Banks' Specialization and Private Information

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Fifth Conference on Financial Stability – Banco de España & CEMFI
13 June 2025

Motivation

- **Special role of banks** in allocation of resources
  - One key component is **information** acquisition & generation
  - Screening and monitoring
  - *Leland and Pyle (1977), Diamond (1984)*

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  - *Petersen and Rajan (1994), Degryse and Ongena (2005)*

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- Relationship lending
  - Information obtained only through one specific borrower
  - *Petersen and Rajan (1994), Degryse and Ongena (2005)*
- Bank lending **specialization**
  - Information obtained through various borrowers
  - Sharing same geography/export country/sector
  - *Loutskina and Strahan (2011), Paravisini et al. (2023), Giometti and Pietrosanti (2022)*

Motivation & contribution 1: Specialization & firm type

- Bank lending **specialization**
  - If specialization associated with **enhanced expertise**
  - Banks may obtain an **info. advantage** where they specialize
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- **Universe of** banks and **firms** with active loans in Spain
  - Small and micro firms are the backbone of the Spanish economy
  - 95% of active nf firms, 42% of employment (DIBE 2024)
  - 39% of outstanding lending (Credit Registry 6/2024)

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- **This paper: Specialization type matters for diff. firm types**
  - Geographical (sectoral) specialization for small (large) firms
  - **Contribution 1**

Motivation & contribution 1: Specialization & firm type

- Performance of firms (Y_f) may depend on various factors, including:
  - Firm ($X1_f$), local ($X2_l$), & sector ($X3_s$) specific factors
  - $Y_f = X1_f + X2_l + X3_s + \epsilon_f$

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- Relevance of these factors may vary depending on firm type
  - E.g., 3 different manufacturing firms
  - Firm with artisan and exclusive furniture makers may depend more on the health status of their employees ($X1_f$)
  - **Small** firm producing furniture for local sales may depend more on **local** economic activity ($X2_l$)
  - **Large** firm producing and exporting furniture may depend more on changes in trade policies and tariffs affecting the **sector** ($X3_s$)

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- **Different specialization matters more for different firm types**
  - E.g., relationship benefits for smaller firms *Bharath et al. (2011)*
  - **Local (sector)** specialization can help banks gain local (sector)-specific info more relevant for **small (large)** firms
  - **Contribution 1**

Motivation & contribution 2: Direct measure of info

- Specialization is **assumed** to be related to info. lending advantages
  - Invest more in info collection *(Loutskina and Strahan (2011)*
  - Enhanced skills, expertise, or technology *(Paravisini et al., 2023)*
  - Informational advantages that facilitate better ex-ante screening and ex-post monitoring *(Blickle et al., 2023)*
  - **Yet, no paper has shown a direct link**
  - Specialization $\leftrightarrow$ greater information (we do not claim causality)

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- Banks' private risk assessments (PDs) reported to regulators
  - As a measure of banks' private information
  - *Howes and Weitzner (2023), Beyhaghi et al. (2024)*
  - Private info. in relationship lending *(Claessens et al., 2024)*

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- **This paper: Specialization directly related to info measure**
  - Local (sector) specialized better prediction of PD of small (large) firms
  - **Contribution 2**

Agenda

- Overview
- Literature review
- Data
- Results
  - Specialization and loan default
  - Specialization and informational advantages
  - Specialization and loan supply
- Validation of findings using relationship lending
- Conclusion

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Overview: Research questions

Research Questions

1. Are geographical lending specialization and sectoral lending specialization related to loan default differently based on firm size?
2. Is specialization directly linked to better private information?

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2. Is specialization directly linked to better private information?

- **Spanish Credit Registry**: Detailed loan-level information
  - Local & sector specialization
  - Loan ex-post realized default
  - Banks' private risk assessments (PDs)
  - Loan applications
  - Relationship lending

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Literature review

- Special role of banks
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- Bank lending specialization
  - Local areas, sector, export market, collateral type...
  - Lending advantage and more favorable loan conditions
  - *Loutskina and Strahan (2011), Berger et al. (2017), Giometti and Pietrosanti (2022), Paravisini et al. (2023), Blickle et al. (2023), Bonfim et al. (2023), Blickle et al. (2024)*
  - Affects transmission of shocks, MP & other outcomes
  - *Gopal (2021), Iyer et al. (2022), Casado and Martinez-Miera (2024), Ruzzier (2024), Degryse et al. (2024), De Jonghe et al. (2024)*
  - **This paper: Specialization type matters for diff. firm types**

Literature review

- Banks' private information
  - Banks' internal risk assessments as a private information measure
  - *Howes and Weitzner. (2023), Beyhaghi et al. (2024), Claessens et al. (2024)*
  - Despite prior research has reported some biases in these estimates
  - *Begley et al. (2017), Plosser and Santos (2018), Behn et al. (2022)*
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- Small vs. large firms
  - Asymmetric information is presumable more pronounced for small firms
  - Also more susceptible to information frictions
  - And more likely to experience credit supply constraints
  - *Gertler and Gilchrist (1994), Petersen and Rajan (1994, 2002), Chodorow-Reich (2014), Duygan-Bump (2015), Chodorow-Reich et al. (2022)*
  - **This paper: Local (sector) specialization helps ameliorate information frictions for small (large) firms**

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Data: Main database

- Central Credit Registry (**CIR**)
  - Loan level data to non-financial firms
  - Quarterly from 2018q3 to 2024q2

- Loan characteristics
  - Loan (realized) default status
  - Amount, maturity, interest rate, secured status, loan type..

- Firm characteristics
  - Size
  - Geographical market
  - Sector of activity

- Bank-firm characteristics
  - Internal risk estimates (PDs) for IRB banks
  - Relationship length

▸ Sum Stats ▸ Filters

Data: Local specialization variable

- Capture the relevance of a given **municipality** for a given bank
  - Around 5,797 (with any firm having positive outstanding lending)
  - One of the definitions of local banking markets used by regulators
  - *E.g., Resolution on the acquisition of Bankia by Caixabank (CNMC C/1144/20)*

- Specialization of a given bank b in municipality m and quarter t:

$$LocalSpec_{bmt} = \frac{A_{bmt}}{A_{bt}} = \frac{\text{Lending by } \textbf{bank b} \text{ in muni m in quarter t}}{\text{Total lending by } \textbf{bank b} \text{ in quarter t}}$$

  - Where A refers to outstanding **corporate** lending
  - **Geographical** specialization

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- Municipality of a non-financial firm
  - "Address of its registered headquarters or where the management and direction of its activities or business are effectively centralized"

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- Municipality of a non-financial firm
  - "Address of its registered headquarters or where the management and direction of its activities or business are effectively centralized"
  - (Possibly) more closely related to economic activity of small firms

