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
- Monetary policy tightening has financial stability implications
  - 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, etc. => opportunity to to substitute bank credit => affecting monetary policy transmission

Introduction

Aims

- Assess the relationship between the ECB's monetary policy tightening since July 2022 and SME credit demand behaviour
  - Investigates SME substitution behaviour away from bank borrowing towards alternative sources of financing
  - Monetary policy tightening $\Rightarrow$ SME cost of borrowing $\uparrow$
  - $\Rightarrow$ SMEs seek alternative (*relatively cheaper*) financing options
- Exploit the heterogeneity in bank credit substitution during monetary policy contraction across firm characteristics
  - $\Rightarrow$ SME substitution depends upon heterogeneity 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

- 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, age, size, credit-quality
- Heterogeneity across the sample of *core* and *periphery* countries
  - Core countries sensitive to turnover and firm-age
  - Periphery countries sensitive to turnover, company size and credit-quality

Literature Review

- **SME credit demand substitution**
  - SMEs tend to be more dependent on bank credit (Hoffmann et al., 2022; Bongini et al., 2021; Peydró et al., 2021)
  - Bank credit substitution towards alternate source of finance such as mercantile credit (Meltzer, 1960) and trade credit (Meltzer, 1960; Schwartz, 1974; Petersen and Rajan, 1997; Nilsen, 2002)
- **Monetary policy shocks**
  - During mon. pol contraction, tight lending conditions (Kashyap and Stein, 2000) lead firms to substitute traditional bank credit to alternative sources (Yang, 2011; Bottero and Conti, 2023; Jude et al., 2024)
- **Firm Heterogeneity**
  - Credit decisions shaped by firm size, age, turnover, banking relationship and credit-risk (Burlon et al., 2019; De Jonghe et al., 2020; Bernanke and Gertler, 1996)
  - Our results add to the evidence base contributing the design and evaluation of future policy measures

Data

1. SAFE

- Survey on the Access to Finance of Enterprises (SAFE)
- EU/ECB firm-level survey
  - Variables: firm characteristics (age, size, industry, ownership strcuture), financing conditions, finance needs, access to finance
- 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

Key Component 1: Bank Credit 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

Bank Credit Substitution

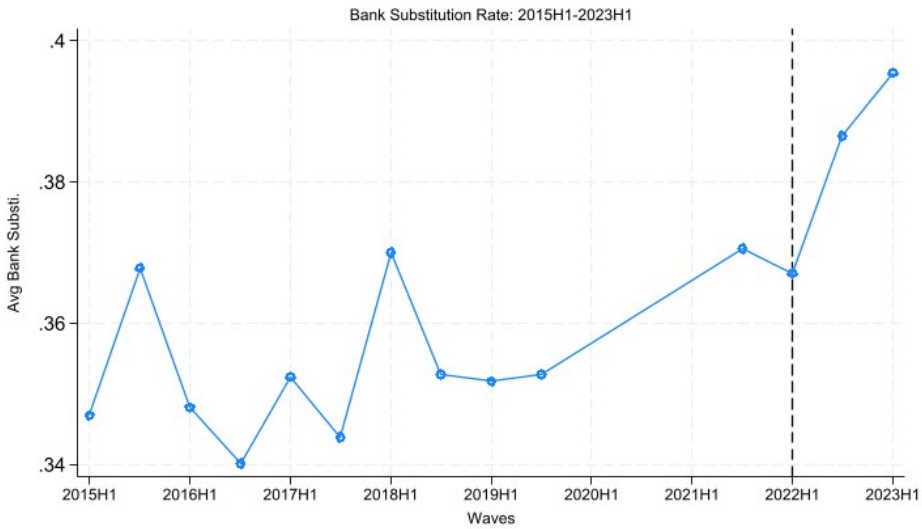


Figure: Full Sample: Bank Credit Substitution increasing post Mon Pol. announcements

