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

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ECMI / NBS / CEPS / SUERF Research Conference

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

Definition and Research Questions

Following Blickle et al. (2025, JoF):

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

$\Rightarrow$ *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 Analysis

- **Credit channel** of monetary policy: policy rate changes transmit to real activity by affecting availability of bank credit.

  $\rightarrow$ How exactly does credit availability change in response to MP?

- So far, mostly separate consideration of bank or firm characteristics. **This paper:** *interplay* between banks and firms in the form of specialization.

  $\rightarrow$ leverage rich micro-data from AnaCredit.

- **Panel local projections** interacting high frequency monetary policy shocks with measures of specialization.

- **Key result:** Banks insulate industries and size categories in which they specialize from changes in interest rates and credit.

Literature

- Bank specialization and implications for firm financing:
  - Blickle et al. (2025, JoF), Paravisini et al. (2023, JoF), Iyer et al. (2022, WP)
  - *Euro area context:* De Jonghe et al. (2020, RoF), Simoens and Tamburrini (2025, ECB WP), De Jonghe et al. (2025, MS), Degryse et al. (2025, RoF), Bonfim et al. (2024, WP), Cabossioras and Tielens (2024, WP), Duquerroy et al. (2022, BdF WP), Böve et al. (2010, BuBA DP)

    Contribution: Entire EA and size specialization; monetary policy effects.

- 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, Ecnma), Cloyne et al. (2023, JEEA), Anderson and Cesa-Bianchi (2024, AEJ: Macro)

Specialization in the Euro Area

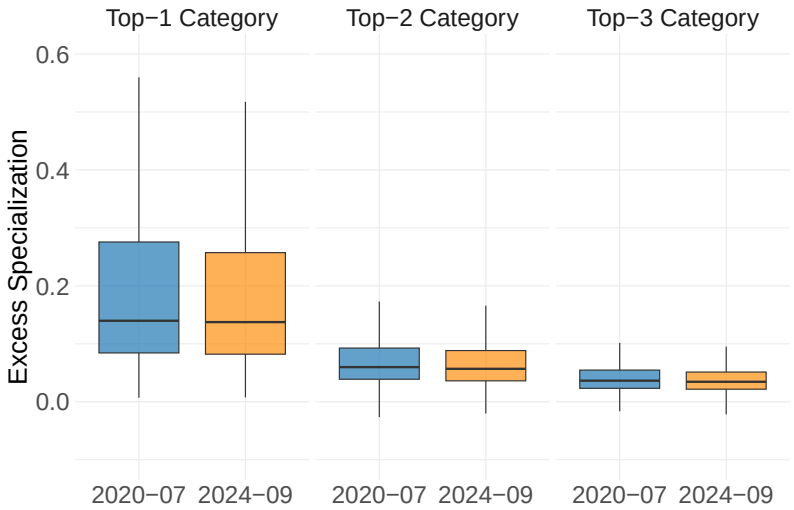
Data and Sample Selection

- 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 (except Croatia) in 2020m7-2024m9.
- Key sample selection: ▸ Sample Reduction
  - 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 creditors (syndicated loans)
  - Exclude firms that are in default
  - Trim or winsorize extreme values
- Final loan-level data *per month*: around 6 million loans from 2300 banks.

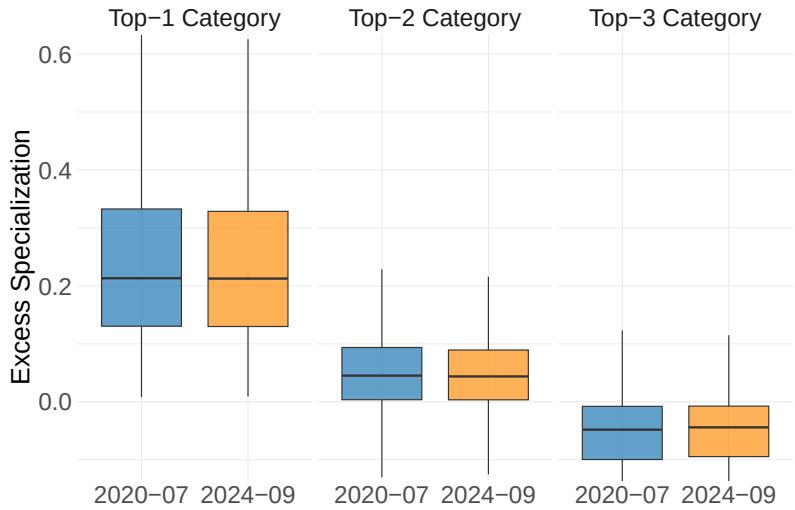
▸ Summary Statistics

Specialization Patterns - Top Categories

- By bank and month, identify categories with highest specialization.
- Visualize distribution of specialization values in top categories across banks.



(a) Borrower Industry



(b) Borrower Size

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

▸ Weighted ▸ Intensity ▸ Bank-level ▸ Large Banks ▸ Region ▸ RelSpec

Specialization and Credit Conditions

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

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

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

▸ Estimation Results

Specialization and Monetary Policy

Baseline Analysis

- Do banks adjust 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 monetary policy with specialization

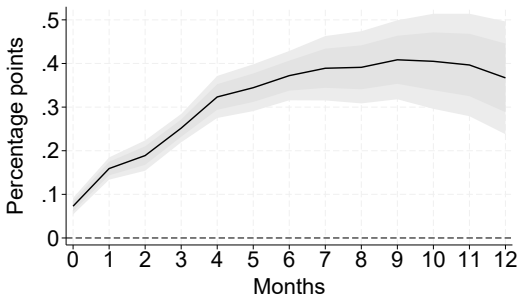
$$\Delta CreditCondition_{b,i,t+h,t-1} = \alpha_b + \alpha_i + \alpha_{c,t} + \beta_h^{int} Spec_{b,i,t-1} \Delta R_t + \Gamma_{1h} Z_{b,i,t-1} + \Gamma_{2h} Z_{b,i,t-1} \Delta R_t + e_{b,i,t+h}$$

  - $\Delta CreditCondition$: 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).

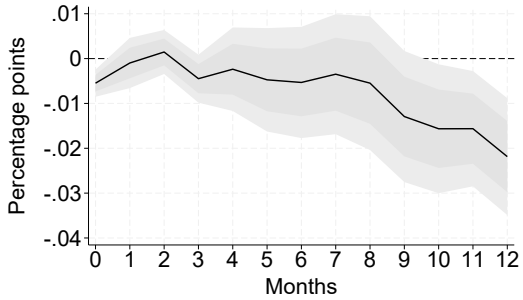
▸ Shocks ▸ Avg-Spec and S1

Specialization and Interest Rate Pass-Through

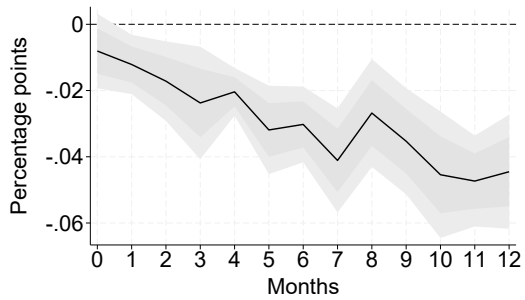
→ Effect of 25 bp exogenous change in policy rate on change in **interest rate**



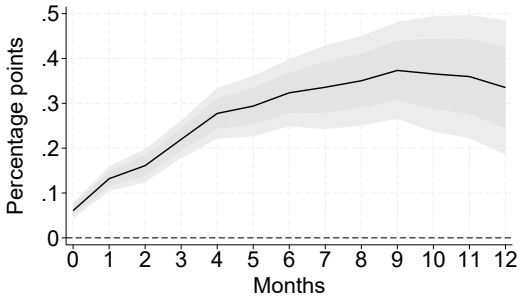
Average Effect



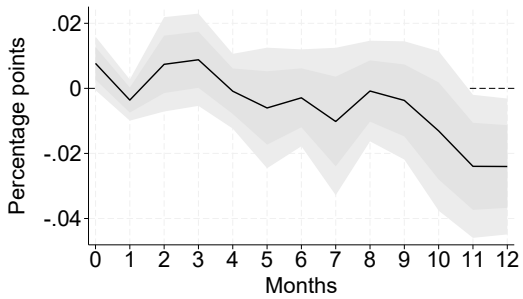
Int. Q4 Ind. Spec.



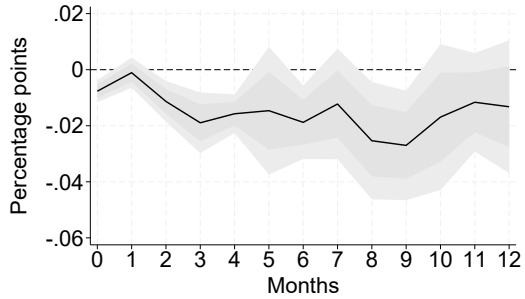
Int. Top Industry



Average Effect



Int. Q4 Size Spec.

