Bank Specialization and the Transmission of Euro Area Monetary Policy[1]

Latvijas Banka

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[1] The views expressed are those of the author and not necessarily of the Bank of Latvia or the Eurosystem.

Definition and Research Questions

Following Blickle et al. (2023, NBER WP):

$$Specialization_{b,s,t} \equiv \frac{LoanAmount_{b,s,t}}{\sum_s LoanAmount_{b,s,t}} - \frac{\sum_b LoanAmount_{b,s,t}}{\sum_b \sum_s LoanAmount_{b,s,t}}$$

$\Rightarrow$ *Over-proportional* exposure of bank b to borrower group s

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Research Questions:

1. What are the key patterns of specialization in borrower industry and size? Is specialization relevant for borrowing conditions?
2. How does specialization interact with monetary policy pass-through to interest rates and the transmission to credit supply?

Motivation and Approach

- Credit channel $\rightarrow$ Important to understand how exactly availability of corporate credit changes in response to monetary policy
- So far: focus separately on bank or firm characteristics.
- **This paper:** *Interplay* between banks and borrowers in the form of bank specialization.
- **Main approach:** Panel local projections using AnaCredit data at different aggregation levels; Interactions of MP effects with specialization.

Literature

- Bank specialization and implications for firm financing
  - Blickle et al. (2023, NBER WP), DeJonghe et al. (2020, RoF), DeJonghe et al. (2021, NBB WP), Degryse et al. (2024, NBB WP), Duquerroy et al. (2022, BdF WP), Böve et al. (2010, BuBA DP)

    Contribution: entire euro area, explicitly consider monetary policy

- Bank credit and monetary policy
  - Bernanke and Gertler (1995, JEP), Kashyap and Stein (2000, AER), Dell'Ariccia et al. (2017, JoF), Gomez et al. (2021, JME)

    Contribution: role of specialization; beyond bank-level

- Methodology: micro-responses to macroeconomic shocks
  - Almuzara and Sancibrian (2024, WP) Ottonello and Winberry (2020, Ecnm), Cloyne et al. (2023, JEEA), Anderson and Cesa-Bianchi (2024, AEJ: Macro)

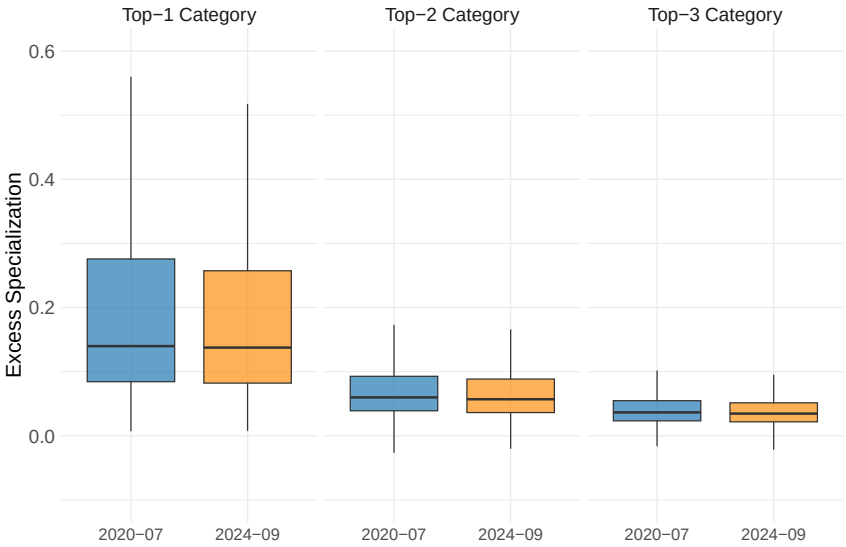
Specialization in the Euro Area

Data and Sample Selection

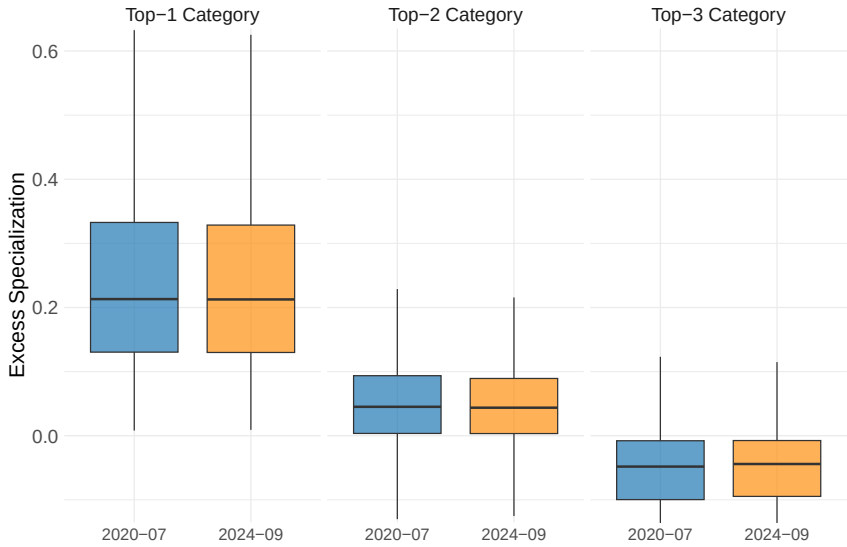
- Specialization in borrower **industry** (2-digit NACE) and **size category** (EU classification); calculated relative to loan shares in respective country
- Compute specialization and assess implications using **AnaCredit** data for all euro area countries in 2020m7-2024m9
- Key sample selection:
  - Euro-denominated domestic loans to non-financial firms above EUR 25,000
  - Only credit lines, revolving credit and other loans
  - Exclude loans with multiple debtors and syndicated loans
  - Exclude firms that are in default
- Final loan-level data per month: around 6 million loans from 2300 banks

▸ Summary Statistics

Specialization Patterns



(a) Borrower Industry



(b) Borrower Size

Specialization primarily in one or two top categories; almost no banks are fully diversified; overall degree constant.

▸ Histograms ▸ Intensity ▸ Industry-Size

Specialization and Borrowing Conditions

- Does specialization affect credit conditions for borrowing firms?
- Bank-firm level panel regression using data on **newly issued loans**

$$\begin{aligned} CreditCondition_{b,f,i,s,n,t} = \alpha_{b,t} + \alpha_{i,s,t} + \beta_1 Spec_{b,i,t} + \beta_2 Spec_{b,s,t} + \gamma_1 RegShare_{b,n} \\ + \gamma_2 MktShare_{b,i,t} + \gamma_3 MktShare_{b,s,t} + \gamma_3 Rel_{f,b} + \Gamma X_{f,t} + e_{b,f,i,s,n,t} \end{aligned}$$

- Higher specialization (broadly) associated with:
  - Lower interest rates
  - Larger amount of credit
  - Longer maturity
  - *Higher* collateral share

▶ Details

Specialization and Monetary Policy Transmission

Overview

- Do banks change interest rates and credit supply more or less for borrower groups in which they specialize?