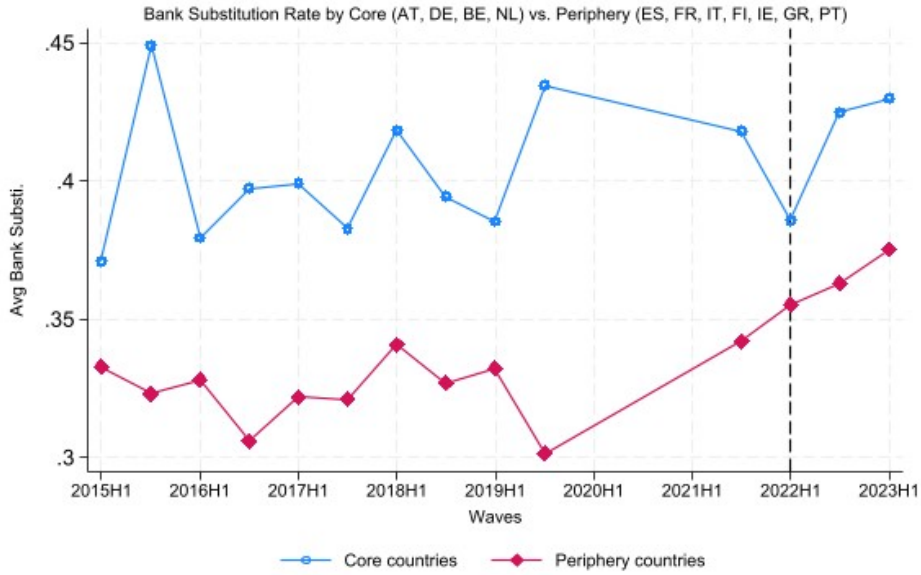


Figure: Core vs. Periphery: Bank Credit Substitution more across Core but rate of increase higher across Periphery

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

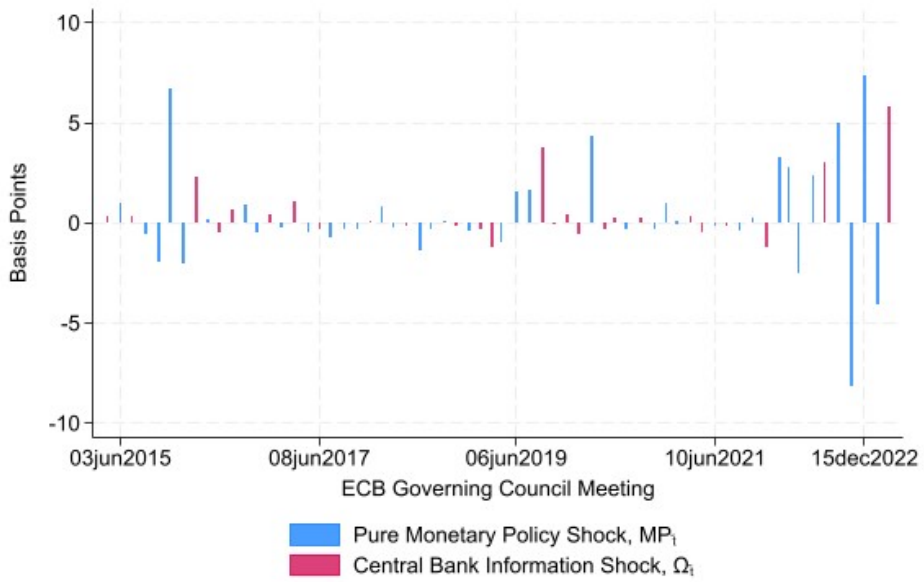


Figure: Monetary Policy Shocks

- 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)

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

- Where for firm i in country j and wave t
  - $Y_{i,j,t}$: bank credit 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)