Data: Example local specialization

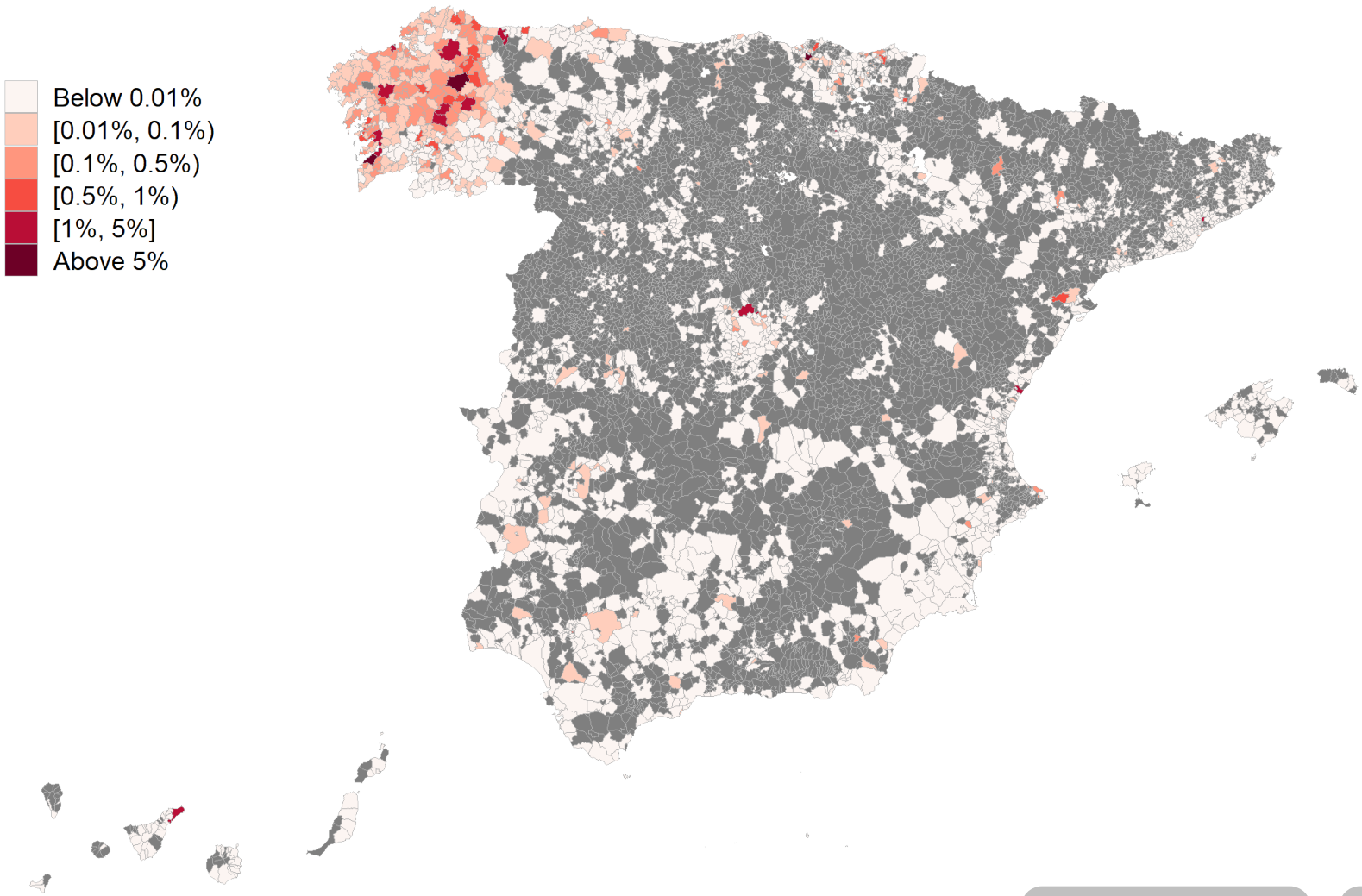
- Bank 1
- Corporate lending:
  - Municipality A: €9 million
  - Municipality B: €1 million
- Local specialization:
  - Municipality A: $0.9 = 90\%$
  - Municipality B: $0.1 = 10\%$

Data: Example excess local specialization

- Over-investment
  - Our identification strategy already accounts for this
- All banks
  - Municipality A: €600 million Local Spec = 0.6 = 60%
  - Municipality B: €400 million Local Spec = 0.4 = 40%
- Bank 1
  - Municipality A: €9 million Local Spec = 0.9 = 90%
  - Local Excess Spec = 0.9 - 0.6 = 0.3 = 30%
  - Municipality B: €1 million Local Spec = 0.1 = 10%
  - Local Excess Spec = 0.1 - 0.4 = -0.3 = -30%

Data: Group of banks (2024q2) local excess spec

- **Lugo (Lugo) 6.6%** Pontevedra (Pont.) 3.9%
- Vigo (Pont.) 5.1% Chantada (Lugo) 1.3%



▸ Alternative Group ▸ Average

Data: Group of banks (2024q2) local excess spec

- Province of Galicia
- **Lugo (Lugo) 6.6%** Pontevedra (Pont.) 3.9%
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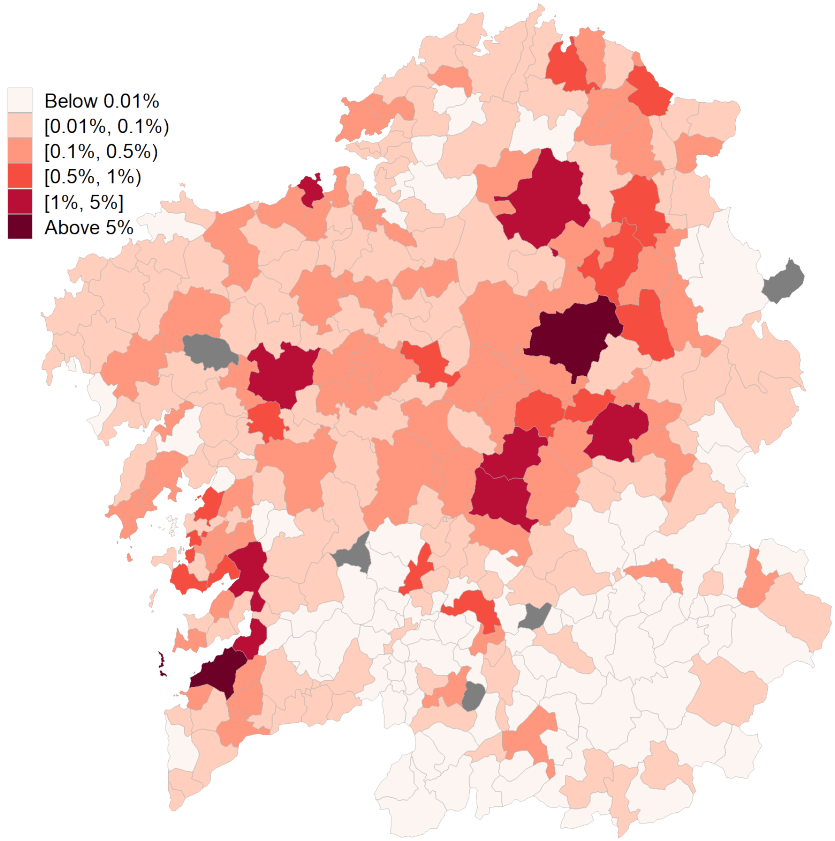