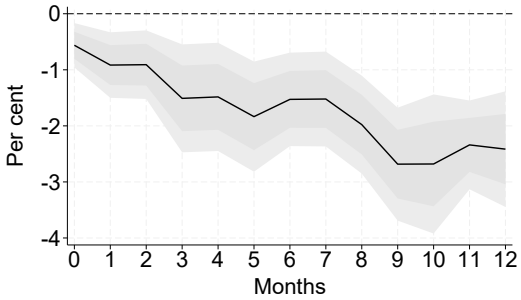


Int. Top Size Category

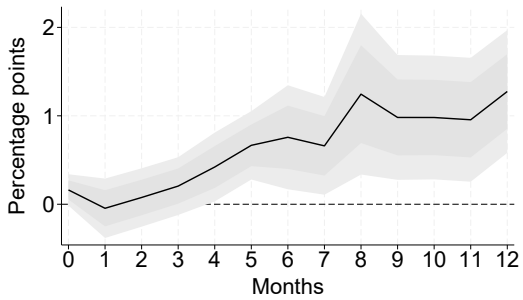
Banks raise interest rates less in categories where they are highly specialized; further dampening when in top category.

Specialization and Credit Supply

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



Average Effect



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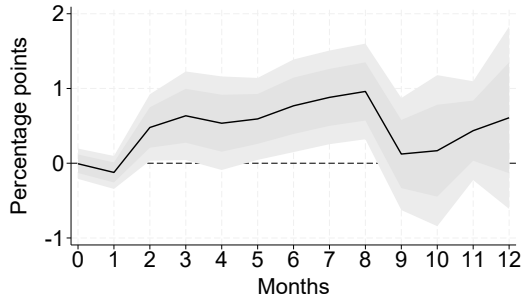

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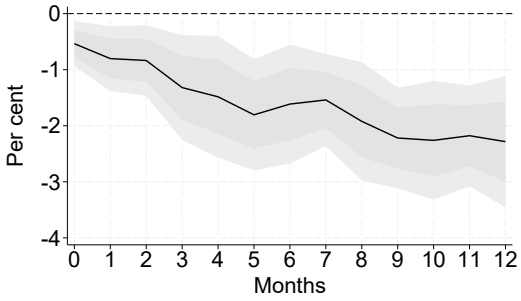
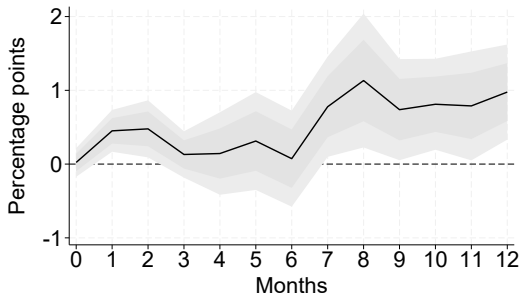


Average Effect



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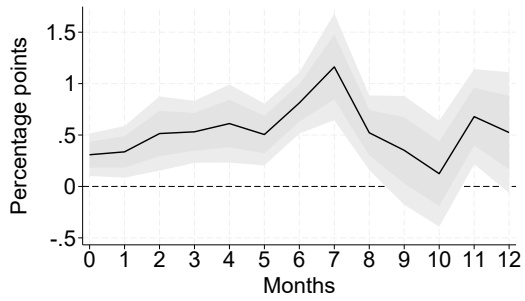

Int. Top Size Category

Banks reduce credit less in categories where they are highly specialized; further dampening when in top category.

Robustness

- Simple joint significance check: test if average LP response is zero. ▸ Approach
  - Use associated regression results as base for robustness checks. ▸ Results

- Key results:
  1. *Specialization thresholds:* Results robust to changes in cutoff; insulating in terms of credit requires relatively high specialization (Q4). ▸ Results
  2. *Countries:* Insulating top groups largely robust to country exclusions; Insulating high specialization groups particularly strong in FR and ES. ▸ Results
  3. *Sectors:* Results largely robust to (one digit NACE) sector exclusions; differential effect particularly strong in manufacturing. ▸ Results
  4. *Bank Size:* Large banks tend to insulate less in terms of interest rates and somewhat more in terms of credit. ▸ Results
  5. *Alternative shock:* Results largely robust to using alternative shock, but industry specialization effect on credit volumes insignificant. ▸ Results

- Further checks on *country groups*, *QE shocks* and *asymmetry*. ▸ Results

Extensions

Extensive vs. Intensive Margin

- Are interactions driven by differences among existing borrowers (intensive margin) or among new borrowers (extensive margin)?
- Analyze evolution of rates and credit during MP tightening, conditioning on the degree of specialization at the beginning of the hiking episode ▸ Details

  $\rightarrow$ Compare results from baseline to regression using only existing borrowers.
- Muted change in interest rates for high specialization industries exclusively driven by differences in treatment of new borrowers. ▸ Results
- Muted change in credit among both but more pronounced for existing borrowers (relative to total reduction). ▸ Results

Implications of Baseline Results

Baseline result: banks insulate borrowers in industries and size categories where they specialize from changes in interest rates and credit supply.

→ Direct evidence on potential implications? ▸ Specifications

1. MP effectiveness and **specializing bank market share**
   - Industry-size level local projections of change in credit
   - Interaction with credit share of high spec. banks and associated spec. degree

   → Muted credit response in groups dominated by specialized banks. ▸ Details

2. MP effects on specializing bank market share
   - LP of change in high specialization share on monetary policy

   → Increase in share of credit from specializing banks after MP hike. ▸ Details

Conclusion

Conclusion

Key findings:

- Specialization widespread among euro area banks; more favorable credit terms where a bank specializes.
- Higher specialization dampens pass-through of monetary policy to corporate lending rates and credit volumes.
- Muted impact of monetary policy on credit volumes in industry and size categories dominated by specialized banks.
- Monetary policy hikes raise share of credit from specializing banks in a given industry or size category.

Implications

Selection of potential **implications** for monetary policy:

- *Distributional effects*: Firms' responsiveness depends on specialization.
  - Does the firm already borrow from banks that specialize in its group?
  - Does the firm belong to a group that is dominated by specializers?
- *Effectiveness:* Exposure of borrower groups depends on specialization.
  - Monetary policy less effective when most relevant industries or size categories in an economy are dominated by specializing banks.
  - Reallocation of credit reduces MP effectiveness after tightening cycle when more credit has moved to specializing banks.

Appendix

Sample Selection - Implications

Table: Implications of Selection for Sample Size in 2020-07

Country	Loan number after selection (% of initial)				Loan volume after selection (% of initial)			
	No syndicated loans	Loan types	No default firms	Domestic only	No syndicated loans	Loan types	No default firms	Domestic only
AT	83.75	73.38	70.87	68.20	74.34	59.69	58.00	51.50
BE	99.34	86.52	84.19	83.21	89.36	81.37	79.43	71.95
CY	99.63	60.66	41.02	40.46	95.23	72.18	57.28	53.06
DE	90.30	77.54	75.76	75.12	73.78	59.44	58.53	56.87
EE	98.92	66.02	64.74	64.69	89.63	70.30	69.35	69.16
ES	98.93	90.42	84.16	84.09	85.90	80.02	75.69	74.99
FI	96.12	79.26	76.61	76.51	90.99	86.02	84.09	83.76
FR	98.31	88.35	84.98	84.93	83.30	75.51	73.54	73.10
GR	96.12	93.68	81.99	81.92	72.00	66.82	55.35	55.12
IE	97.10	44.43	42.94	40.91	75.22	53.17	51.03	36.56
IT	96.61	54.62	50.56	50.54	79.82	49.07	44.89	44.64
LT	99.09	52.28	50.46	50.38	91.18	67.58	65.75	65.42
LU	69.07	55.50	53.96	30.83	50.03	37.89	37.31	13.48
LV	99.39	85.81	83.28	82.57	93.20	78.98	76.08	72.55
MT	97.25	51.45	45.97	45.42	92.97	55.73	50.32	48.07
NL	98.72	30.09	29.18	28.52	91.78	45.26	44.45	40.61
PT	99.52	83.68	76.83	76.77	95.73	80.53	71.66	71.58
SI	97.40	71.04	67.84	67.62	70.93	61.35	59.32	58.05
SK	99.03	57.75	55.53	55.46	83.22	40.41	39.33	37.80
Euro Area	96.46	76.50	72.67	72.33	80.39	64.27	61.69	59.63