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

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

Results

Baseline Specification

	Bank Subst. (1)	Bank Subst. (2)	Bank Subst. (3)	Bank Subst. (4)	Bank Subst. (5)
MP_{t-1}	0.029***	0.031***	0.032***	0.033***	0.029***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
MP_t	0.070***	0.080***	0.080***	0.070***	0.068***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.004)
Turnover 2: >€500k & <=€1M	0.006		0.007	0.002	0.005
	(0.005)		(0.005)	(0.006)	(0.007)
Turnover 3: >€1M & <=€2M	0.005		0.009	0.005	0.008*
	(0.007)		(0.006)	(0.005)	(0.004)
Turnover 4: >€2M & <=€10M	-0.020		-0.013	-0.024**	-0.024**
	(0.011)		(0.009)	(0.009)	(0.009)
Turnover 5: >€10M & <=€50M	-0.041**		-0.035*	-0.045**	-0.042***
	(0.018)		(0.016)	(0.015)	(0.013)
Turnover 6: >€50M	-0.073***		-0.068***	-0.076***	-0.068***
	(0.023)		(0.020)	(0.019)	(0.017)
Income profit (1:↑, 0 :↓ /*Same*)		0.014**	0.015**	-0.017***	-0.010*
		(0.006)	(0.006)	(0.004)	(0.005)
Firm size 2: Small		-0.018*	-0.013*	-0.010	-0.006
		(0.009)	(0.006)	(0.007)	(0.006)
Firm Size 3: Medium		-0.039**	-0.010	-0.008	-0.004
		(0.015)	(0.007)	(0.006)	(0.005)
Firm Age 2: 2-5 years	0.015	0.030	0.016	0.009	0.009
	(0.028)	(0.032)	(0.031)	(0.028)	(0.033)
Firm Age 3: 5-10 years	0.049*	0.066*	0.051	0.045*	0.041
	(0.027)	(0.031)	(0.031)	(0.025)	(0.030)
Firm Age 4: Over 10 years	0.033	0.049	0.036	0.028	0.026
	(0.023)	(0.029)	(0.028)	(0.024)	(0.027)
Credit Risk 2: Moderate				0.006	0.012*
				(0.006)	(0.007)
Credit Risk 2: Safe/V.Safe				0.060***	0.068***
				(0.009)	(0.011)
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)	Yes	Yes	Yes	Yes	Yes
Econ. Controls (t)	Yes	Yes	Yes	Yes	Yes
Country*Wave	Yes	Yes	Yes	Yes	Yes
Observations	67,173	67,003	65,893	57,716	53,789
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.

Results

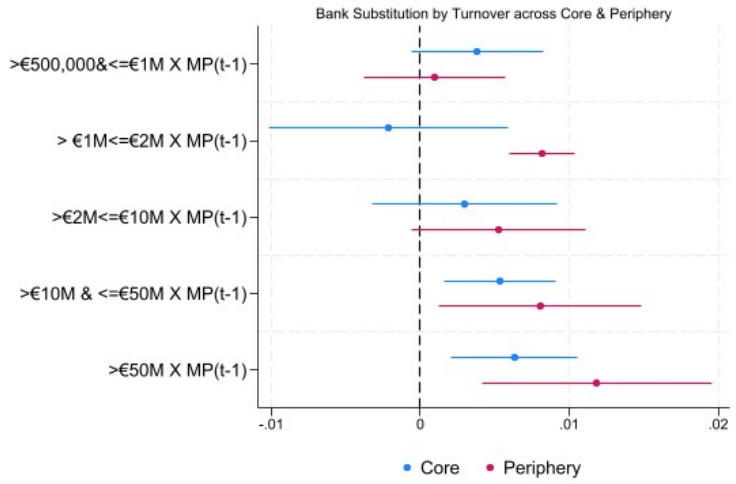
Heterogeneous Response to Monetary Policy