▸ Alternative Group ▸ Average

Data: Sector specialization variable

- Capture the relevance of a given **sector** for a given bank
  - 21 sectors with any firm having positive lending
  - 20 sectors after excluding financial & insurance activities
  - Following the NACE 2009 classification

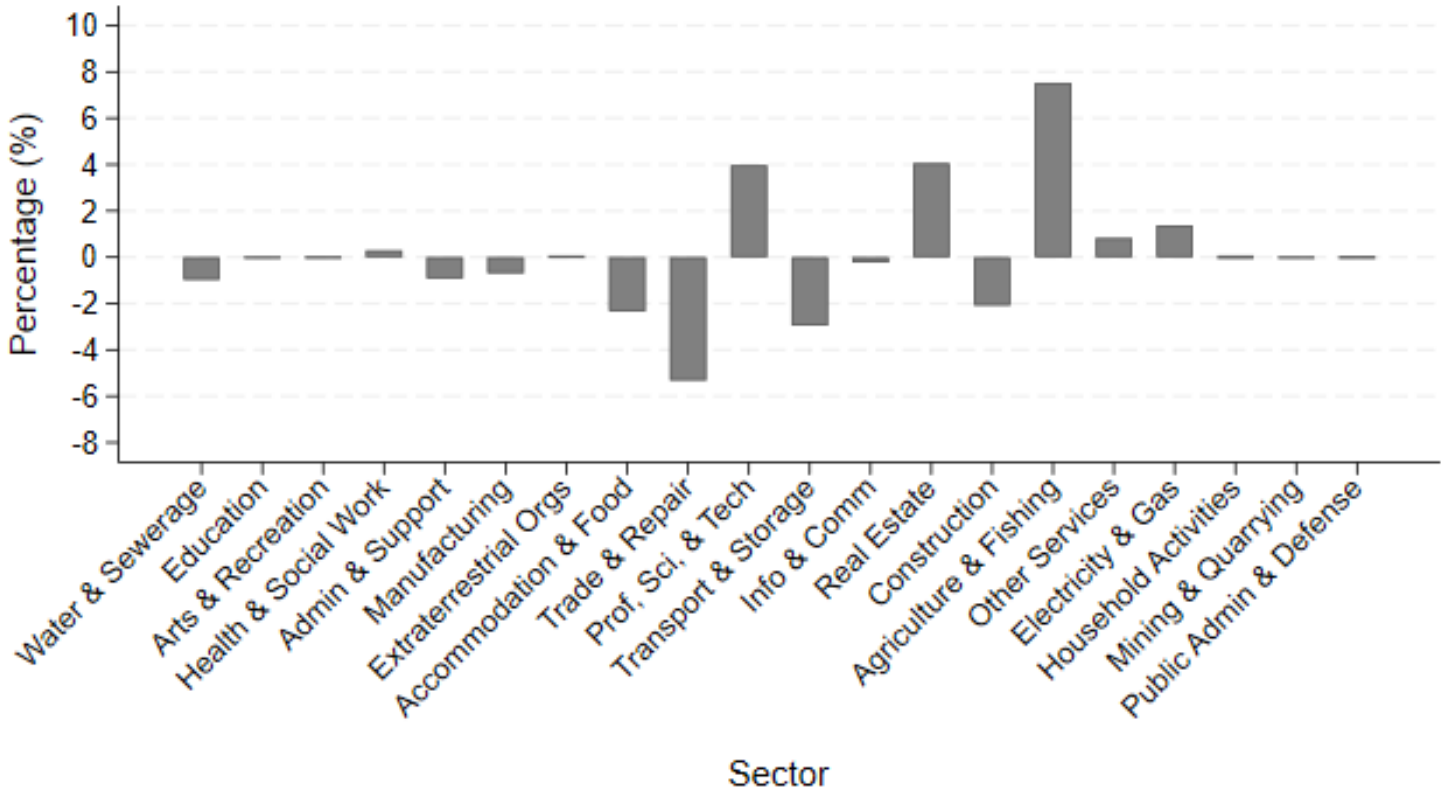
- Specialization of a given bank b in sector i and quarter t:

$$SectorSpec_{bit} = \frac{A_{bit}}{A_{bt}} = \frac{\text{Lending by } \textbf{bank b} \text{ in sector i in quarter t}}{\text{Total lending by } \textbf{bank b} \text{ in quarter t}}$$

  - Where A refers to outstanding **corporate** lending
  - **Sector** specialization

Data: Group of banks (2024q2) sector excess spec

- Agriculture & Fishing: 7.5%
- Real Estate: 4.1%
- Prof., sci. & tech.: 4%



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Data: Specialization in top munis and sectors

	Top municipality or sector					All other municipalities or sectors				
Specialization type	mean	p25	p50	p75	sd	mean	p25	p50	p75	sd
Local Spec (municipality)	0.396	0.191	0.329	0.575	0.249	0.001	0.000	0.000	0.000	0.008
Sector Spec (20 sectors)	0.369	0.252	0.312	0.423	0.177	0.046	0.006	0.019	0.060	0.061

- Degree of local (sector) specialization
  - ▷ In the top municipality (sector) vs. other municipalities (sectors)
- Used in the interpretation of the results

▸ Excess Spec ▸ Persistence ▸ Munis Top vs. Other ▸ Sectors Top vs. Other

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Loan default: Baseline estimates

- Baseline regression:

$$Default_{lbfmistT} = \omega_{bt} + \alpha_{mist} + \beta_1 LocalSpec_{bm,t-1} + \beta_2 SectorSpec_{bi,t-1} + \Gamma Controls_{lbfmist} + \epsilon_{lbfmist} \quad (1)$$