  $\rightarrow$ Panel LP-IV on **outstanding credit** at bank-industry and bank-size level

- Key specification: interaction of MP with specialization

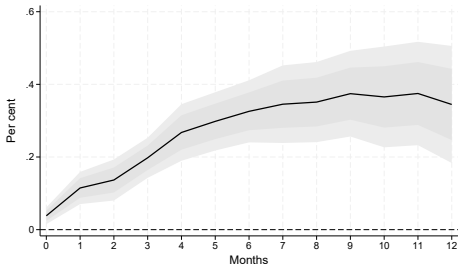
$$\Delta CreditCondition_{b,i,t+h,t-1} = \alpha_b + \alpha_i + \alpha_{c,t} + \beta_h^{int} Spec_{b,i,t-1} \Delta R_t + \Gamma_{1h} Z_{b,i,t-1} + \Gamma_{2h} Z_{b,i,t-1} \Delta R_t + e_{b,i,t+h}$$

  - $\Delta CreditCondition$: absolute change in interest rate or log real credit amount
  - ΔR_t: EURIBOR1m instrumented with Altavilla et al. (2019) *Target* factor
  - $Spec_{b,i}$: Dummy if in highest quartile of specialization distribution or dummy if most preferred category (controlling for magnitude of spec)

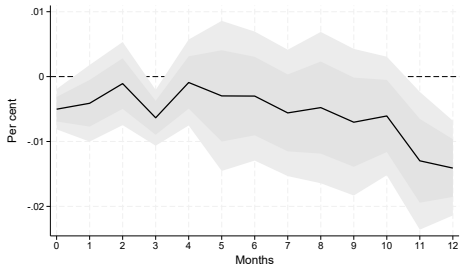
▸ Shocks ▸ Avg-Spec and S1

Specialization and Interest Rate Pass-Through

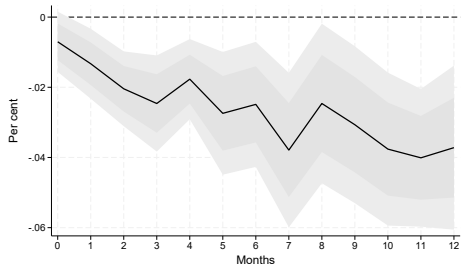
→ Effect of 25 bp exogenous change in policy rate on change in **interest rate**



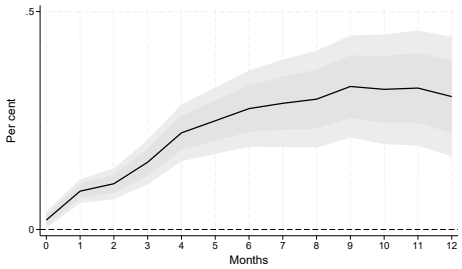
Average



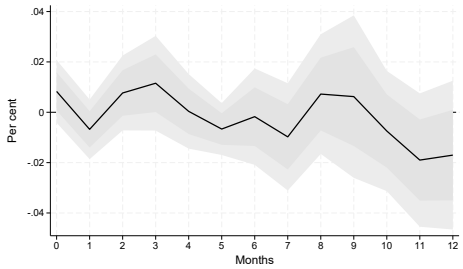
Q4 Industry Spec.



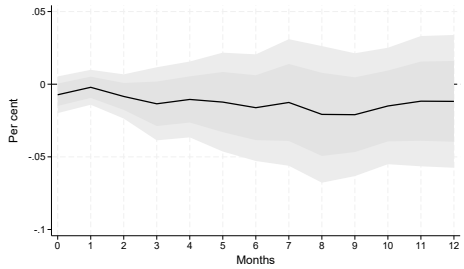
Top Industry



Average



Q4 Size Spec.

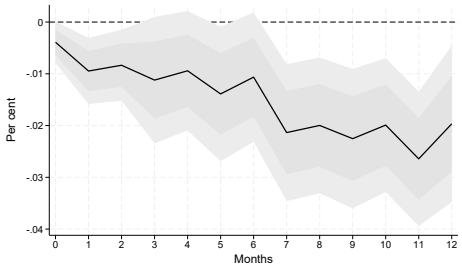


Top Size Category

Banks raise interest rates less in industries where they are highly specialized; further dampening when in top industry.

Specialization and Credit Supply

→ Effect of 25 bp exogenous change in policy rate on log-change in **credit**:



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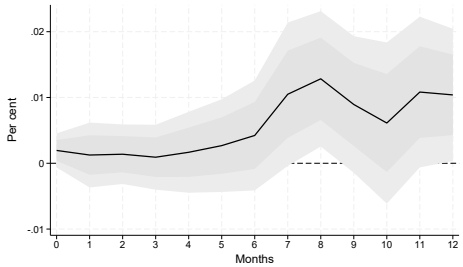

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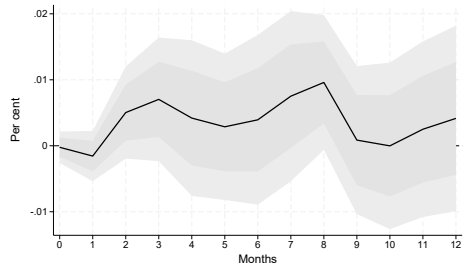
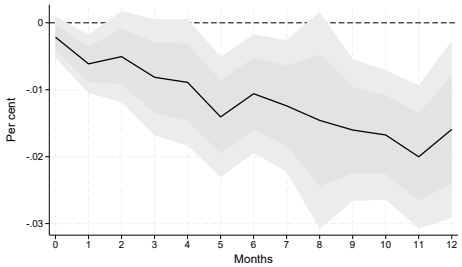


Top Industry



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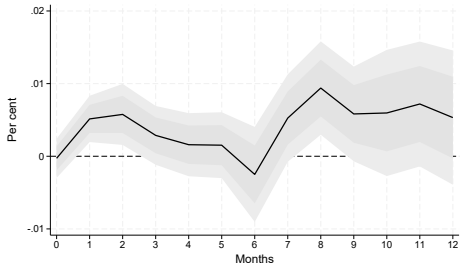

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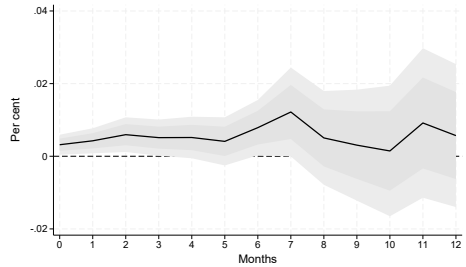


Top Size Category

Banks reduce credit less in industries and size groups where they are highly specialized; no additional effect of top category.

Additional Results - Overview

General result: banks shield borrowers in industries and size categories where they specialize from increases in interest rates and reductions in credit supply.