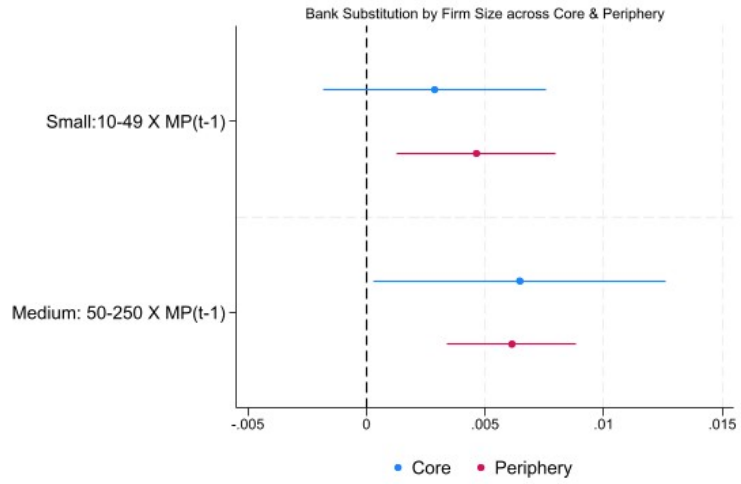
Turnover		Income/Profits		Size		Age (Years)		Cr. Quality	
Var.	**Bank Subst.**	**Var.**	**Bank Subst.**	**Var.**	**Bank Subst.**	**Var.**	**Bank Subst.**	**Var.**	**Bank Subst.**
MP (t-1)	0.026***	MP (t-1)	0.021***	MP (t-1)	0.033***	MP (t-1)	0.011***	MP (t-1)	0.025***
	(0.001)		(0.001)		(0.000)		(0.004)		(0.001)
MP (t)	0.064***	MP (t)	0.051***	MP (t)	0.073***	MP (t)	0.018***	MP (t)	0.055***
	(0.003)		(0.003)		(0.001)		(0.001)		(0.002)
>500k&<=1M	-0.001	Income	0.022***	Medium	-0.009	2-5	0.007	Moderate	0.006
	(0.007)		(0.005)		(0.006)		(0.045)		(0.004)
>1M&<=2M	-0.005	**MP(t-1)*(Income)**	0.002*	Large	-0.009	5-10	0.037	Safe/V.Safe	0.054***
	(0.003)		(0.001)		(0.006)		(0.034)		(0.010)
>2M&<=10M	-0.039***			**MP(t-1)*Medium**	0.004***	>10	0.018	**MP(t-1)*Moderate**	0.002
	(0.011)				(0.001)		(0.036)		(0.003)
>10M&<=50M	-0.065***			**MP(t-1)*Large**	**0.006*** **	**MP(t-1)*2-5**	**0.009**	**MP(t-1)*Safe/V.Safe**	**0.003****
	(0.015)				**(0.001)**		**(0.011)**		**(0.001)**
>50M	-0.091***					**MP(t-1)*5-10**	**0.012***		
	(0.021)						**(0.006)**		
MP(t-1)*(>500k&<=1M)	**0.002**					**MP(t-1)*>10**	**0.007***		
	(0.001)						**(0.004)**		
MP(t-1)*(>1M&<=2M)	**0.005****								
	(0.002)								
MP(t-1)*(>2M&<=10M)	**0.005***								
	(0.002)								
MP(t-1)*(>10M&<=50M)	**0.007*****								
	(0.002)								
MP(t-1)*(>50M)	**0.010*****								
	(0.002)								
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)	Yes	Bank Controls (t)	Yes	Bank Controls (t)	Yes	Bank Controls (t)	Yes	Bank Controls (t)	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	-2.297***	Constant	-1.964***	Constant	-2.082***	Constant	-0.957***	Constant	-2.018***
	(0.123)		(0.103)		(0.039)		(0.044)		(0.061)
Observations	54,868	Observations	55,851	Observations	59,450	Observations	57,103	Observations	56,383
R-squared	0.036	R-squared	0.039	R-squared	0.032	R-squared	0.031	R-squared	0.035

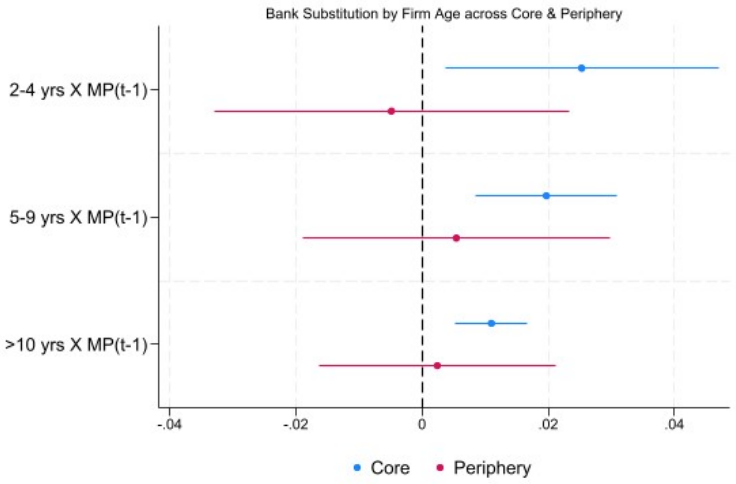
Clustered SE on country in parenthesis *** p<0.01 ** p<0.05 * p<0.1.