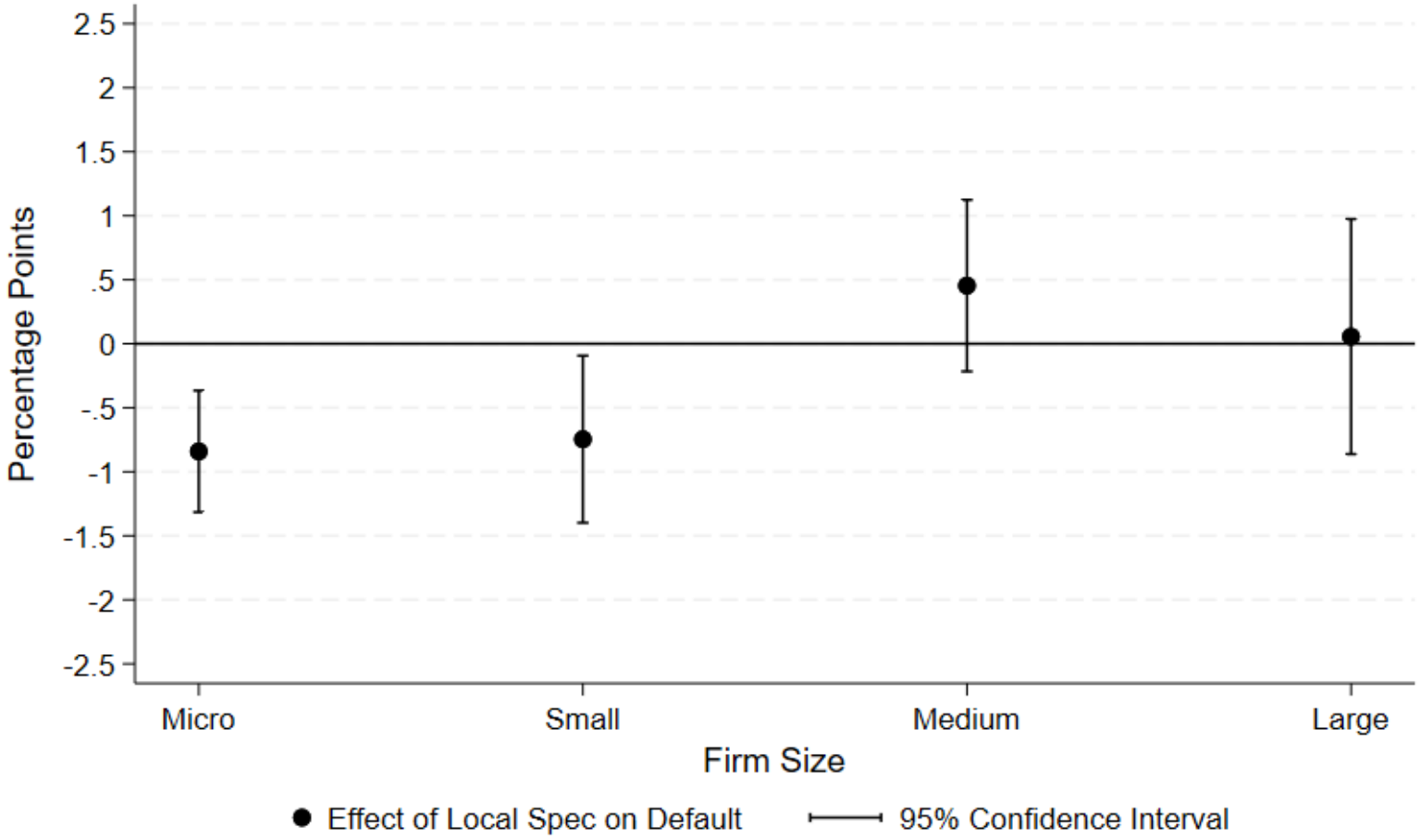
  - $Default_{lbfmistT}$=1 if new loan ever enters in default
  - (l) loan (b) bank (f) firm (m) municip. (i) sector (t) quarter (s) size
  - (t) quarter of origination (T) maturity or last period observed

- Controls ($Controls_{lbfmist}$):
  - Loan: $Secured_l$, $Amount_l$, $Interestrate_l$, $ProductType_l$, $Maturity_l$
  - Bank-firm: $RelLength_{bft}$
  - Bank-muni/sector: $LocalMktSh_{bm,t-1}$, $SectorMktSh_{bi,t-1}$

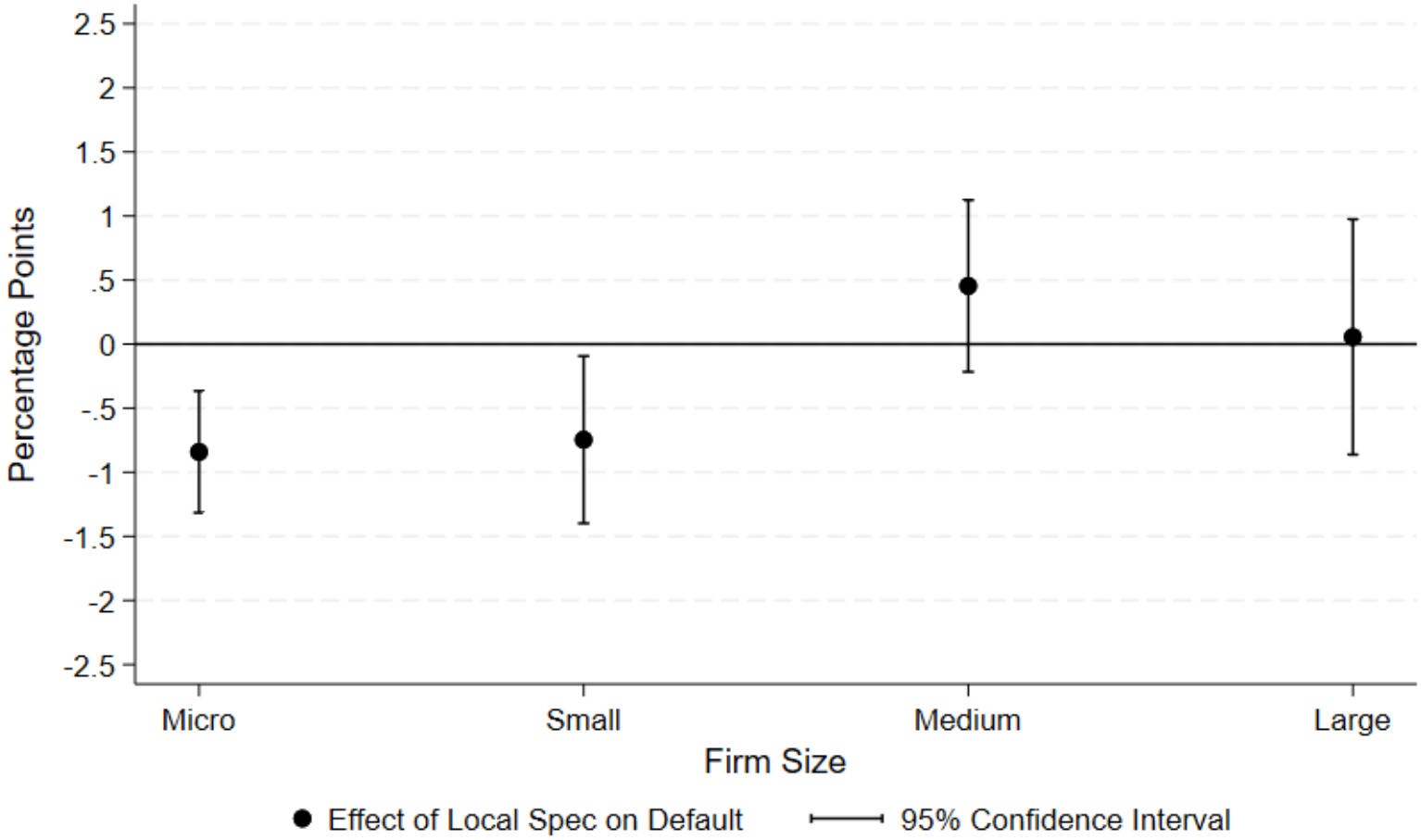
- **Bank-time** (ω_{bt}) and **muni-sector-size-time** (α_{mist}) **fixed effects**
  - In the spirit of *Degryse et al. (2019)*