Now: Direct evidence on potential implications

1. MP effectiveness and **specializing bank market share**

   $\rightarrow$ Less credit contraction in categories dominated by specialized banks?

   - LP of change in credit at industry-size level on MP shock
   - Interaction with share of credit from banks with high specialization

2. MP effects on specializing bank market share

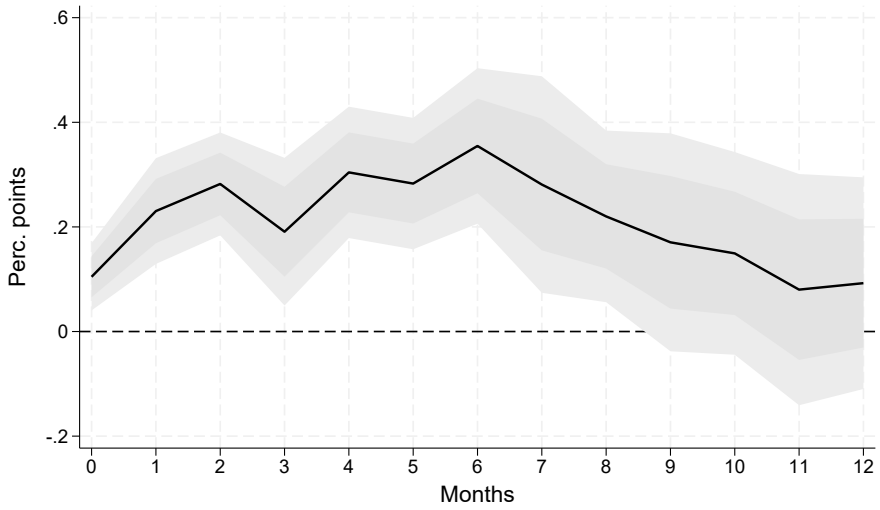
   $\rightarrow$ Increase in share of credit in the hands of specializing banks?

   - LP of change in high specialization share on MP shock

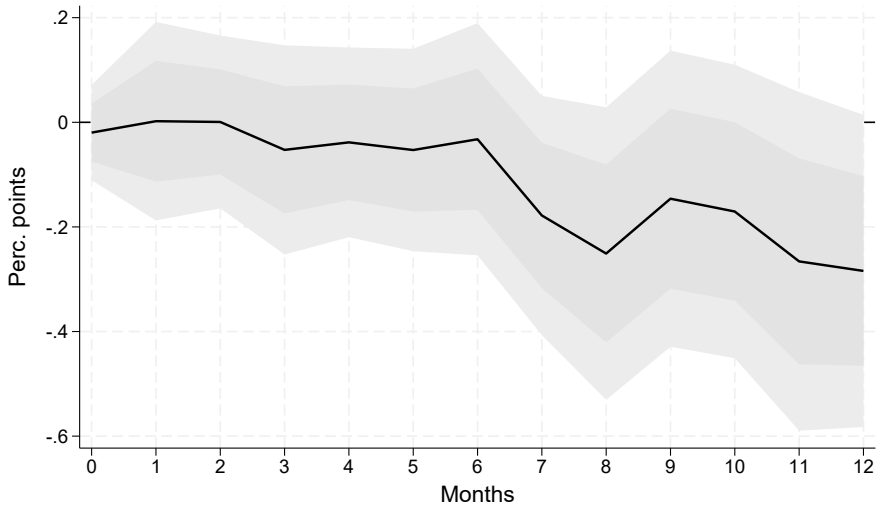
▸ Specifications ▸ Intensive Margin

MP Effectiveness and Specializing Bank Market Share

→ Marginal effect of 10 p.p. higher market share of specializing banks on response to exogenous 25bp change in interest rate



(a) Industry Specialization

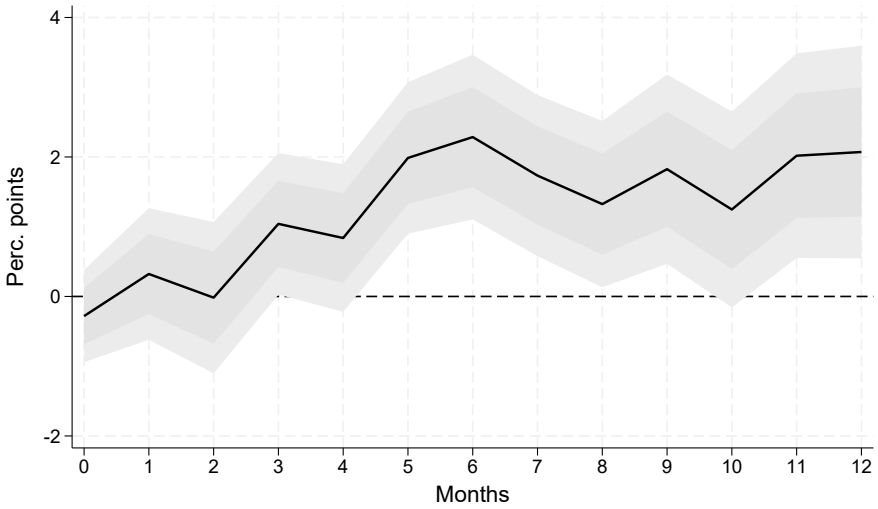


(b) Size Specialization

Higher specializing banks market share in industry dampens MP effects on credit. No significant effect of size spec. market share.

MP Effects on Specializing Bank Market Share

→ Effect of a 25bp rate change on market share of specializing banks



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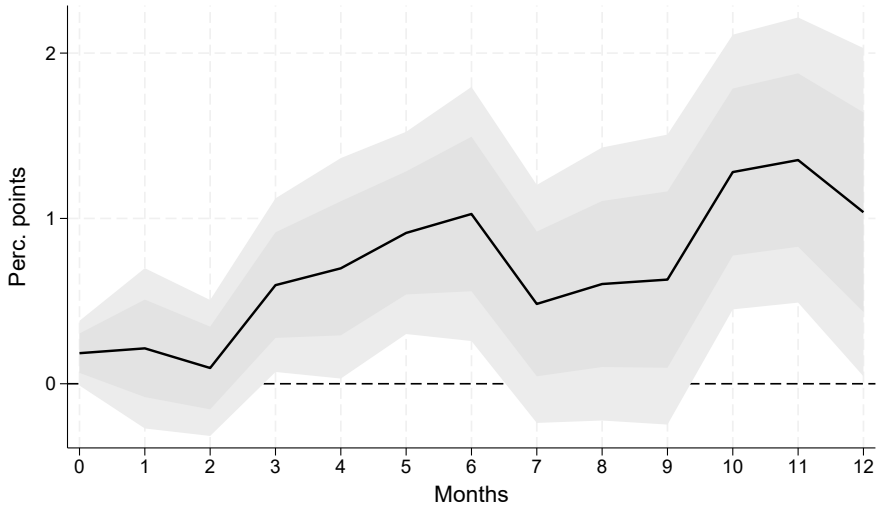

(b) Size Specialization

MP leads to increasing share of credit from highly specialized banks.