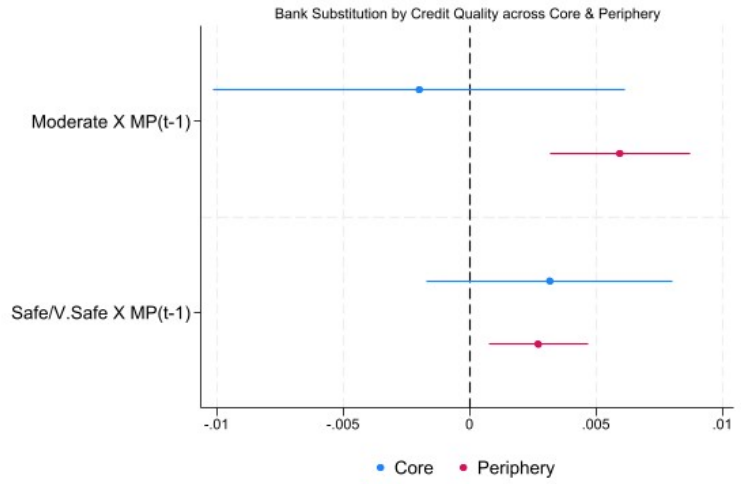
Results

Core vs. Periphery Country-Level Analysis



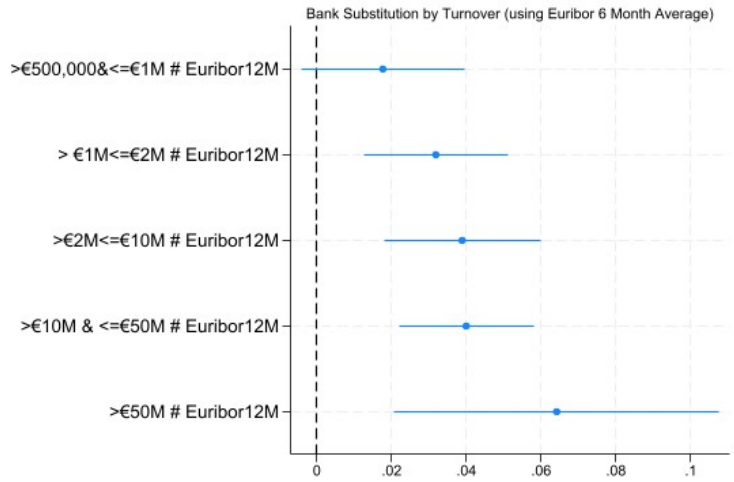


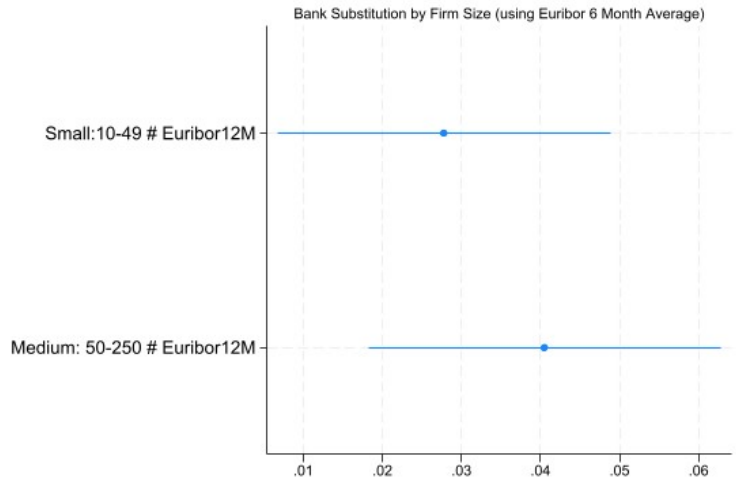


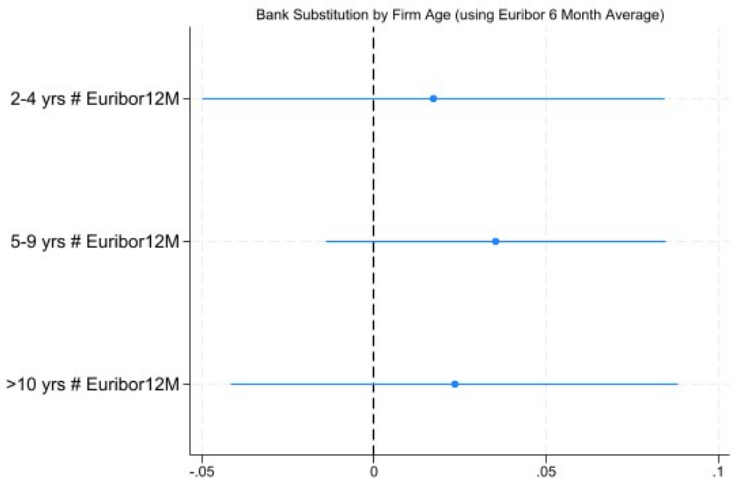