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Summary Statistics

Table: Summary Statistics for Loans Outstanding in 2020-07

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	389	163084	114.48	45.27	41.24	27.97	701.99	177.68	2529.15	4.48
BE	38	285440	112.03	33.96	61.11	16.96	392.49	107.96	1568.68	3.51
CY	12	9843	6.14	4.78	1.36	0.00	624.15	129.94	2239.04	5.50
DE	755	1029616	579.80	70.65	482.82	26.33	563.12	97.43	2074.33	2.97
EE	9	6863	7.12	6.89	0.12	0.10	1037.04	136.82	4216.17	6.01
ES	120	891286	256.44	138.99	37.33	80.13	287.72	71.66	1670.07	4.31
FI	135	128707	79.39	70.92	7.20	1.27	616.80	96.40	2723.77	4.39
FR	161	2465200	604.97	379.17	218.03	7.77	245.40	89.24	931.65	2.71
GR	16	78347	41.09	10.06	17.10	13.93	524.49	103.94	2708.04	5.84
IE	14	28478	12.44	10.01	0.59	1.83	436.84	76.63	2444.02	5.09
IT	204	855045	288.65	280.11	2.16	6.39	337.59	85.73	1549.64	4.96
LT	20	10793	8.47	4.10	3.56	0.81	784.51	96.30	3308.99	6.15
LU	33	10014	11.61	6.49	4.53	0.58	1158.93	269.40	4170.88	3.98
LV	12	6021	4.41	3.68	0.31	0.42	732.67	104.13	3015.36	6.03
MT	12	4234	3.94	0.26	3.60	0.08	931.46	221.33	2806.23	4.85
NL	28	68319	136.23	116.89	14.07	5.27	1994.08	255.70	5696.95	3.34
PT	112	196188	49.45	23.14	15.10	11.22	252.07	69.33	1127.58	5.26
SI	13	16109	7.21	0.53	4.36	2.32	447.85	106.67	1577.65	4.81
SK	18	29931	9.85	0.72	7.97	1.17	329.18	67.47	1659.87	4.84
Euro Area	2101	6283518	2333.74	1206.63	922.56	204.55	371.41	89.90	1692.70	3.63

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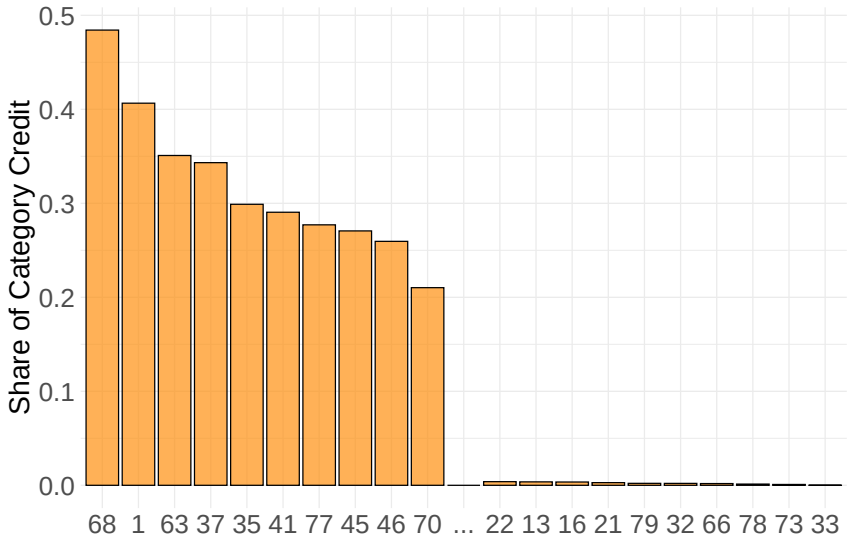
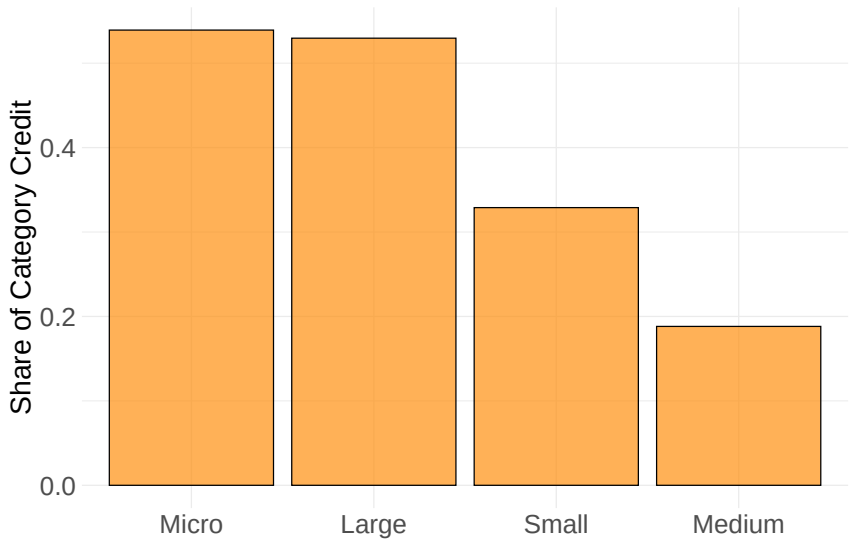
Specialization Patterns - Intensity

- By category, compute total credit from banks for which it is Top-1.
- Plot ratio of specializer to total credit for each category.



(a) Industries



(b) Size Categories

Some borrower categories are heavily dominated by specializing banks; for others, specializers are largely irrelevant.

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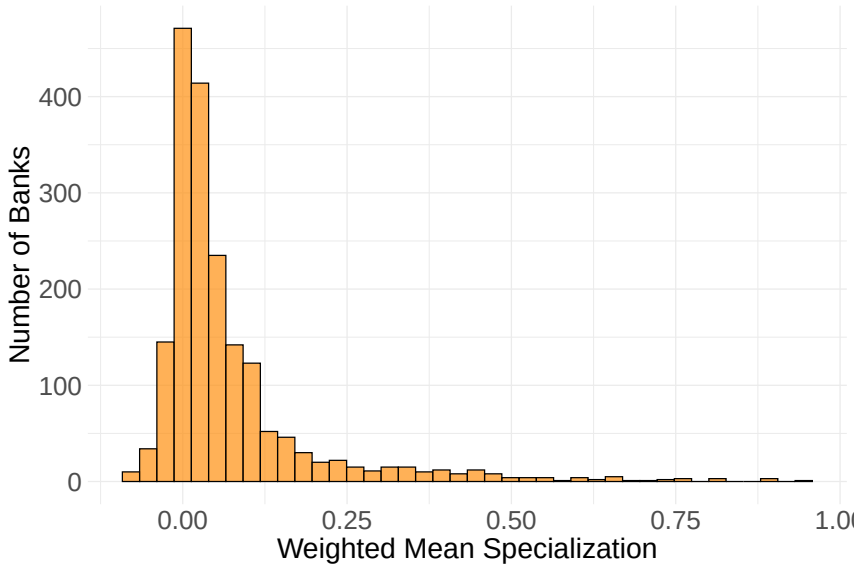
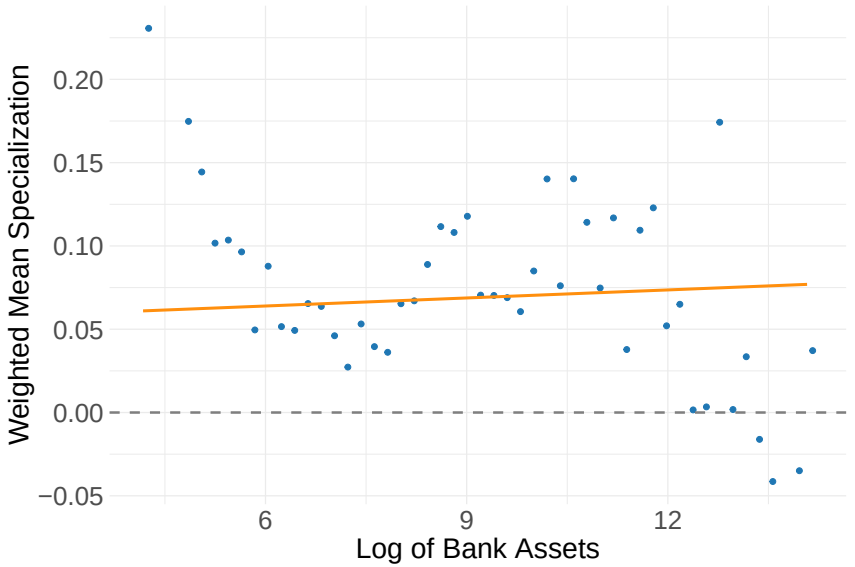
Specialization Patterns - Bank-Level Specialization (1/2)

- Volume-weighted mean specialization across industries or size categories (within bank).
- High if most lending is to categories where the bank specializes.