▸ Firm Size

Loan default: **Local** specialization & firm size

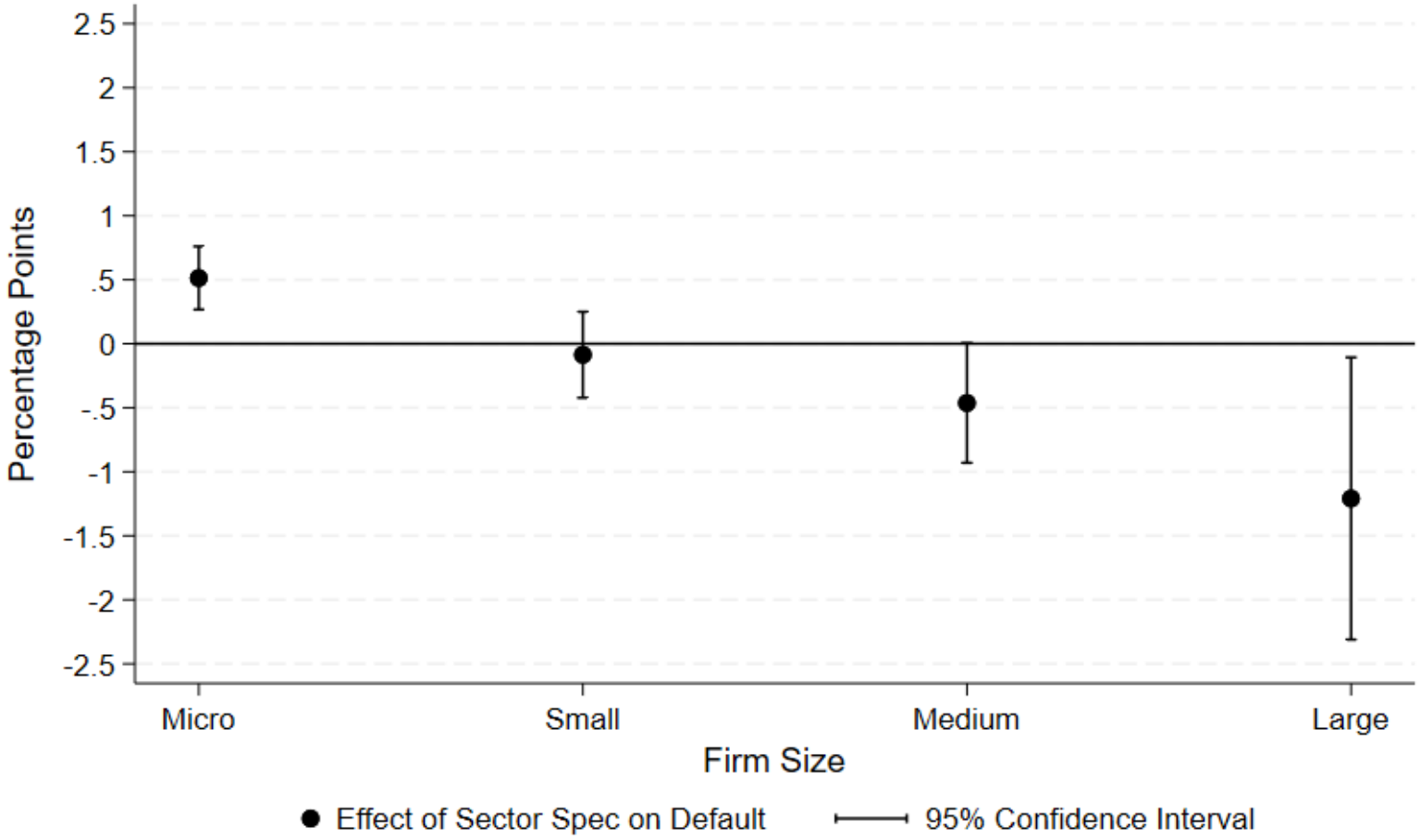


Loan default: **Local** specialization & firm size

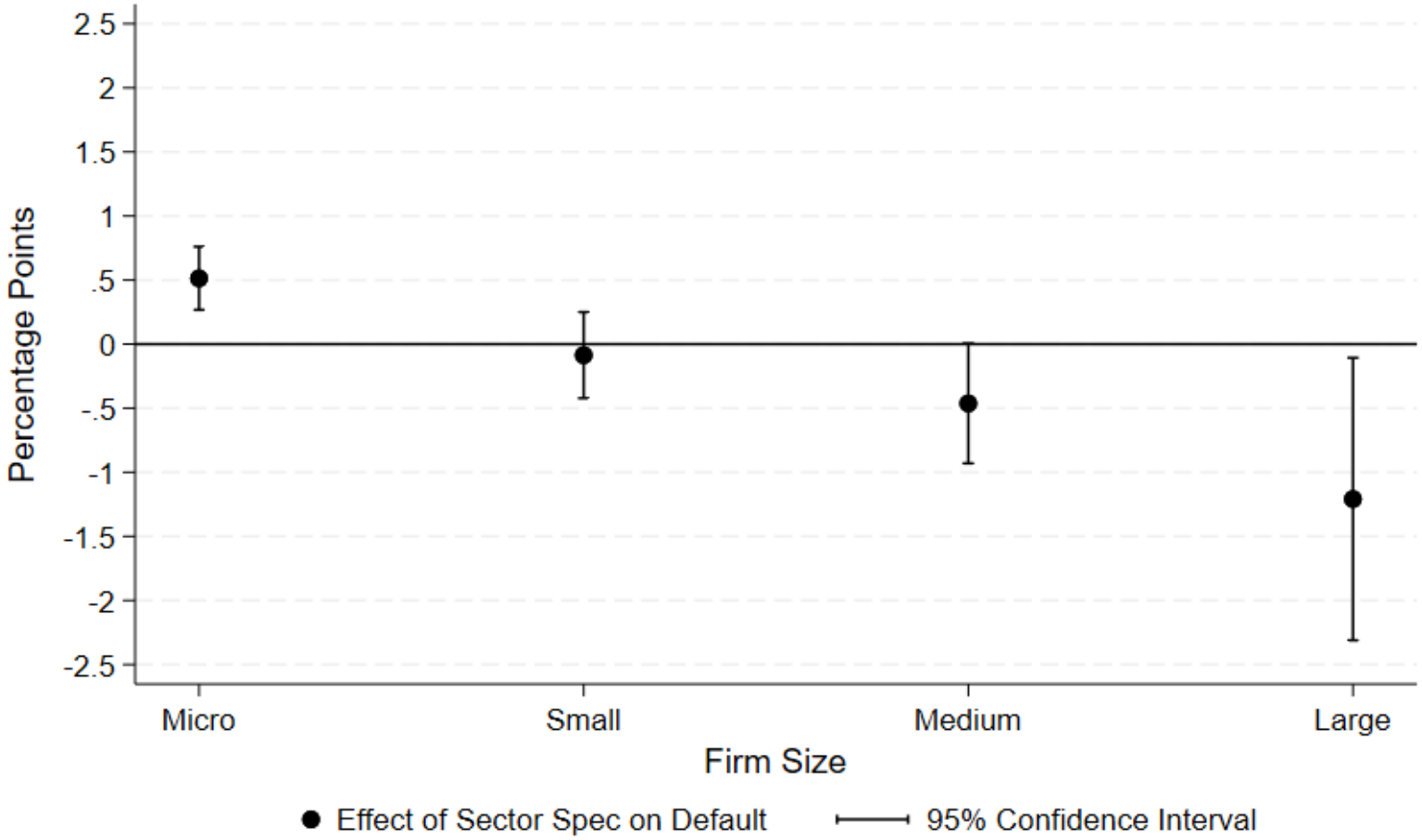


- Loan granted by bank to **micro (small)** firm in its top muni is
  - ▷ **0.84 (0.75)** p.p. less likely to default ex-post, compared to other loans