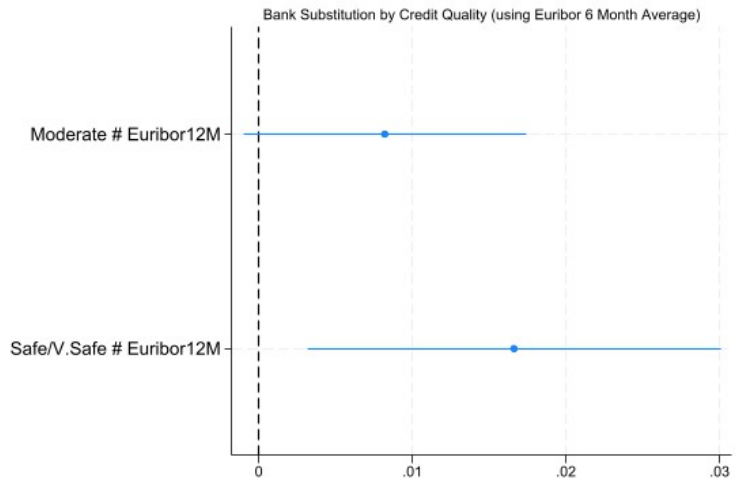
Results

Robustness Check 1: Alternative Monetary Policy Shock Indicator- Change in average 12-month maturity Euribor between 't' and 't-1'