(a) Mean Specialization in Industry



(b) Ind. Spec. and Bank Size

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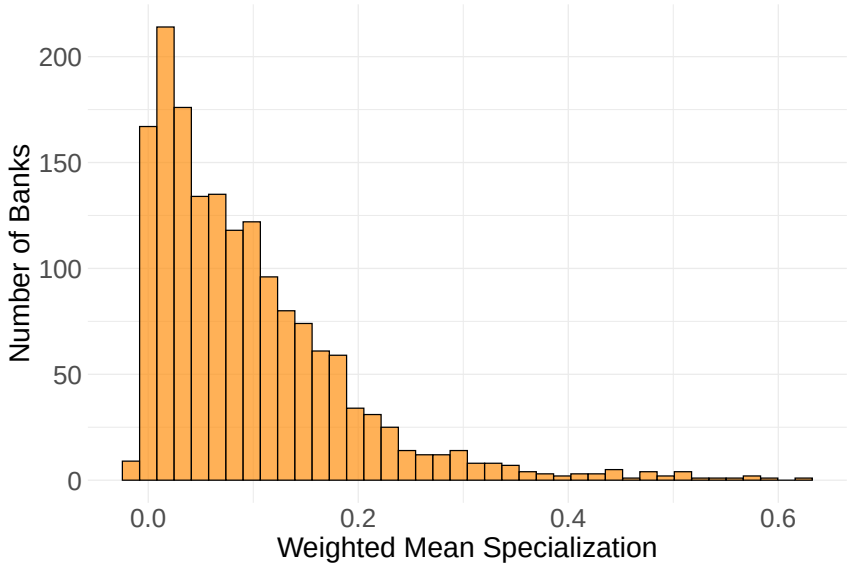
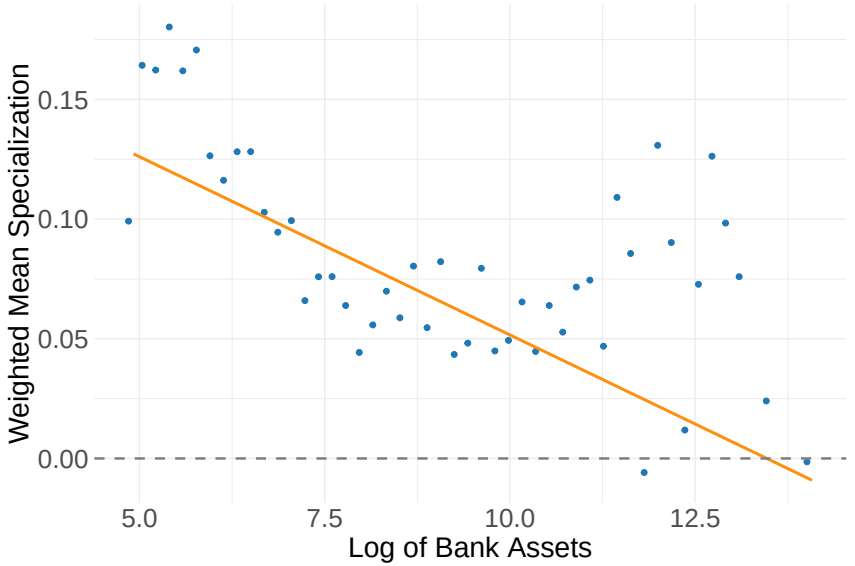
Specialization Patterns - Bank-Level Specialization (2/2)



(a) Mean Specialization in Size



(b) Size Spec. and Bank Size

High reliance on categories with high specialization for most banks.
Broadly associated with smaller bank size

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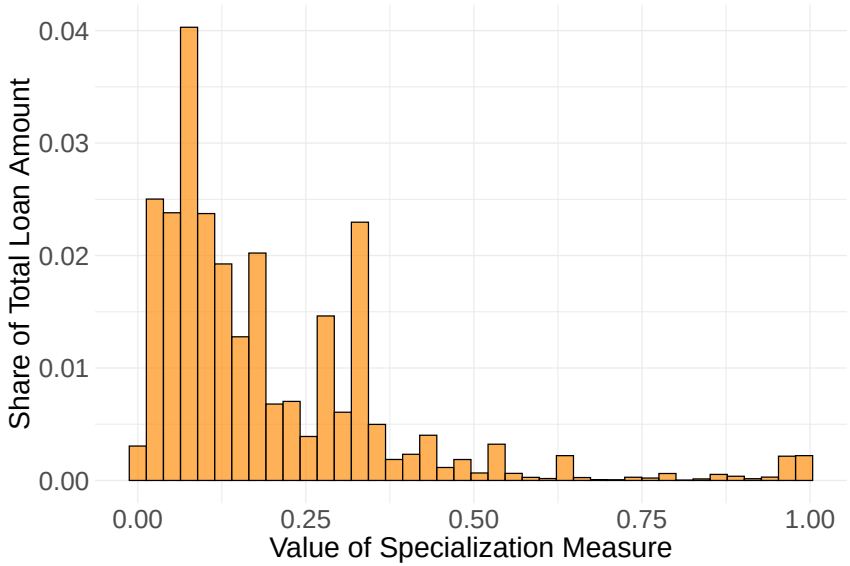
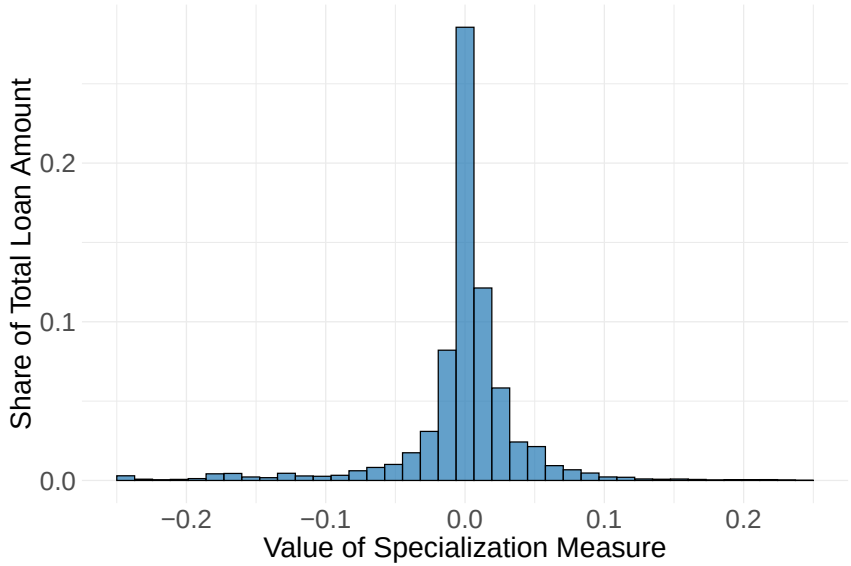
Industry Specialization Weighted by Loan Amount (1/2)



(a) Top Industry



(b) Other Industries

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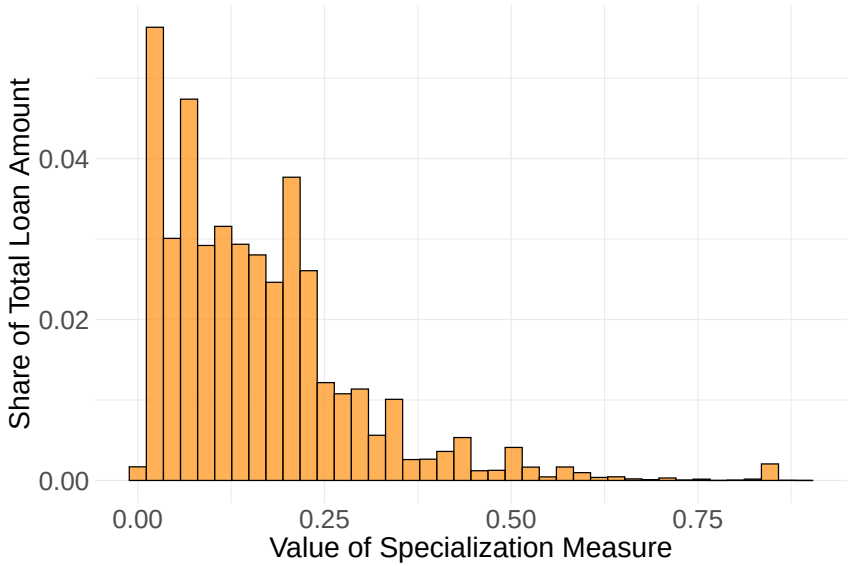
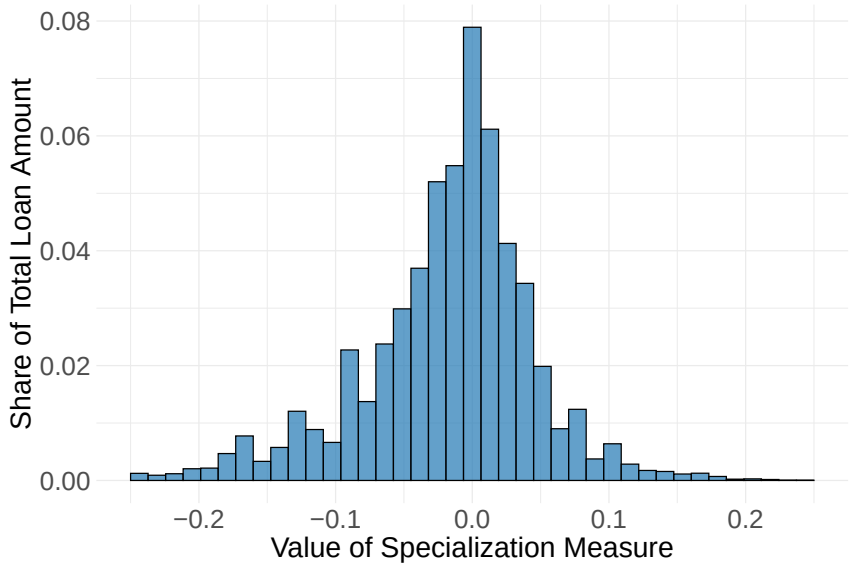
Size Specialization Weighted by Loan Amount (2/2)