Loan default: **Sector** specialization & firm size



Loan default: **Sector** specialization & firm size



- Loan granted by bank to **large (medium)** firm in its top sector is
  - ▷ **1.21 (0.46)** p.p. less likely to default ex-post, compared to other loans

Loan default: Samples of firms

	Default						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local Spec	-0.0103***	-0.0210***	0.0109	-0.0213***	-0.0189**	0.0115	0.00142
	(0.00395)	(0.00500)	(0.00672)	(0.00613)	(0.00842)	(0.00865)	(0.0119)
Observations	9,350,812	5,717,604	3,633,052	2,868,821	2,848,603	1,842,658	1,790,200
R-squared	0.204	0.180	0.337	0.158	0.229	0.325	0.370
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	All	MicroSmall	MedLarge	Micro	Small	Medium	Large

- **Local** specialization associated with lower loan default for **micro & small** firms

▸ Excess Spec ▸ Example ▸ Sector Heterogeneity ▸ Showing Controls ▸ Further Interpretation

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	(0.00395)	(0.00500)	(0.00672)	(0.00613)	(0.00842)	(0.00865)	(0.0119)
Sector Spec	0.00214	0.0100***	-0.0198***	0.0159***	-0.00267	-0.0143*	-0.0374**
	(0.00260)	(0.00303)	(0.00682)	(0.00389)	(0.00531)	(0.00739)	(0.0174)
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Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	All	MicroSmall	MedLarge	Micro	Small	Medium	Large

- **Sector** specialization associated with lower loan default for **medium & large** firms

▸ Excess Spec ▸ Example ▸ Sector Heterogeneity ▸ Showing Controls ▸ Further Interpretation

Loan default: Robustness micro & small firms

- Specialization variable
  - Excess and relative as in *Blickle et al. (2023)*
  - Sample of micro & small firms, number instead of amount, excluding specific firm
  - Without sector variables and without market share
  - Quartiles and 4th quartile as in *Paravisini et al. (2023)*
  - Higher than median

- Dependent variable, different samples, drawn amount & province
  - One-year ex-post default, including doubtful loans
  - Drawn amount
  - Excluding ICO-loans, focusing outstanding loans
  - IRB (PD) banks, controlling for initial PD
  - Maturity shorter than end of our sample (no right-censoring)
  - Province and NACE2digits

Loan default: Robustness micro & small firms

	Default									
	Excess	Relative	Spec MicroSmall	Number	Spec Without Firm	No Sector	No Sector MktSh	Quartiles	Top	Spec > Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Local Spec	-0.0210***	-1.89e-05***	-0.0172***	-0.0109*	-0.0155***	-0.0207***	-0.0296***			
	(0.00500)	(5.55e-06)	(0.00479)	(0.00570)	(0.00505)	(0.00500)	(0.00486)			
Local Spec d4								-0.00775***	-0.00209***	
								(0.000850)	(0.000389)	
Local Spec d3								-0.00577***		
								(0.000756)		
Local Spec d2								-0.00458***		
								(0.000731)		
Local Spec d34										-0.00179***
										(0.000324)
Observations	5,717,604	5,717,604	5,713,151	5,717,604	5,072,579	5,717,709	5,717,709	5,717,604	5,717,604	5,717,604
R-squared	0.180	0.180	0.180	0.180	0.199	0.180	0.180	0.180	0.180	0.180
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall

▸ Back Interpretation Excess

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  - Sample of micro & small firms, number instead of amount, excluding specific firm
  - Without sector variables and without market share
  - Quartiles and 4th quartile as in *Paravisini et al. (2023)*
  - Higher than median

- Dependent variable, different samples, drawn amount & province
  - One-year ex-post default, including doubtful loans
  - Drawn amount
  - Excluding ICO-loans, focusing outstanding loans
  - IRB (PD) banks, controlling for initial PD
  - Maturity shorter than end of our sample (no right-censoring)
  - Province

Loan default: Robustness micro & small firms

	Default									
	Default1y	Defaultdud	Drawn	No ICOs	Not Only New	PD Banks	PD Banks	PD Banks	No right-censored	Province
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Local Spec	-0.0159***	-0.0119*	-0.0198***	-0.0151***	-0.0165***	-0.0329***	-0.0737***	-0.0939***	-0.0206***	-0.0149***
	(0.00445)	(0.00644)	(0.00538)	(0.00466)	(0.00239)	(0.0119)	(0.0230)	(0.0235)	(0.00631)	(0.00253)
PD								0.0774***		
								(0.0049)		
Observations	5,717,604	5,717,604	5,512,399	4,942,859	30,294,492	3,629,117	1,516,440	1,516,440	4,461,621	5,951,659
R-squared	0.204	0.193	0.181	0.188	0.117	0.173	0.236	0.242	0.218	0.047
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall
Period	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2	2021q4-2024q2	2021q4-2024q2	2018q3-2024q1	2018q3-2024q2

▸ Fixed Effects ▸ BankProvinceTime FE

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  - **Specialization and informational advantages**
  - Specialization and loan supply
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Information: Analysis

- Potential link between specialization & enhanced private information
  - Assumed in prior literature
  - E.g., *Paravisini et al. (2023), Blickle et al. (2023)*
  - **We provide evidence that supports this assumption**

▸ Reg. EU 575/2013 ▸ PD ▸ PD and NP ▸ Specialization IRB Banks

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  - *Howes and Weitzner (2023), Beyhaghi et al. (2024)*
  - *Claessens et al. (2024)*

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  - *Claessens et al. (2024)*

- PDs by banks using IRB models
  - "Probability of default of risk holders during one year"
  - Four major spanish banks
  - Account for 68.2% of lending (66.4% micro & small firms) in 2023q2
  - Still specialize locally and sectorally (lesser extent)

▸ Reg. EU 575/2013 ▸ PD ▸ PD and NP ▸ Specialization IRB Banks

Information: Analysis

- Given our previous results on loan default
  - Examine predictive ability of PDs
  - **Locally** specialized vs. non-specialized bank for **micro & small** firm
  - **Sectoral** specialized vs. non-specialized bank for **medium & large** firm