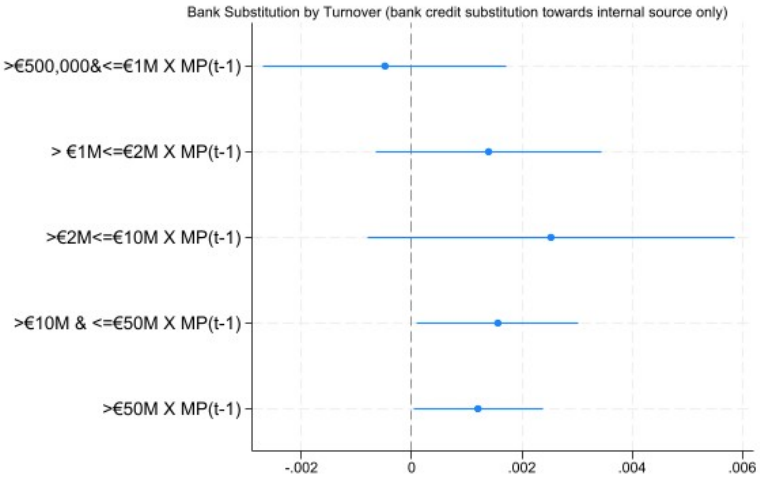


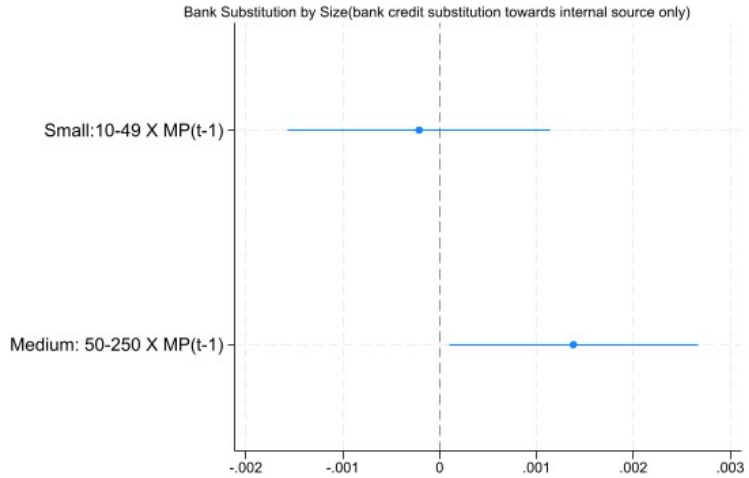


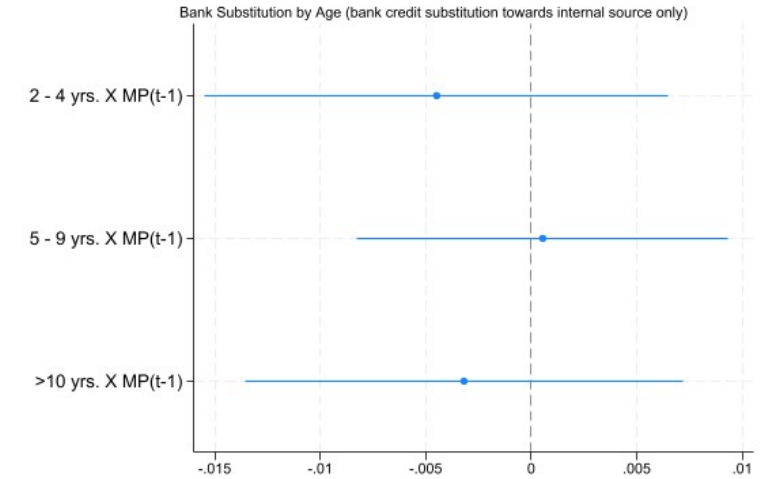


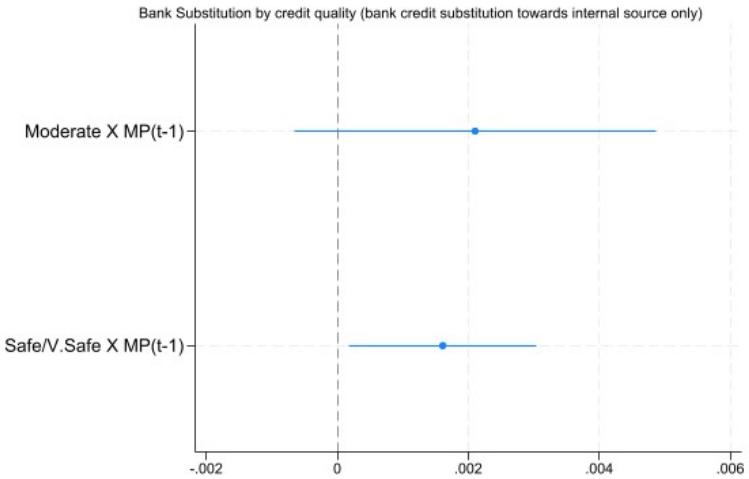
Results

Robustness Check 2: Substitution with only internal sources of finance, such as retained earnings