Conclusion

Conclusion

Key findings:

- Specialization widespread among euro area banks; more favorable credit terms where a bank specializes.
- Higher specialization dampens pass-through of MP to corporate lending rates and credit volumes.
- High share of credit by specializing banks reduces MP impact on an industry.
- MP raises share of credit by specializing banks in a given industry or size category.

Implications

Selection of potential (policy) **implications** of results so far:

- Heterogeneity in MP responses across firms depends on degree of specialization of their lenders.
- MP generally less effective when most relevant industries in an economy are dominated by specializing banks.
- Reallocation of credit reduces MP effectiveness over prolonged tightening cycles when more and more credit accrues to specializing banks.
- ...

Appendix

Summary Statistics

Table: Summary Statistics for Loans Outstanding in 2021-01

Country	No. of banks	No. of loans	Total loan volume (EUR bn)				Loan volume (EUR thousands)			Rate
			All	Other loans	Credit lines	Revolving credit	Mean	Median	S.d.	(weighted mean), %
AT	469	162635	103.68	54.67	21.88	27.13	637.50	160.00	2289.13	1.60
BE	40	279318	95.21	26.93	55.55	12.74	340.88	104.13	1302.92	1.68
CY	13	9801	6.78	5.69	1.04	0.05	692.05	137.01	2509.65	2.93
DE	849	818136	485.58	200.92	272.39	12.27	593.52	124.70	2144.53	1.75
EE	10	6351	5.72	5.60	0.01	0.11	899.93	114.76	3985.05	2.30
ES	127	958869	266.34	172.50	30.17	63.68	277.77	77.40	1467.58	1.80
FI	171	127791	72.83	64.45	7.17	1.20	569.91	98.75	2418.21	1.25
FR	164	2364924	549.45	376.22	167.82	5.41	232.34	87.92	903.53	1.51
GR	17	69173	27.94	4.94	14.53	8.46	403.85	101.95	1886.75	3.83
IE	23	26193	12.71	9.11	2.23	1.37	485.09	93.59	2321.91	2.97
IT	217	1081454	271.35	267.04	0.52	3.79	250.91	60.00	1106.00	1.61
LT	17	9301	5.76	4.98	0.22	0.56	619.00	100.00	2241.06	2.72
LU	33	9422	7.64	4.69	2.08	0.87	811.12	197.33	3493.94	1.23
LV	16	5704	4.00	3.42	0.20	0.39	701.94	103.88	2837.88	2.73
MT	9	3504	2.66	0.71	1.93	0.02	758.86	179.49	2185.04	3.60
NL	26	31667	63.18	49.47	12.19	1.52	1995.10	382.50	4860.96	2.62
PT	122	208726	49.09	25.45	13.67	9.96	235.18	60.00	1017.08	2.69
SI	15	15448	6.34	3.42	1.36	1.57	410.71	107.27	1194.95	1.80
SK	22	20375	7.89	5.03	1.98	0.89	387.40	86.20	1780.60	2.20
Euro Area	2360	6208792	2044.16	1285.22	606.95	151.99	329.24	87.50	1457.55	1.74

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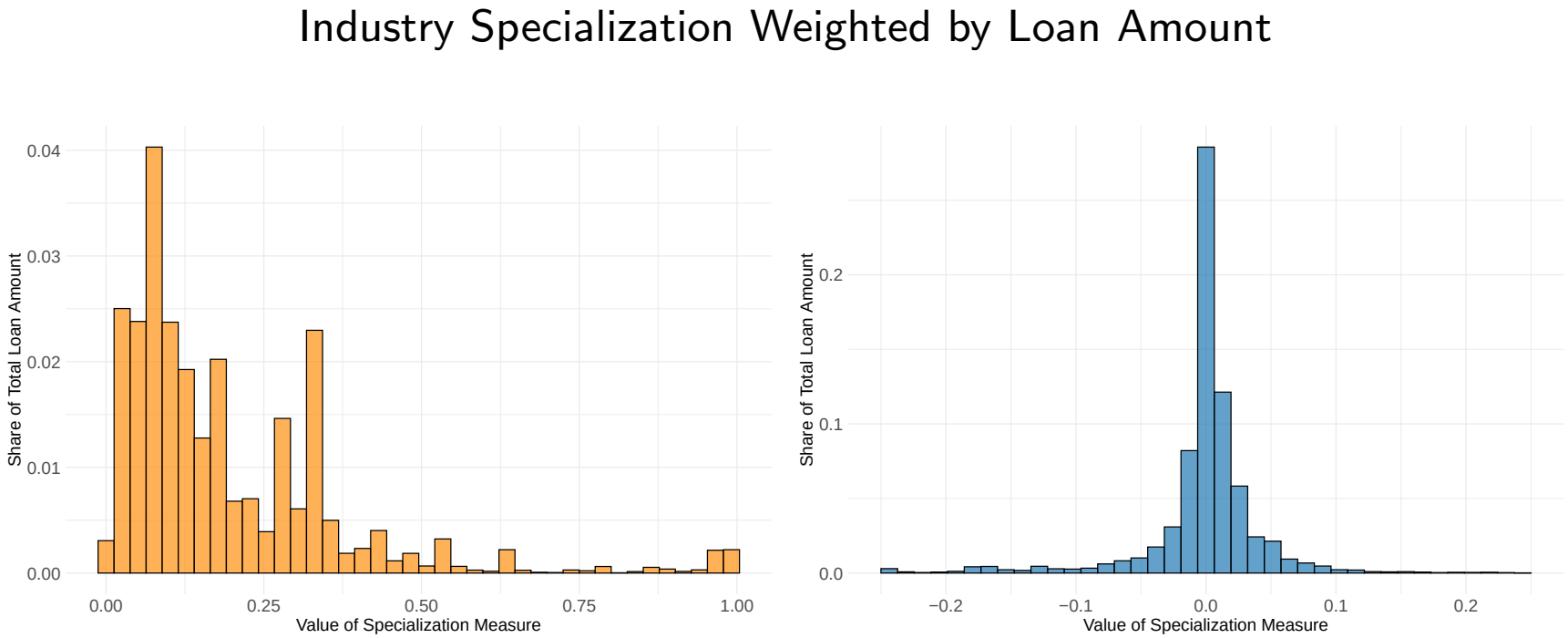
Specialization Patterns (1/3)