(a) Top Size Category



(b) Other Size Categories

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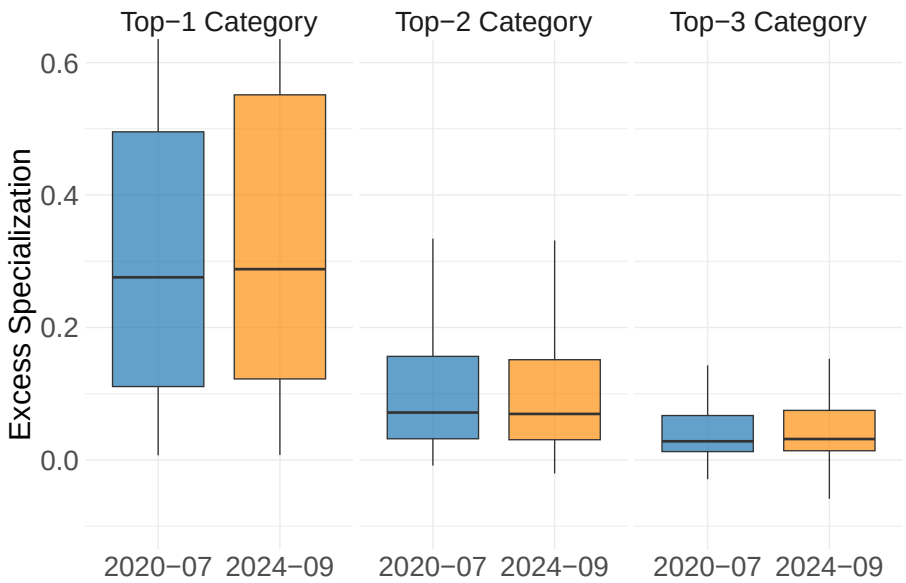
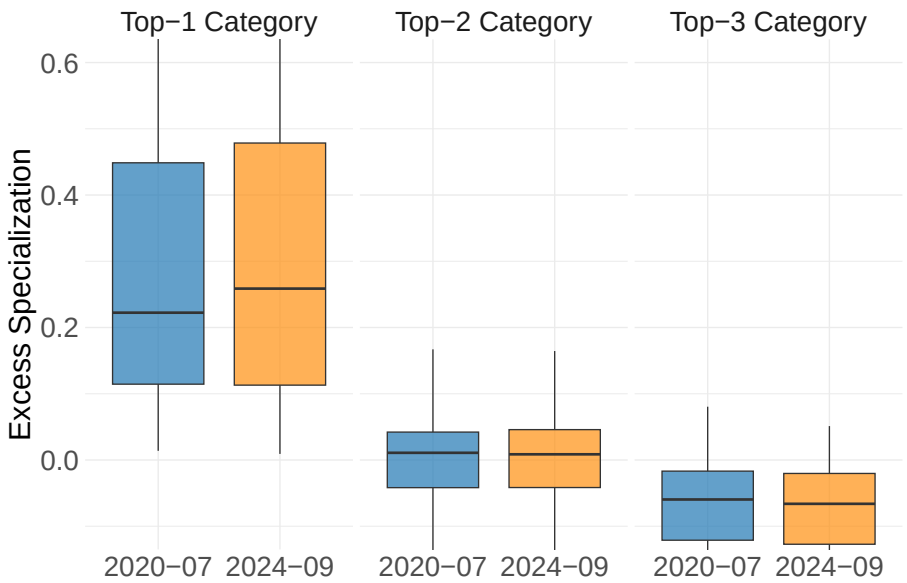
Specialization in Top Categories - Large Banks

→ "Large" if assets above 90th percentile of country's cross-sectional distribution.



(a) Specialization by Industry



(b) Specialization by Firm Size

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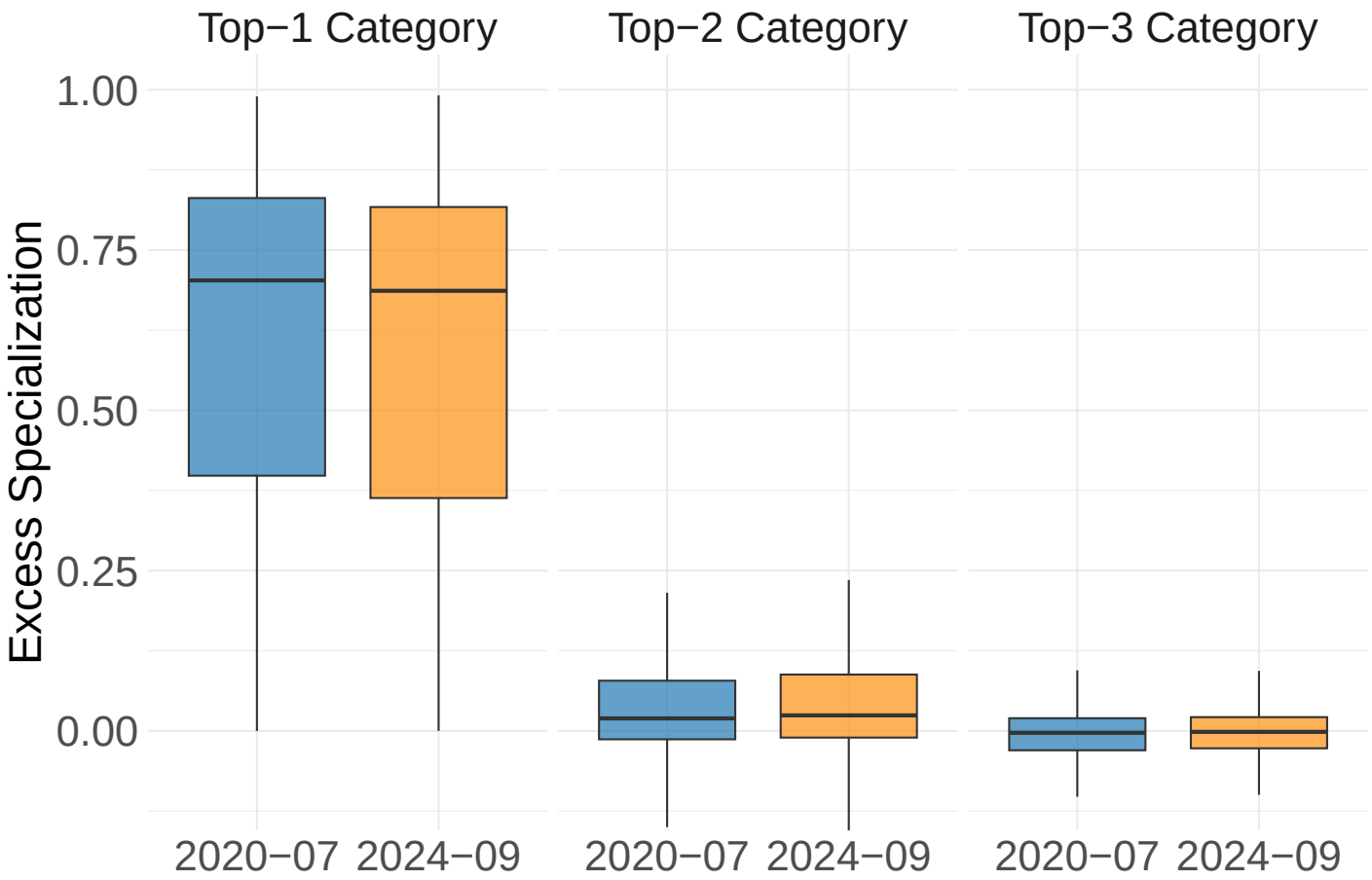
Excess Specialization by Region