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- Bank-firm-quarter information (2021q4-2024q2)
  - Within-firm analysis: PD reported by two IRB banks
  - PD reported by bank with highest vs. bank with lowest degree
  - Of **local** specialization for **micro & small** firms
  - Of **sector** specialization for **medium & large** firms

Information: Analysis

- Area Under the Receiver Operating Curve (AUROC)
  - Interpreted as measure of how well PD predicts realized default
  - *Howes and Weitzner (2023)*
  - Also used with different predictors *(Iyer et al., 2016)*

▸ Example Simple ROC

Information: Analysis

- Area Under the Receiver Operating Curve (AUROC)
  - Interpreted as measure of how well PD predicts realized default
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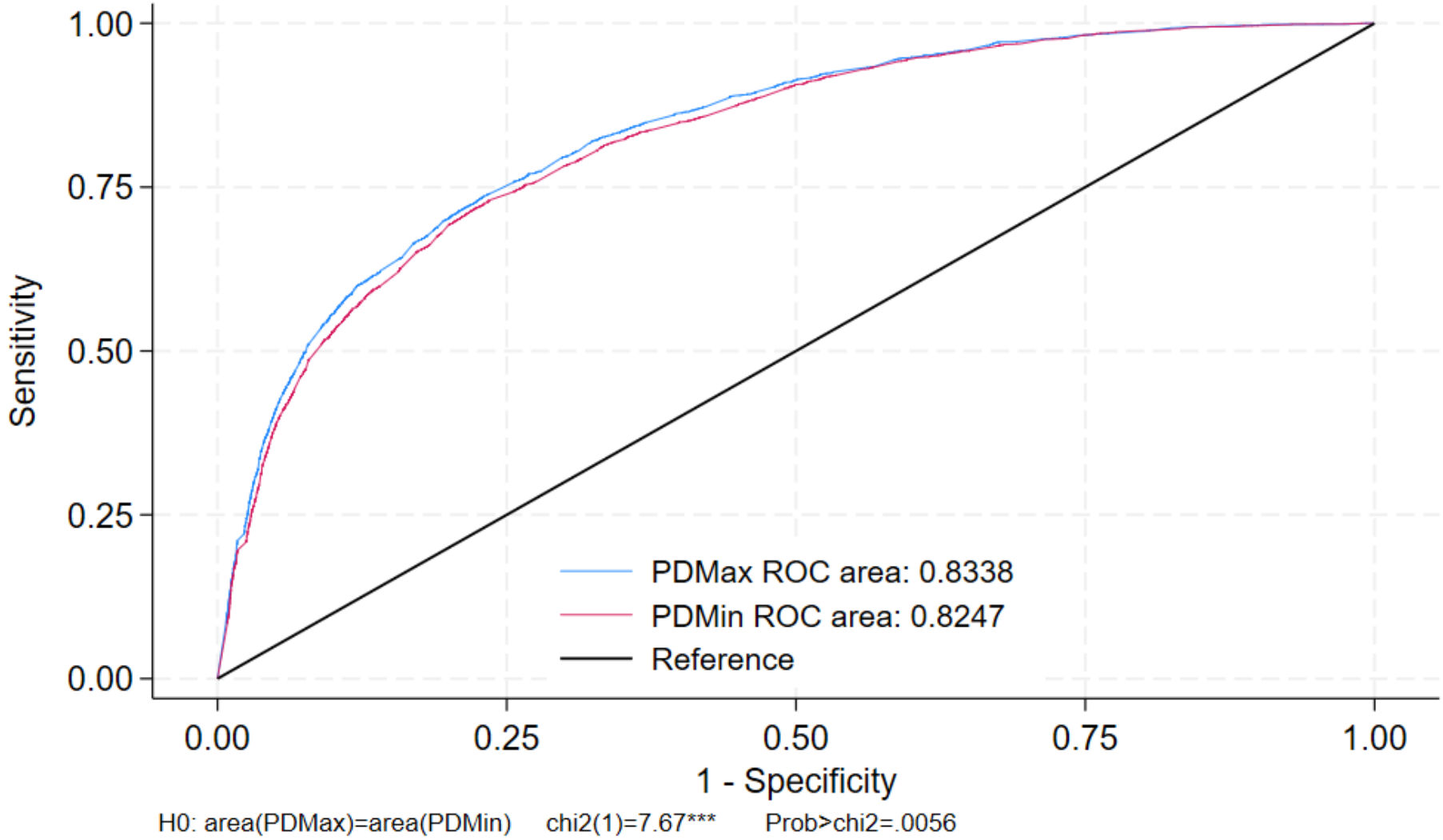
- ROC curve
  - Plots sensitivity (TPR) against 1-specificity (FPR) at various thresholds
  - Thresholds = every possible value of the PD
  - PD exceeds a threshold, classified as defaulted
  - TPR and FPR are computed and plotted, forming the ROC curve

▸ Example Simple ROC

Information: **Local** specialization **micro & small** firms



▸ Table & Robustness ▸ PD vs. controls

Information: **Local** specialization **micro & small** firms

- Randomly chosen ex-post defaulting and non-defaulting **micro or small** firm
  - Prob. that defaulting firm has higher PD than non-defaulting firm
  - Is 83.38% for the locally specialized bank
  - Is 82.47% for the locally non-specialized bank
  - Is **0.91 p.p. higher for the locally specialized** bank compared to the locally non-specialized bank
  - Statistically significant at the 1% level *(DeLong et al., 1988)*