(a) Top Industry

(b) Other Industries

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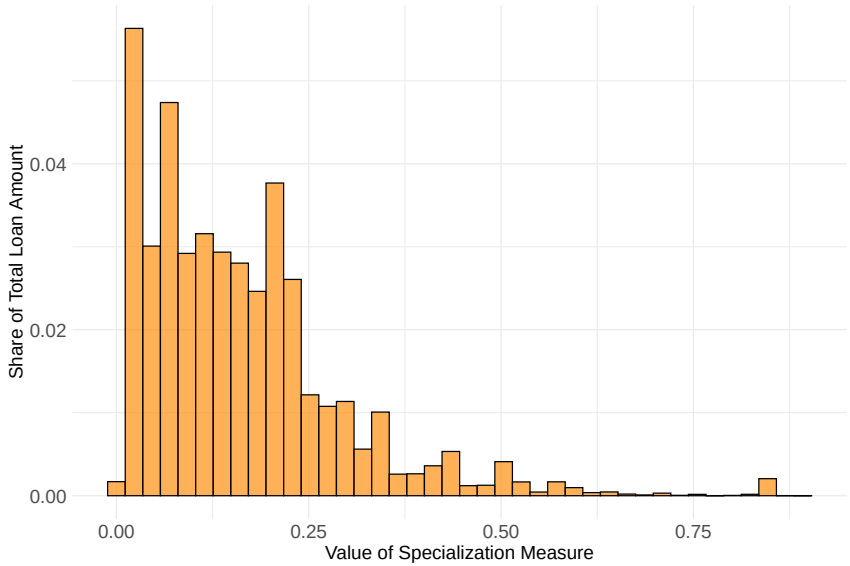
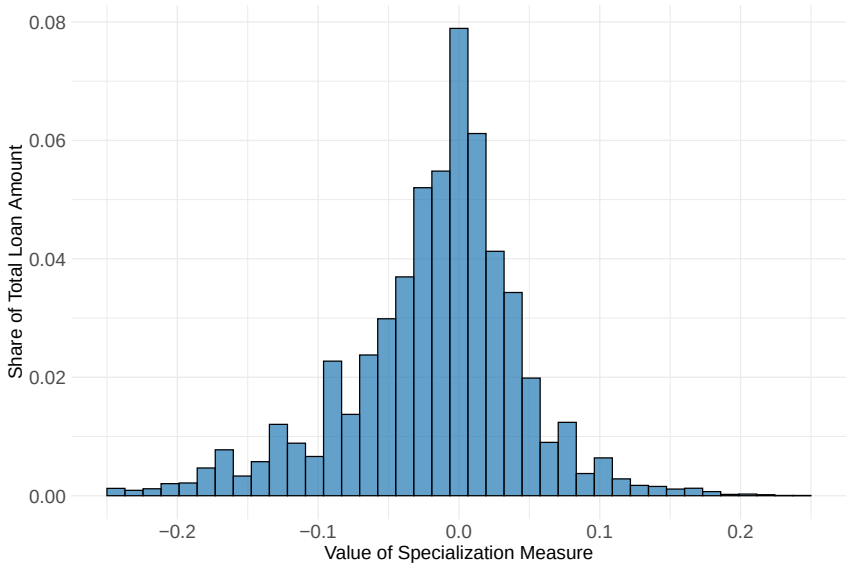
Specialization Patterns (2/3)

Size Specialization Weighted by Loan Amount



(a) Top Size Category



(b) Other Size Categories

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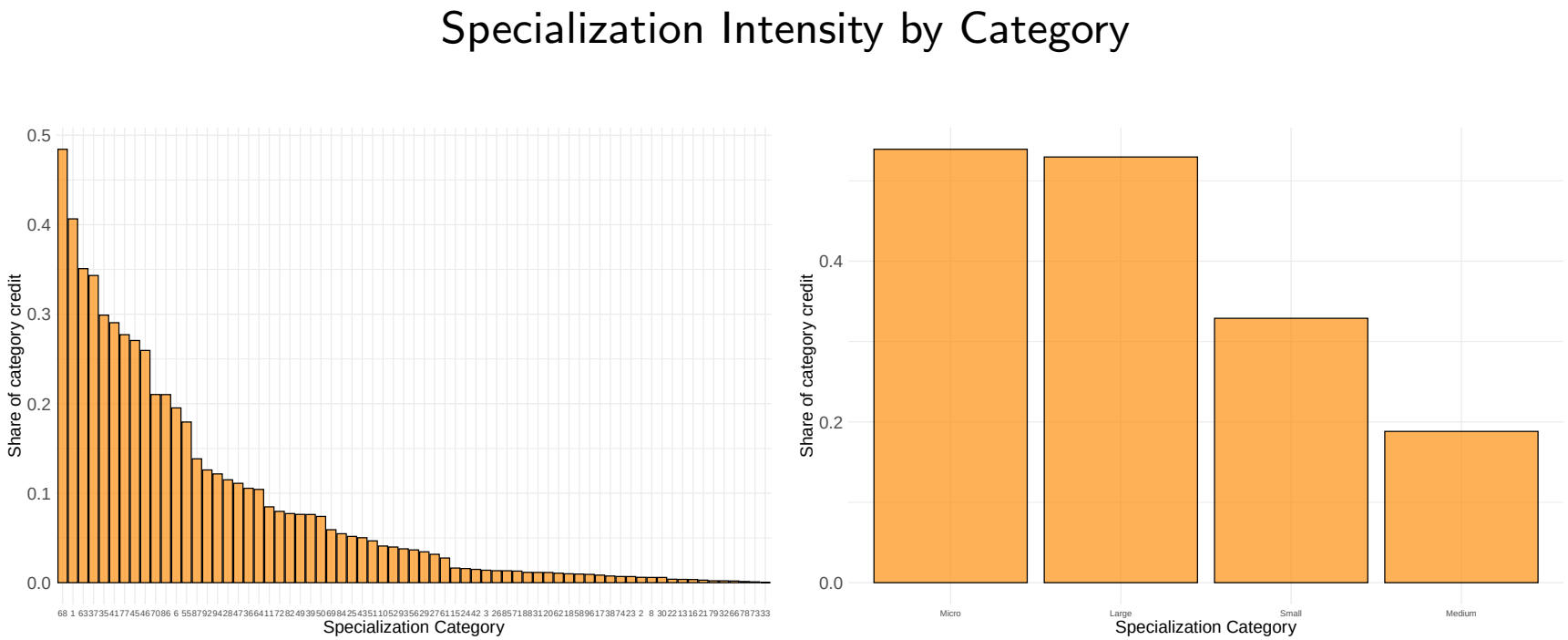
Specialization Patterns (2/3)



(a) Industries

(b) Size Categories

→ Share of total credit from banks for which the category is most preferred.