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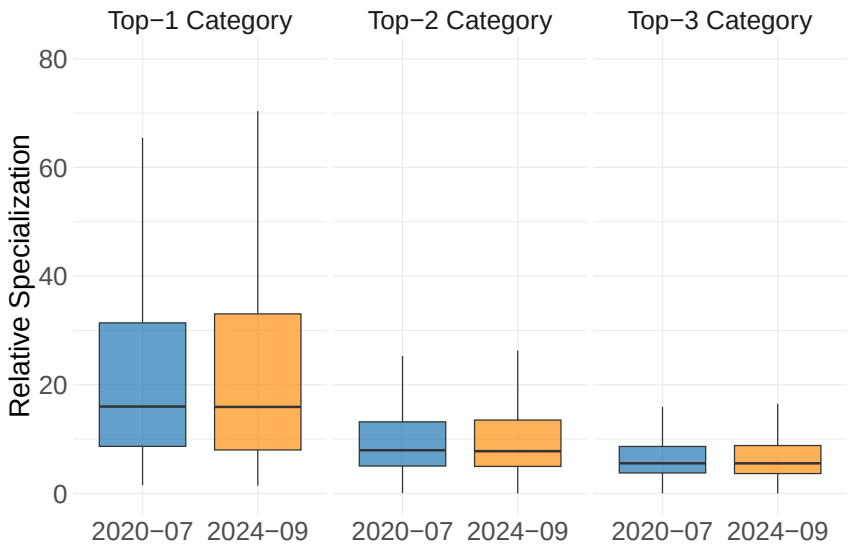
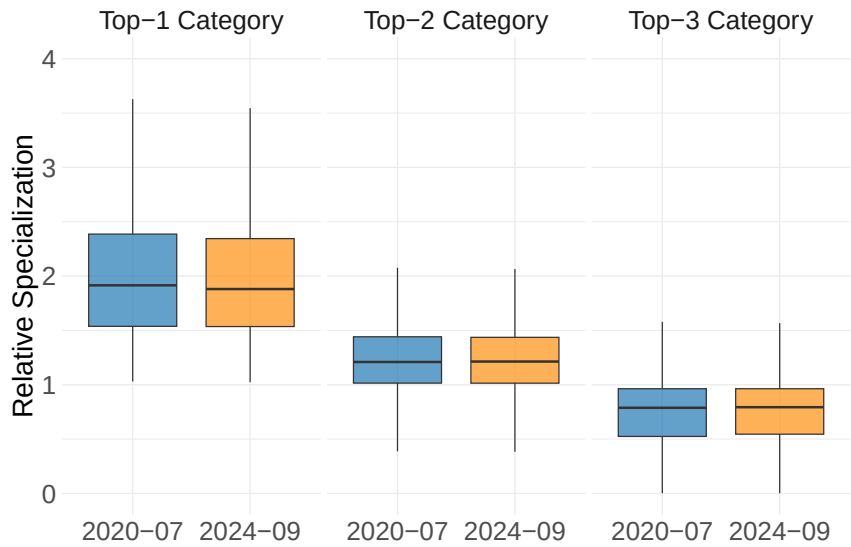
Relative Specialization - Top Categories

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



(a) Borrower Industry



(b) Borrower Size

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Specialization and Interest Rates, Credit Amount

	Interest Rate			Credit 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 lower interest rates and (for industry spec) larger credit amounts.

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Specialization and Maturity, 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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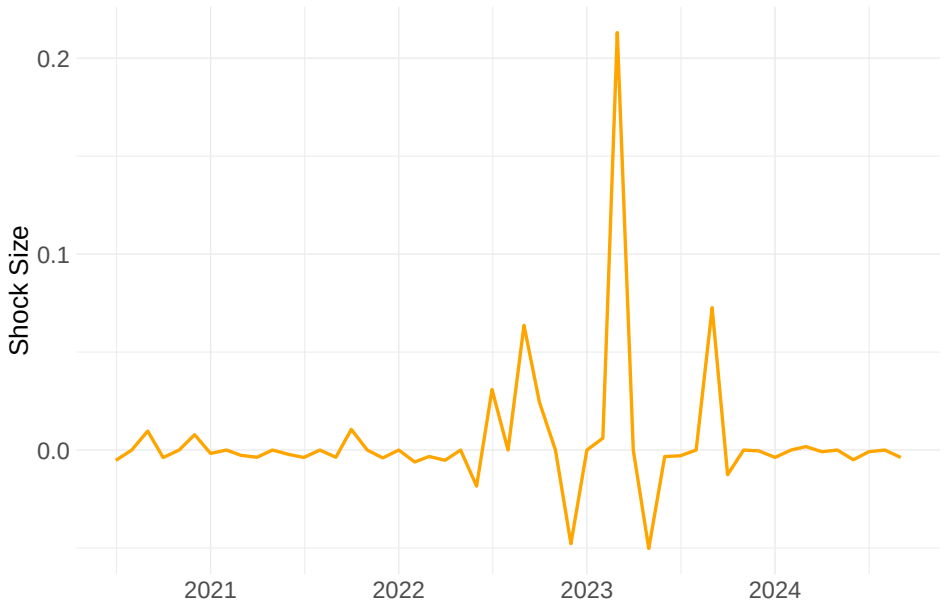
Monetary Policy Shocks

- 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 specification 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	2.497***	1.952***	2.054***
	(0.462)	(0.605)	(0.570)
F-statistic	27.70	20.86	14.73
R-squared	0.378	0.269	0.251
Observations	279114	279114	279114

Standard errors in parentheses

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

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Simple Check on Joint Significance

- Idea: If responses at different horizons generally have the same sign, test if average response is zero
- Specifically:

$$H_0 : \frac{\beta_0 + ... + \beta_H}{H+1} \equiv \bar{\beta}_H = 0$$

- In practice, use auxiliary regression such as

$$\frac{1}{H+1}\left(\sum_{h=0}^{H} \Delta CC_{b,i,t+h,t-1}\right) = \bar{\beta}_H \Delta R_t + FE + controls_{b,i,t-1} + e_{b,i,t+h}$$

$\rightarrow$ Do standard significance test on $\bar{\beta}_H$

Back

Average Response and Size Specialization

	Interest Rate			Credit Outstanding		
	(1)	(2)	(3)	(4)	(5)	(6)
Policy Rate	1.047***			-0.0554**		
	(0.173)			(0.0217)		
(Policy Rate)*(High Spec.)		-0.0253			0.0243*	
		(0.0325)			(0.0126)	
(Policy Rate)*(Top)			-0.0649*			0.0255***
			(0.0336)			(0.00689)
R-squared	0.507	0.0275	0.0284	0.0196	0.0144	0.0162
Observations	274837	274837	274837	273893	273893	273893

Standard errors in parentheses

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

Back

Average Response and Industry Specialization

	Interest Rate			Credit Outstanding		
	(1)	(2)	(3)	(4)	(5)	(6)
Policy Rate	1.200***			-0.0674***		
	(0.148)			(0.0199)		
(Policy Rate)*(High Spec.)		-0.0328			0.0251**	
		(0.0235)			(0.0123)	
(Policy Rate)*(Top)			-0.122***			0.0223*
			(0.0284)			(0.0112)
R-squared	0.421	0.0191	0.0204	0.0197	0.0207	0.0189
Observations	2677357	2677357	2677357	2668778	2668778	2668778

Standard errors in parentheses

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

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Robustness - Specialization Thresholds

	Interest Rate			Credit Outstanding		
	Baseline	D10	> median	Baseline	D10	> median
Industry Specialization						
(Policy Rate)*(High Spec)	-0.0328	-0.0398	-0.0411*	0.0251**	0.0260**	-0.00230
	(0.0235)	(0.0344)	(0.0210)	(0.0123)	(0.0105)	(0.0106)
Size Specialization						
(Policy Rate)*(High Spec)	-0.0253	-0.0156	-0.0540**	0.0243*	-0.0179	0.0176
	(0.0325)	(0.0260)	(0.0235)	(0.0126)	(0.0163)	(0.0151)

Standard errors in parentheses

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

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Robustness - Industry Specialization and Country Effects

	Baseline	excl. FR	excl. DE	excl. ES	excl. IT
Interest Rate					
(Policy Rate)*(High Spec)	-0.0328	0.00807	-0.0550*	-0.0453	-0.0374
	(0.0235)	(0.0160)	(0.0317)	(0.0294)	(0.0253)
(Policy Rate)*(Top)	-0.122***	-0.103***	-0.122***	-0.126***	-0.130***
	(0.0284)	(0.0256)	(0.0183)	(0.0321)	(0.0319)
Credit Outstanding					
(Policy Rate)*(High Spec)	0.0251**	0.0171*	0.0374**	0.0131	0.0265**
	(0.0123)	(0.00861)	(0.0181)	(0.0125)	(0.0123)
(Policy Rate)*(Top)	0.0223*	0.0138	0.0283	0.00759	0.0252***
	(0.0112)	(0.0127)	(0.0254)	(0.00719)	(0.00882)