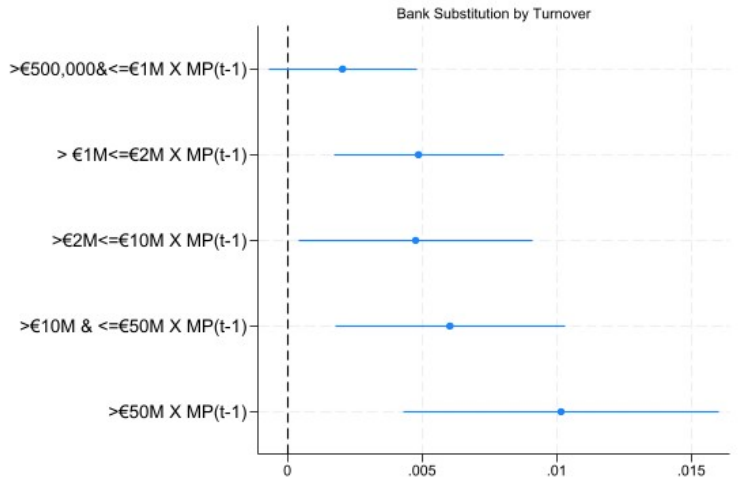


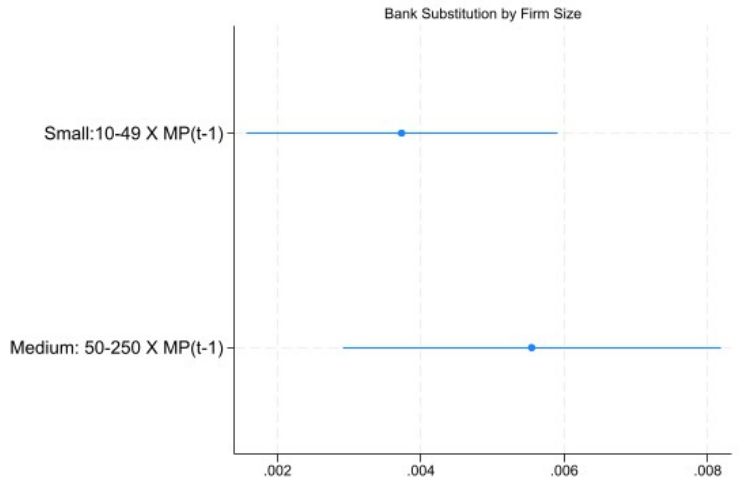


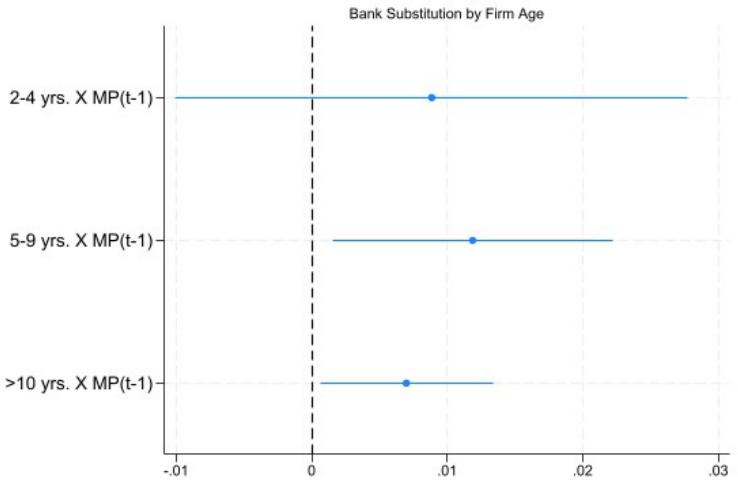


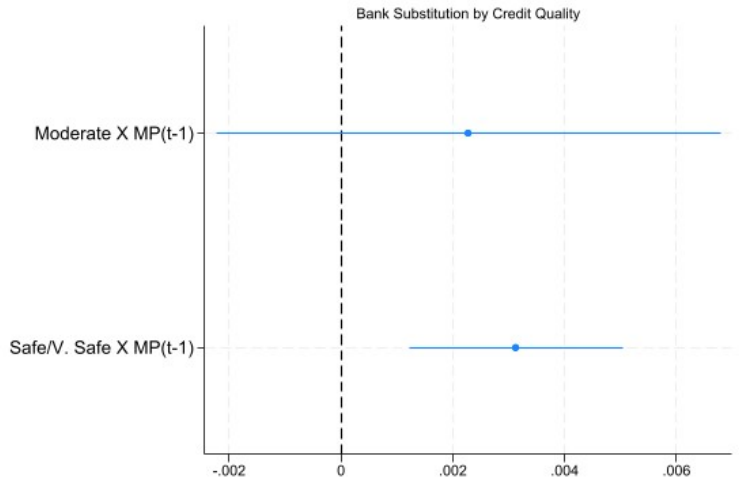
Results

Robustness Check 3: Adding Sector-Wave Fixed Effects









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

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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
- Safe
  - Income/profit remain unchanged/increased and leverage decreases
  - *OR* income/profit increased and leverage unchanged

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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

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