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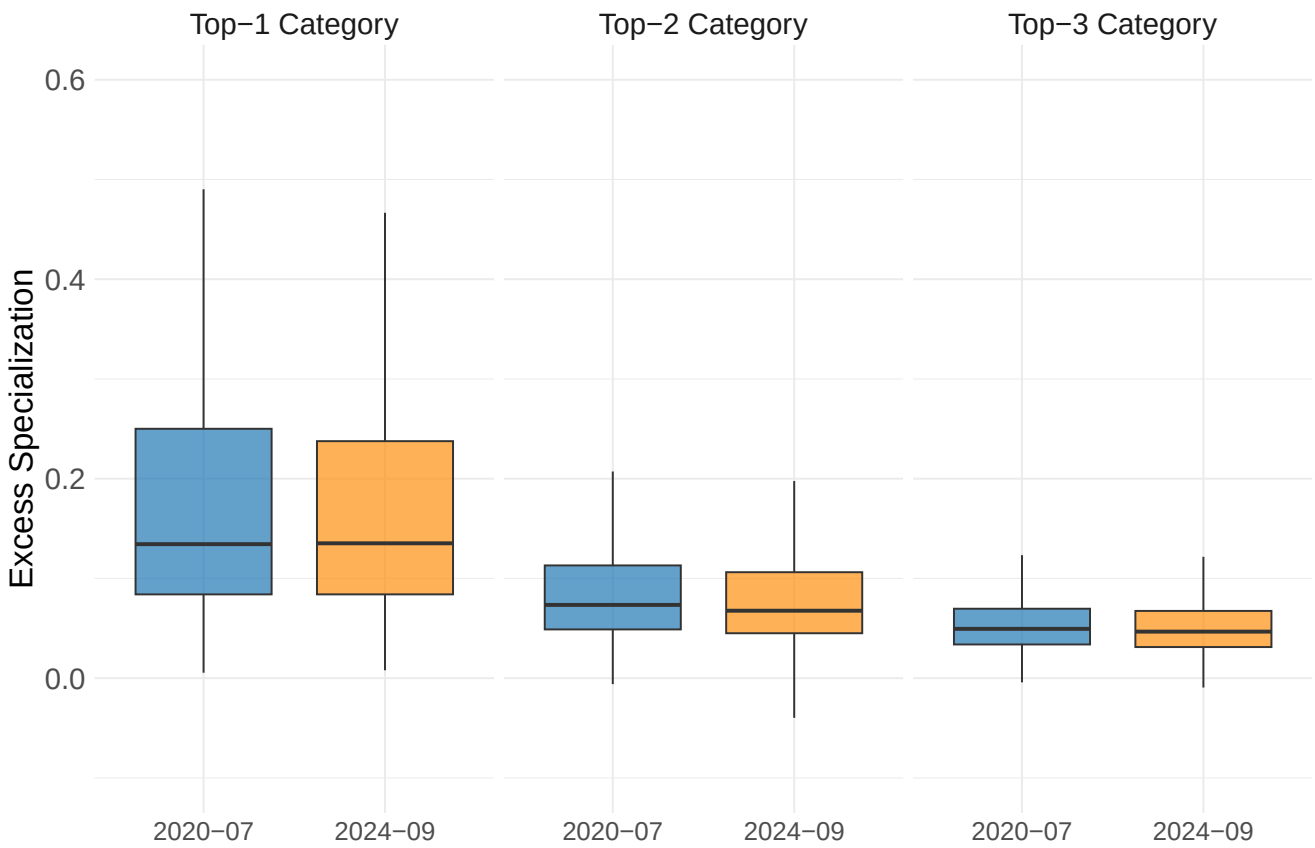
Specialization Patterns - Industry-Size Groups (1/3)



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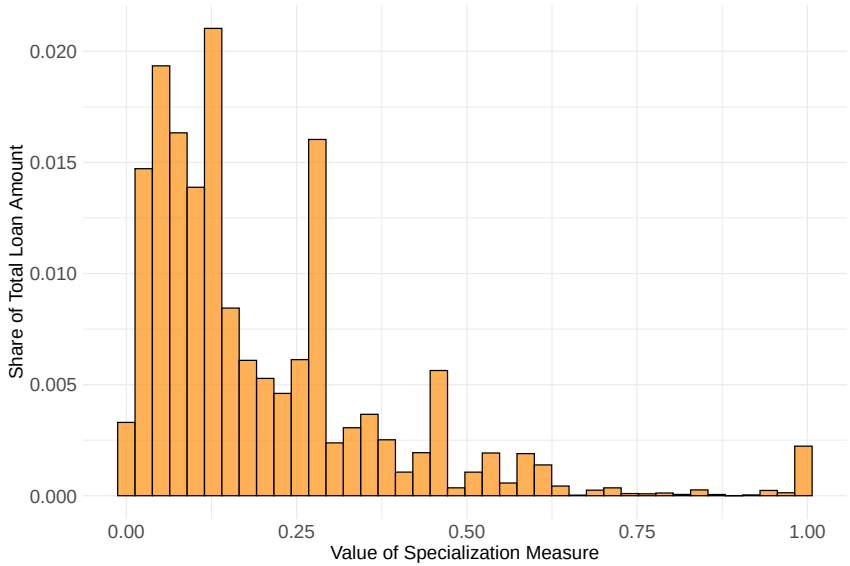
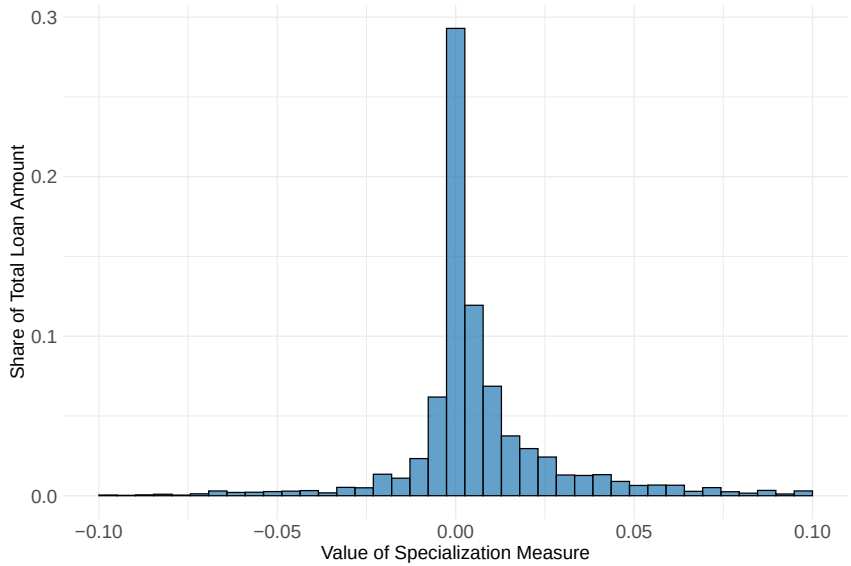
Specialization Patterns - Industry-Size Groups (2/3)