Standard errors in parentheses

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

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Robustness - Size Specialization and Country Effects

	Baseline	excl. FR	excl. DE	excl. ES	excl. IT
Interest Rate					
(Policy Rate)*(High Spec)	-0.0253	-0.0312	-0.0546*	-0.0285	-0.0261
	(0.0325)	(0.0228)	(0.0300)	(0.0387)	(0.0337)
(Policy Rate)*(Top)	-0.0649*	0.0267	-0.0957**	-0.0762**	-0.0789**
	(0.0336)	(0.0207)	(0.0388)	(0.0350)	(0.0330)
Credit Outstanding					
(Policy Rate)*(High Spec)	0.0243*	0.0154	0.0290**	0.0127	0.0294**
	(0.0126)	(0.0161)	(0.0124)	(0.0104)	(0.0117)
(Policy Rate)*(Top)	0.0255***	0.0265**	0.0236***	0.0253***	0.0196*
	(0.00689)	(0.0114)	(0.00812)	(0.00648)	(0.0102)

Standard errors in parentheses

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

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Robustness - Industry Specialization and Sector Effects

	Baseline	excl. L	excl. C	excl. G	excl. F
Interest Rate					
(Policy Rate)*(High Spec)	-0.0328	-0.0373	-0.0471*	-0.0246	-0.0383*
	(0.0235)	(0.0294)	(0.0267)	(0.0175)	(0.0204)
(Policy Rate)*(Top)	-0.122***	-0.0850**	-0.104***	-0.109**	-0.128***
	(0.0284)	(0.0376)	(0.0267)	(0.0431)	(0.0312)
Credit Outstanding					
(Policy Rate)*(High Spec)	0.0251**	0.0270*	0.0142	0.0228*	0.0272*
	(0.0123)	(0.0134)	(0.0109)	(0.0123)	(0.0140)
(Policy Rate)*(Top)	0.0223*	0.0296**	0.0140	0.0264*	0.0217*
	(0.0112)	(0.0132)	(0.00979)	(0.0147)	(0.0115)

Standard errors in parentheses

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

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Robustness - Large Banks

	Interest Rate		Credit Outstanding	
	High Spec.	Top Group	High Spec.	Top Group
Industry Specialization				
(Policy Rate)*(Spec)	-0.0556**	-0.105***	0.0176	0.0149
	(0.0229)	(0.0298)	(0.0146)	(0.0170)
(Policy Rate)*(Spec)*(Large Bank)	0.0374**	-0.0294***	0.0124	0.0130
	(0.0158)	(0.00747)	(0.0179)	(0.0343)
Size Specialization				
(Policy Rate)*(Spec)	-0.0502*	-0.117***	0.0381*	0.0248*
	(0.0272)	(0.0385)	(0.0199)	(0.0143)
(Policy Rate)*(Spec)*(Large Bank)	0.0387	0.0726***	-0.0214	0.00100
	(0.0331)	(0.0222)	(0.0189)	(0.0240)

Standard errors in parentheses

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

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Alternative Shock Series - Size Specialization Effect

	Interest Rate			Credit Outstanding		
	(1)	(2)	(3)	(4)	(5)	(6)
Policy Rate	1.233***			0.0199		
	(0.199)			(0.0360)		
(Policy Rate)*(High Spec.)		0.0573			0.0167*	
		(0.0350)			(0.00943)	
(Policy Rate)*(Top)			-0.139***			0.0261**
			(0.0332)			(0.0117)
R-squared	0.544	0.0264	0.0279	0.0139	0.0137	0.0157
Observations	274837	274837	274837	273893	273893	273893

Standard errors in parentheses

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

(Results based on MP shock from Zlobins (2025) and EURIBOR3m)

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Alternative Shock Series - Industry Specialization Effect

	Interest Rate			Credit Outstanding		
	(1)	(2)	(3)	(4)	(5)	(6)
Policy Rate	1.148***			-0.00986		
	(0.242)			(0.0305)		
(Policy Rate)*(High Spec.)		-0.0224			0.00265	
		(0.0200)			(0.0139)	
(Policy Rate)*(Top)			-0.0897**			0.00826
			(0.0428)			(0.0135)
R-squared	0.440	0.0196	0.0211	0.0181	0.0201	0.0184
Observations	2677357	2677357	2677357	2668778	2668778	2668778

Standard errors in parentheses

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

(Results based on MP shock from Zlobins (2025) and EURIBOR3m)

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Robustness - Country Groups and Industry Specialization

	Baseline	Large	Core	CEE	High HHI
Interest Rate					
(Policy Rate)*(High Spec)	-0.0328	-0.0319	-0.0333	-0.0867	-0.00972
	(0.0235)	(0.0300)	(0.0340)	(0.0686)	(0.0138)
(Policy Rate)*(Top)	-0.122***	-0.130**	-0.125**	-0.267***	-0.0785
	(0.0284)	(0.0481)	(0.0485)	(0.0770)	(0.0488)
Credit Outstanding					
(Policy Rate)*(High Spec)	0.0251**	0.0300*	0.0125	-0.0737***	0.0424**
	(0.0123)	(0.0169)	(0.0146)	(0.0244)	(0.0158)
(Policy Rate)*(Top)	0.0223*	0.0402**	0.00461	0.0713*	0.0593*
	(0.0112)	(0.0178)	(0.00557)	(0.0413)	(0.0339)

Standard errors in parentheses

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

Estimations on subsamples where only specific groups of countries are included.

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Robustness - Country Groups and Size Specialization

	Baseline	Large	Core	CEE	High HHI
Interest Rate					
(Policy Rate)*(High Spec)	-0.0253	0.00459	-0.00874	-0.155*	-0.0659***
	(0.0325)	(0.0381)	(0.0446)	(0.0809)	(0.0229)
(Policy Rate)*(Top)	-0.0649*	-0.0947	-0.112**	0.0230	0.0332
	(0.0336)	(0.0563)	(0.0456)	(0.0822)	(0.0197)
Credit Outstanding					
(Policy Rate)*(High Spec)	0.0243*	0.0364**	0.0212**	-0.0535	0.0404
	(0.0126)	(0.0158)	(0.00946)	(0.0670)	(0.0268)
(Policy Rate)*(Top)	0.0255***	0.0316***	0.0233**	-0.0500*	0.0244
	(0.00689)	(0.00882)	(0.00919)	(0.0293)	(0.0156)

Standard errors in parentheses

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

Estimations on subsamples where only specific groups of countries are included.

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Effects of QE Shocks and Industry Specialization

	Interest Rate			Credit Outstanding		
	(1)	(2)	(3)	(4)	(5)	(6)
QE Shock	0.410*			-0.237		
	(0.204)			(0.171)		
(QE Shock)*(High Industry Spec)		-0.0347			0.283*	
		(0.0637)			(0.145)	
(QE Shock)*(Top Industry)			-0.0828			-0.107
			(0.0656)			(0.118)
R-squared	0.343	0.355	0.355	0.179	0.188	0.186
Observations	1293024	1293024	1293024	1285423	1285423	1285423

Standard errors in parentheses

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

Estimation results where policy rate is replaced with QE shock (up to 2022-7)

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Effects of QE Shocks and Size Specialization

	Interest Rate			Credit Outstanding		
	(1)	(2)	(3)	(4)	(5)	(6)
QE Shock	0.376			-0.248		
	(0.227)			(0.158)		
(QE Shock)*(High Size Spec)		0.0284			0.303***	
		(0.0599)			(0.0799)	
(QE Shock)*(Top Size)			-0.0847			0.203***
			(0.0662)			(0.0340)
R-squared	0.548	0.571	0.571	0.346	0.377	0.379
Observations	134348	134348	134348	133707	133707	133707

Standard errors in parentheses

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

Estimation results where policy rate is replaced with QE shock (up to 2022-7)

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Response Asymmetry

	Size Specialization				Industry Specialization			
	Interest Rate		Credit Outstanding		Interest Rate		Credit Outstanding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Policy Rate	1.066***		-0.0557**		1.219***		-0.0678***	
	(0.153)		(0.0209)		(0.122)		(0.0189)	
(Policy Rate)*(Exp)	0.233		-0.00740		0.304		-0.0111	
	(0.531)		(0.0498)		(0.534)		(0.0536)	
(Policy Rate)*(High Spec)		-0.0226		0.0289***		-0.0346		0.0314***
		(0.0331)		(0.0101)		(0.0215)		(0.0102)
(Policy Rate)*(High Spec)*(Exp)		0.0326		0.0550		-0.0158		0.0553
		(0.0333)		(0.0377)		(0.0577)		(0.0341)
R-squared	0.507	0.0275	0.0196	0.0144	0.422	0.0191	0.0197	0.0207
Observations	274837	274837	273893	273893	2677357	2677357	2668778	2668778

