(0.007)	(0.008)
Turnover 4: >€2M & <=€10M	0.024***		0.019*	0.018*	0.015
	(0.007)		(0.009)	(0.009)	(0.009)
Turnover 5: >€10M & <=€50M	0.022**		0.018	0.015	0.012
	(0.008)		(0.010)	(0.011)	(0.011)
Turnover 6: >€50M	0.011**		0.006	0.005	0.003
	(0.004)		(0.005)	(0.005)	(0.005)
Income profit (1:↑, 0 :↓ /*Same*)		0.012***	0.012***	-0.012***	-0.011**
		(0.002)	(0.002)	(0.004)	(0.003)
Firm size 2: Small		0.014***	0.005	0.005	0.006*
		(0.002)	(0.003)	(0.003)	(0.003)
Firm Size 3: Medium		0.012**	0.003	0.004	0.005
		(0.005)	(0.003)	(0.003)	(0.004)
Firm Age 2: 2-5 years	0.026**	0.031**	0.027**	0.027**	0.031***
	(0.012)	(0.011)	(0.010)	(0.009)	(0.010)
Firm Age 3: 5-10 years	0.021*	0.030**	0.024**	0.019**	0.023**
	(0.010)	(0.010)	(0.009)	(0.008)	(0.008)
Firm Age 4: Over 10 years	0.019	0.028**	0.023**	0.019*	0.022***
	(0.012)	(0.010)	(0.010)	(0.010)	(0.006)
Credit Risk 2: Moderate				0.023***	0.022***
				(0.003)	(0.003)
Credit Risk 2: Safe/V.Safe				0.040***	0.038***
				(0.006)	(0.006)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Labour Cost	No	No	No	Yes	Yes
Fixed Investment	No	No	No	Yes	Yes
Bank Financed Conditions (−6 Months)	No	No	No	No	Yes
Expected Bank Financing (+6 Months)	No	No	No	No	Yes
Bank Controls (t-1)	Yes	Yes	Yes	Yes	Yes
Econ. Controls (t)	Yes	Yes	Yes	Yes	Yes
Country*Wave	Yes	Yes	Yes	Yes	Yes
Observations	71,797	71,577	70,402	64,077	59,243
R-squared	0.015	0.014	0.015	0.018	0.018

Clustered SE on country in parenthesis *** p<0.01, ** p<0.05, * p<0.1

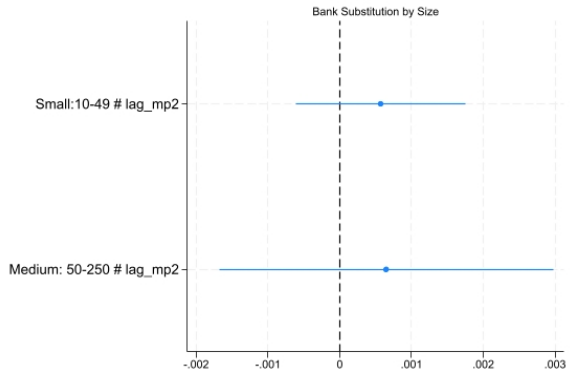
Results

Robustness 2

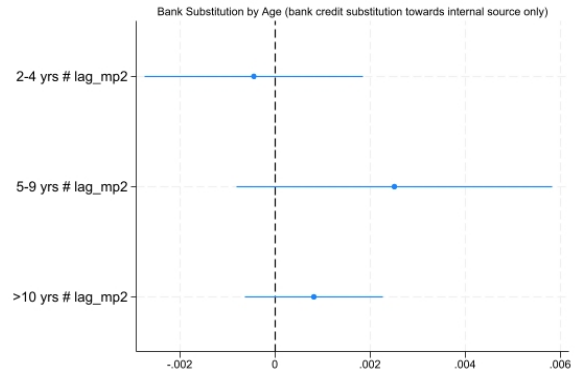
(a) Turnover



(b) Company Size



(c) Firm Age



(d) Credit Risk