Industry-Size Specialization Weighted by Loan Amount



(a) Top Industry-Size Group



(b) Other Industry-Size Groups

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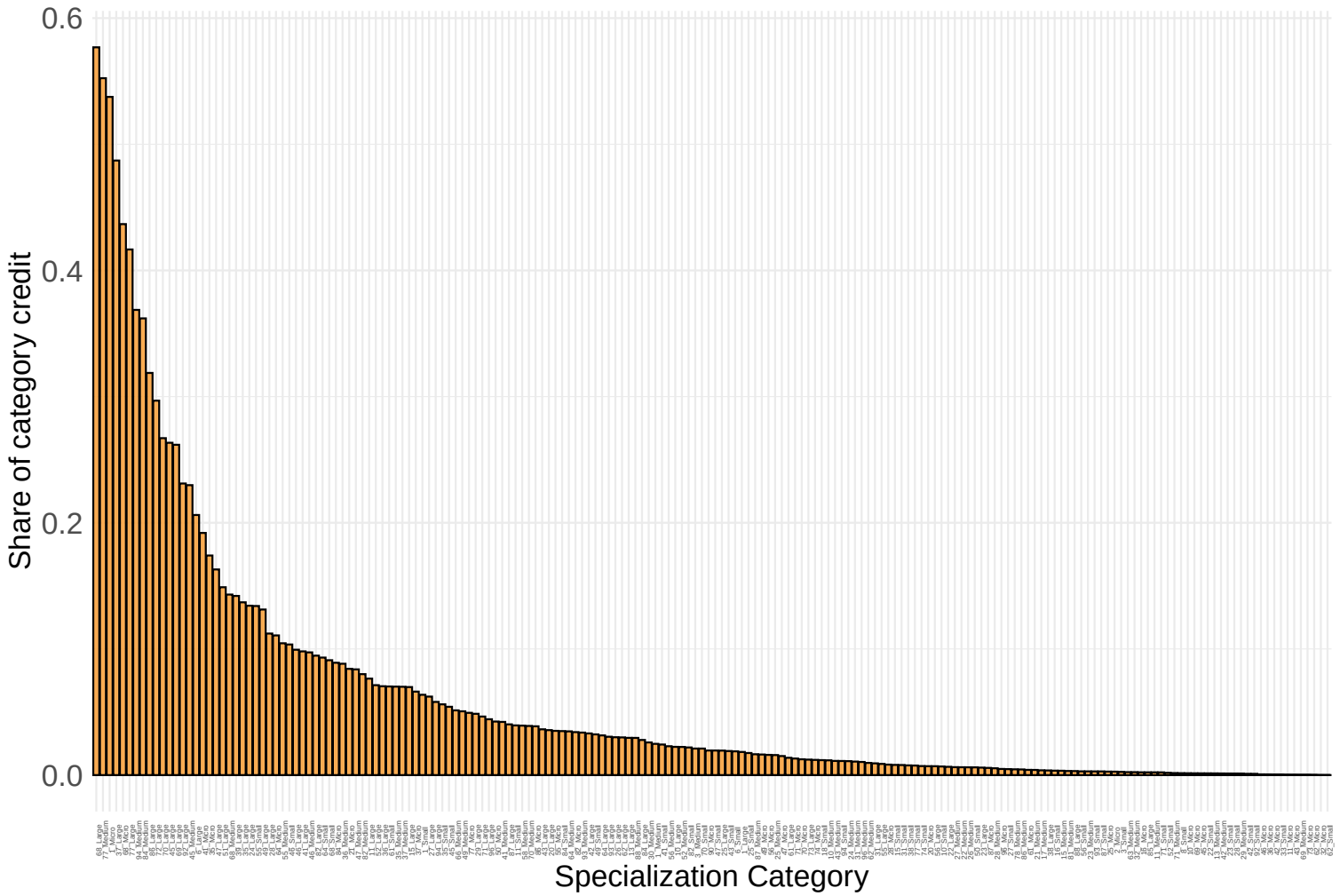
Specialization Patterns - Industry-Size Groups (3/3)



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Implications for Borrowing Conditions - Approach

- Specialization affects credit conditions when they are determined
  $\rightarrow$ focus on newly issued loans
- Aggregation to bank-firm level with value-weighted means across loans within each bank-firm pair
- Panel regression of credit conditions on specialization:

$$\begin{aligned} CreditCondition_{b,f,i,s,n,t} = {} & \alpha_{b,t} + \alpha_{i,s,t} + \beta_1 Spec_{b,i,t} + \beta_2 Spec_{b,s,t} + \gamma_1 RegShare_{b,n} \\ & + \gamma_2 MktShare_{b,i,t} + \gamma_3 MktShare_{b,s,t} + \gamma_3 Rel_{f,b} + \Gamma X_{f,t} + e_{b,f,i,s,n,t} \end{aligned}$$

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Implications Interest Rates and Loan Amount

	Interest Rate			Loan Amount		
	(1)	(2)	(3)	(4)	(5)	(6)
Industry Spec	-0.0500***	-0.0295***	-0.0496***	0.136***	0.175***	0.136***
	(0.00697)	(0.0103)	(0.00695)	(0.0146)	(0.0174)	(0.0146)
Top Industry		-0.0522***			-0.0988***	
		(0.0148)			(0.0143)	
Size Spec	-0.00259	-0.00278	0.00756*	-0.0269***	-0.0272***	-0.0369***
	(0.00336)	(0.00337)	(0.00385)	(0.00748)	(0.00750)	(0.00877)
Top Size Category			-0.0325***			0.0321***
			(0.00653)			(0.0112)
Fixed effects	Industry-Size-Month, Bank-Month					
Controls	Market Shares, Regional Share, Relationship PD, Rate or Amount, Maturity, Collateral Share					
R-squared	0.832	0.832	0.832	0.555	0.554	0.555
Observations	3993676	3993676	3993676	3993676	3993676	3993676

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Higher specialization and top category associated with (slightly) lower interest rates and (much) larger loan amounts.

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Implications for Maturity and Collateral Share

	Maturity			Collateral Share		
	(1)	(2)	(3)	(4)	(5)	(6)
Industry Spec	3.476***	3.369***	3.472***	0.0413***	0.0435***	0.0413***
	(0.334)	(0.364)	(0.334)	(0.00607)	(0.00727)	(0.00606)
Top Industry		0.271			-0.00567	
		(0.629)			(0.0105)	
Size Spec	1.117***	1.118***	1.031***	-0.000780	-0.000801	-0.000651
	(0.142)	(0.142)	(0.174)	(0.00284)	(0.00284)	(0.00286)
Top Size Category			0.276			-0.000413
			(0.317)			(0.00556)
Fixed effects	Industry-Size-Month, Bank-Month					
Controls	Market Shares, Regional Share, Relationship PD, Rate, Amount, Maturity or Collateral Share					
R-squared	0.541	0.541	0.541	0.363	0.363	0.363
Observations	3993676	3993676	3993676	3993676	3993676	3993676

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Higher specialization associated with longer maturity and (for industry spec) *higher* collateral share.