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

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Extensive vs. Intensive Margin

- Are interactions driven by differences among existing borrowers (intensive margin) or among new borrowers (extensive margin)?
- Analyze evolution of rates and credit during MP tightening, conditioning on the degree of specialization at the beginning 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 $t = 2022m7$ (otherwise, $2020m9$)

$\rightarrow$ Compare results from baseline to regression using only 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)
Hike	2.176***			1.967***		
	(0.0718)			(0.0723)		
(HighSpec in Industry)*(Hike)	-0.434***	-0.0898***		-0.380***	-0.0175	
	(0.0557)	(0.0235)		(0.0568)	(0.0230)	
(HighSpec in Size)*(Hike)			-0.0396			-0.0519
			(0.0426)			(0.0417)
(Spec in Industry)*(Hike)			-0.0138			0.00609
			(0.0130)			(0.0128)
(Spec in Size)*(Hike)	-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

	Credit - All Borrowers			Credit - Existing Borrowers		
	(1)	(2)	(3)	(4)	(5)	(6)
Hike	-0.167***			-0.0801***		
	(0.0106)			(0.00751)		
(HighSpec in Industry)*(Hike)	0.0530***	0.0448***		0.0392***	0.0274***	
	(0.0133)	(0.0126)		(0.00961)	(0.00938)	
(HighSpec in Size)*(Hike)			0.0662***			0.0682***
			(0.0160)			(0.0119)
(Spec in Industry)*(Hike)			0.0109*			-0.00114
			(0.00639)			(0.00465)
(Spec in Size)*(Hike)	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

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

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

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Overview

1. Weaker credit effect in categories dominated by specialized banks?

$$\begin{aligned}\Delta Credit_{i,s,c,t+h,t-1} = &\left(\beta_{1h}^{int} HShare_{i,c,t-1} + \beta_{2h}^{int} HShare_{s,c,t-1}\right)\Delta R_t \\ &+ \left(\beta_{3h}^{int} HMean_{i,c,t-1} + \beta_{4h}^{int} HMean_{s,c,t-1}\right)\Delta R_t \\ &+ \alpha_{i,s} + \alpha_{c,t} + +\Gamma_{1h} Z_{i,s,c,t-1} + \Gamma_{2h} Z_{i,s,c,t-1}\Delta R_t + e_{i,s,c,t+h}\end{aligned}$$

2. Increase in credit share of specializing banks after contractionary MP?

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

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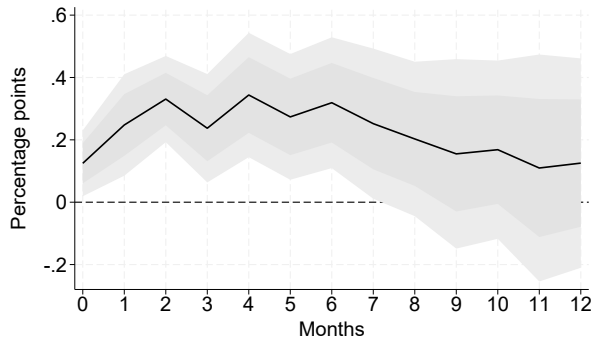
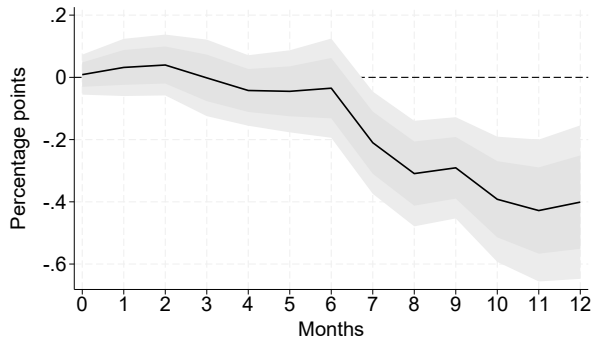
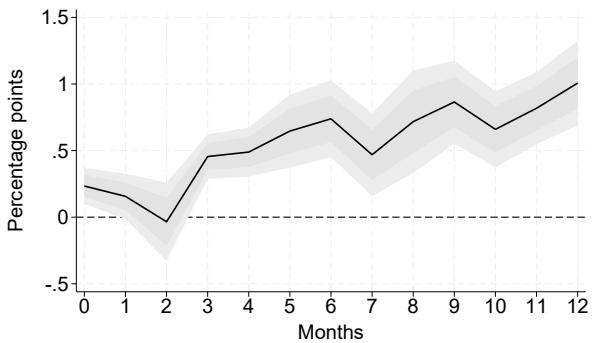
MP Effectiveness and Specialization Intensity



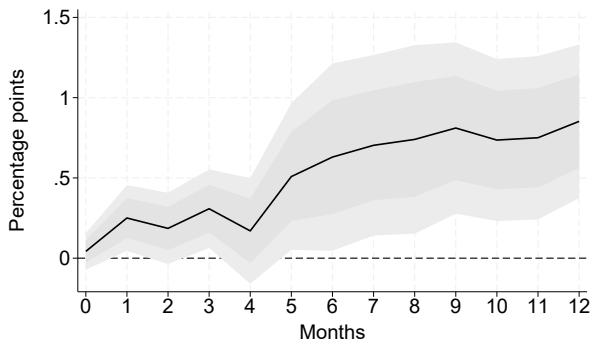
(a) Industry Spec - HShare



(b) Size Spec - HShare



(c) Industry Spec - HMean



(d) Size Spec - HMean

Higher specializer market share and spec. dampen MP effects on credit.

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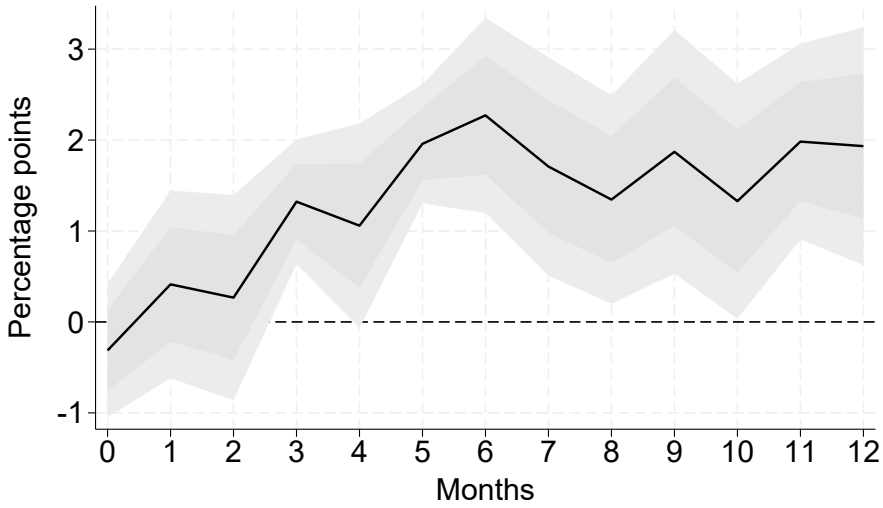
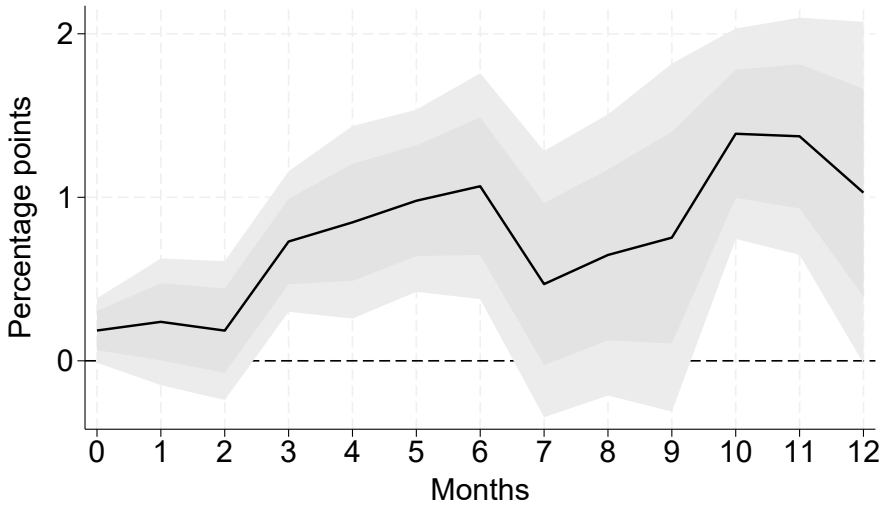
MP Effects on Specializing Bank Market Share

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



(a) Industry Specialization



(b) Size Specialization

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

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