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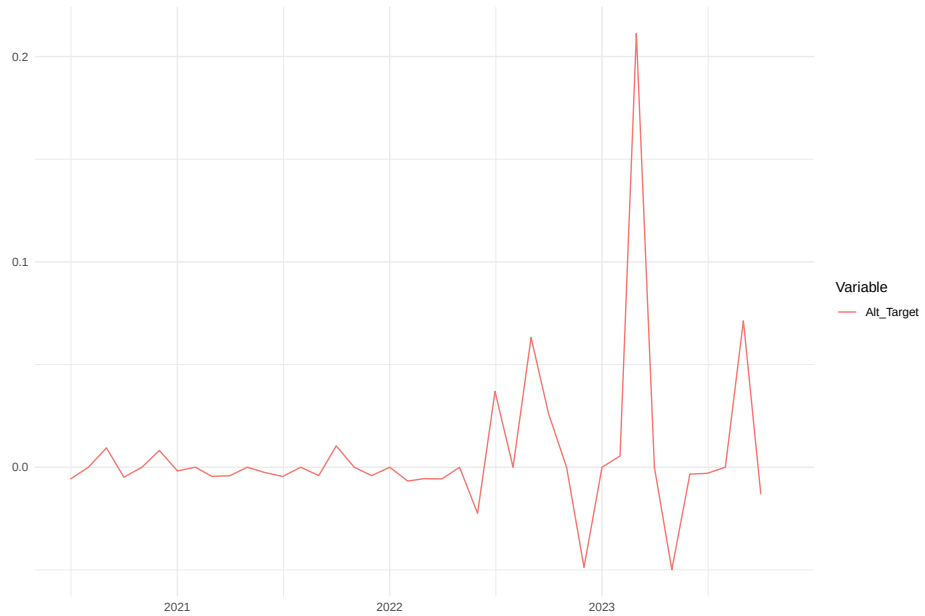
Monetary Policy Shocks

- Shocks based on MP surprises from Altavilla et al. (2019).
- Conventional MP captured by *Target* factor.
- For monthly frequency: assignment of surprises to month when they occur.

MP Shocks used as Instrument in LP



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Local Projections - Further Details

Average effect using bank-industry/size level data:

$$\Delta CreditCondition_{b,i,t+h,t-1} = \alpha_b + \alpha_i + \beta_h^{avg} \Delta R_t + \Gamma_{1h} Z_{b,i,t-1} + \Gamma_{2h} Z_{b,i,t-1} \Delta R_t + \sum_{k=1}^{4} \Gamma_{3h,k} Y_{t-k} + e_{b,i,t+h}$$

First Stage Regression Results for $h = 0$

	1m EURIBOR	3m EURIBOR	1m OIS
	(1)	(2)	(3)
Alt. Target	1.950***	1.516***	1.502***
	(0.214)	(0.252)	(0.238)
F-statistic	41.42	19.91	19.87
R-squared	0.242	0.169	0.132
Observations	271552	271552	271552

Standard errors in parentheses

* p<0.1, ** p<0.05, *** p<0.01

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Additional Results - Specifications

1. MP effectiveness and specializing bank market share

$$\Delta Credit_{i,s,c,t+h,t-1} = \alpha_{i,s} + \alpha_{c,t} + \left(\beta_{1h}^{int} HShare_{i,c,t-1} + \beta_{2h}^{int} HShare_{s,c,t-1}\right) \Delta R_t + \Gamma_{1h} Z_{i,s,c,t-1} + \Gamma_{2h} Z_{i,s,c,t-1} \Delta R_t + e_{i,s,c,t+h}$$

2. MP effects on specializing bank market share

$$\Delta HShare_{i,c,t-1,t+h} = \alpha_{i,s} + \alpha_c + \beta_{1h}^{sint} \Delta R_t + \Gamma_{1h} Z_{i,s,c,t-1} + \Gamma_{2h} Z_{i,s,c,t-1} \Delta R_t + \sum_{k=1}^{4} \Gamma_{3h,k} Y_{c,t-k} + e_{i,s,c,t+h}$$

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Extensive vs. Intensive Margin - Approach

- Are interactions driven by adjustments among existing borrowers (intensive margin) or among new borrowers (extensive margin)?

  → Simple regression on evolution of interest rates and credit during recent MP tightening episode at bank-industry-size level

- Regression conditioning on the degree of specialization at the outset of the hiking episode:

$$\Delta CreditCondition_{b,i,s,t-1,t+18} = \alpha_b + \alpha_{i,s} + \delta_1 Hike_t + (\beta_1 Spec_{b,i,t-1} + \beta_2 Spec_{b,s,t-1} + \gamma_1 MktShare_{b,i,t-1} + \gamma_2 MktShare_{b,s,t-1}) * Hike_t + e_{b,i,s,t}$$

where $Hike_t$ is a dummy for $t = 2022m7$

→ Compare results from baseline to those from regression of credit conditions only among existing borrowers.

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Extensive vs. Intensive Margin - Interest Rates

	Interest Rate - All Borrowers			Interest Rate - Existing Borrowers		
	(1)	(2)	(3)	(4)	(5)	(6)
Tightening	2.176***			1.967***		
	(0.0718)			(0.0723)		
(HighSpec in Industry)*(Tightening)	-0.434***	-0.0898***		-0.380***	-0.0175	
	(0.0557)	(0.0235)		(0.0568)	(0.0230)	
(HighSpec in Size)*(Tightening)			-0.0396			-0.0519
			(0.0426)			(0.0417)
(Spec in Industry)*(Tightening)			-0.0138			0.00609
			(0.0130)			(0.0128)
(Spec in Size)*(Tightening)	-0.0144	-0.00784		-0.0190	-0.0133	
	(0.0353)	(0.0157)		(0.0363)	(0.0156)	
Fixed effects			Industry-Size, Bank			
Country Dummies	No	Yes	Yes	No	Yes	Yes
R-squared	0.736	0.834	0.834	0.717	0.834	0.834
Observations	269533	269533	269533	254156	254156	254156

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Muted increase in interest rates for high specialization industries exclusively driven by differences in treatment of new borrowers.

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Extensive vs. Intensive Margin - Credit Outstanding

	Credit - All Borrowers			Credit - Existing Borrowers		
	(1)	(2)	(3)	(4)	(5)	(6)
Tightening	-0.167***			-0.0801***		
	(0.0106)			(0.00751)		
(HighSpec in Industry)*(Tightening)	0.0530***	0.0448***		0.0392***	0.0274***	
	(0.0133)	(0.0126)		(0.00961)	(0.00938)	
(HighSpec in Size)*(Tightening)			0.0662***			0.0682***
			(0.0160)			(0.0119)
(Spec in Industry)*(Tightening)			0.0109*			-0.00114
			(0.00639)			(0.00465)
(Spec in Size)*(Tightening)	0.0397***	0.0366***		0.0244***	0.0207***	
	(0.0111)	(0.0110)		(0.00569)	(0.00552)	
Fixed effects			Industry-Size, Bank			
Country Dummies	No	Yes	Yes	No	Yes	Yes
R-squared	0.164	0.180	0.180	0.112	0.120	0.121
Observations	269955	269955	269955	254549	254549	254549

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Shielding of high specialization categories among both but more pronounced for existing borrowers (relative to total reduction)

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