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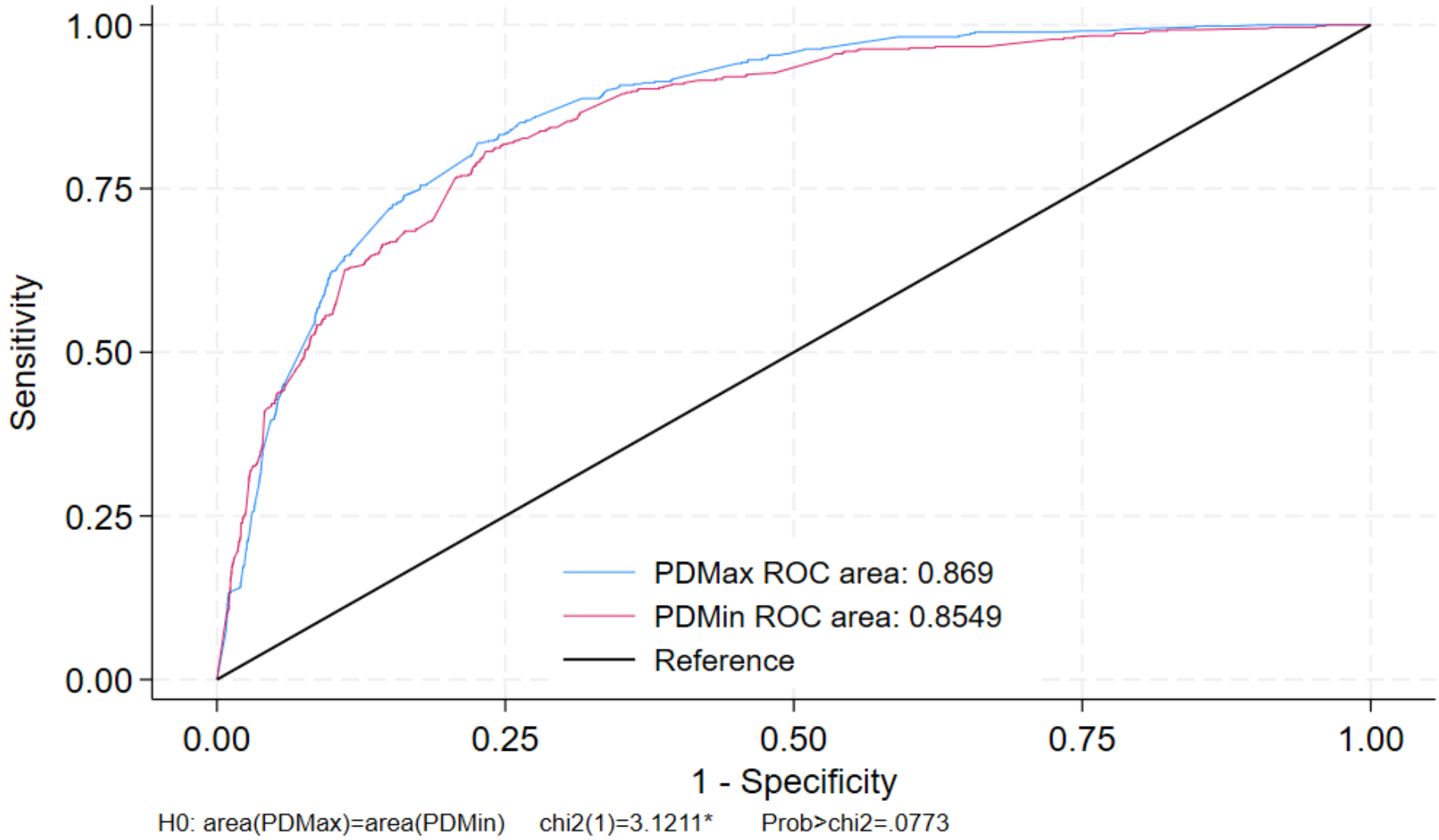
- "Even a 0.01 improvement in AUC is considered a noteworthy gain in the credit scoring industry"
  - *Iyer et al. (2016)*

Information: **Sector** specialization **medium & large** firms



▸ NACE2d

Information: **Sector** specialization **medium & large** firms

- Randomly chosen ex-post defaulting and non-defaulting **medium or large** firm
  - Prob. that non-defaulting firm has higher PD than defaulting firm
  - Is 86.9% for the sectoral specialized bank
  - Is 85.49% for the sectoral non-specialized bank
  - Is **1.41 p.p. higher for the sectoral specialized** bank compared to the sectoral non-specialized bank
  - Statistically significant at the 1% level *(DeLong et al., 1988)*

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Concluding remarks

- **Type of banks' lending specialization matters**
  - For different types of firms
  - Geographical (sectoral) specialization for small (large) firms
  - Lower prob. of default
  - *Within-bank & within-firmtype comparison*
  - **Contribution 1**

Concluding remarks

- **Type of banks' lending specialization matters**
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  - **Contribution 1**

- **Specialization directly related to information measure**
  - PD by specialized bank better predicts ex-post realized default
  - Locally (sectoral) specialized PD for small (large) firms
  - Internal risk assessments (PDs) & *within-firm comparison*
  - **Contribution 2**

Concluding remarks

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  - For different types of firms
  - Geographical (sectoral) specialization for small (large) firms
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  - *Within-bank & within-firmtype comparison*
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- **Specialization directly related to information measure**
  - PD by specialized bank better predicts ex-post realized default
  - Locally (sectoral) specialized PD for small (large) firms
  - Internal risk assessments (PDs) & *within-firm comparison*
  - **Contribution 2**

- **Suggestive supply evidence & validation of findings**
  - Suggestive supply effect related to banks' lending specialization
  - Validation of results & benchmark using relationship lending
  - **Additional results**

Thank you!

Summary statistics: All firms

	N	mean	p25	p50	p75	sd
Amount (thousand €)	9,661,545	84.927	1.966	10.059	35.268	4,297.994
Amount (log)	9,661,545	2.048	0.676	2.308	3.563	2.259
Interest Rate (%)	9,661,545	3.969	2.020	3.792	5.620	2.352
Maturity (remaining quarters)	9,661,545	4.461	1	1	3	8.452
Secured	9,661,545	0.030	0	0	0	0.171
Default	9,661,545	0.012	0	0	0	0.109
Local Spec	9,636,461	0.031	0.000	0.002	0.015	0.075
Local MktSh	9,636,461	0.157	0.065	0.134	0.228	0.117
Sector Spec	9,661,284	0.148	0.086	0.166	0.186	0.084
Sector MktSh	9,661,284	0.122	0.046	0.094	0.207	0.089
RelLength (quarters)	9,661,545	37.967	14	32	61	28.163

▸ Back

Summary statistics: Micro and small firms

	N	mean	p25	p50	p75	sd
Amount (thousand €)	5,955,692	48.753	3.175	12.000	35.000	454.399
Amount (log)	5,955,692	2.308	1.155	2.485	3.555	1.849
Interest Rate (%)	5,955,692	4.065	2.180	3.659	5.640	2.438
Maturity (remaining quarters)	5,955,692	5.561	1	1	4	9.460
Secured	5,955,692	0.030	0	0	0	0.171
Default	5,955,692	0.017	0	0	0	0.128
Local Spec	5,939,099	0.029	0.000	0.001	0.009	0.074
Local MktSh	5,939,099	0.175	0.080	0.166	0.248	0.120
Sector Spec	5,955,524	0.144	0.078	0.163	0.186	0.080
Sector MktSh	5,955,524	0.137	0.042	0.153	0.216	0.091
RelLength (quarters)	5,955,692	32.382	10	24	51	27.130

▸ Back

Summary statistics: Medium and large firms

	N	mean	p25	p50	p75	sd
Amount (thousand €)	3,705,853	143.063	0.648	6.935	36.707	6,915.424
Amount (log)	3,705,853	1.629	-0.434	1.937	3.603	2.744
Interest Rate (%)	3,705,853	3.814	1.789	4.000	5.580	2.199
Maturity (remaining quarters)	3,705,853	2.693	1	1	2	6.111
Secured	3,705,853	0.030	0	0	0	0.170
Default	3,705,853	0.005	0	0	0	0.069
Local Spec	3,697,362	0.034	0.001	0.003	0.020	0.075
Local MktSh	3,697,362	0.128	0.055	0.106	0.174	0.104
Sector Spec	3,705,760	0.153	0.102	0.167	0.185	0.090
Sector MktSh	3,705,760	0.097	0.050	0.065	0.156	0.078
RelLength (quarters)	3,705,853	46.942	25	42	72	27.464

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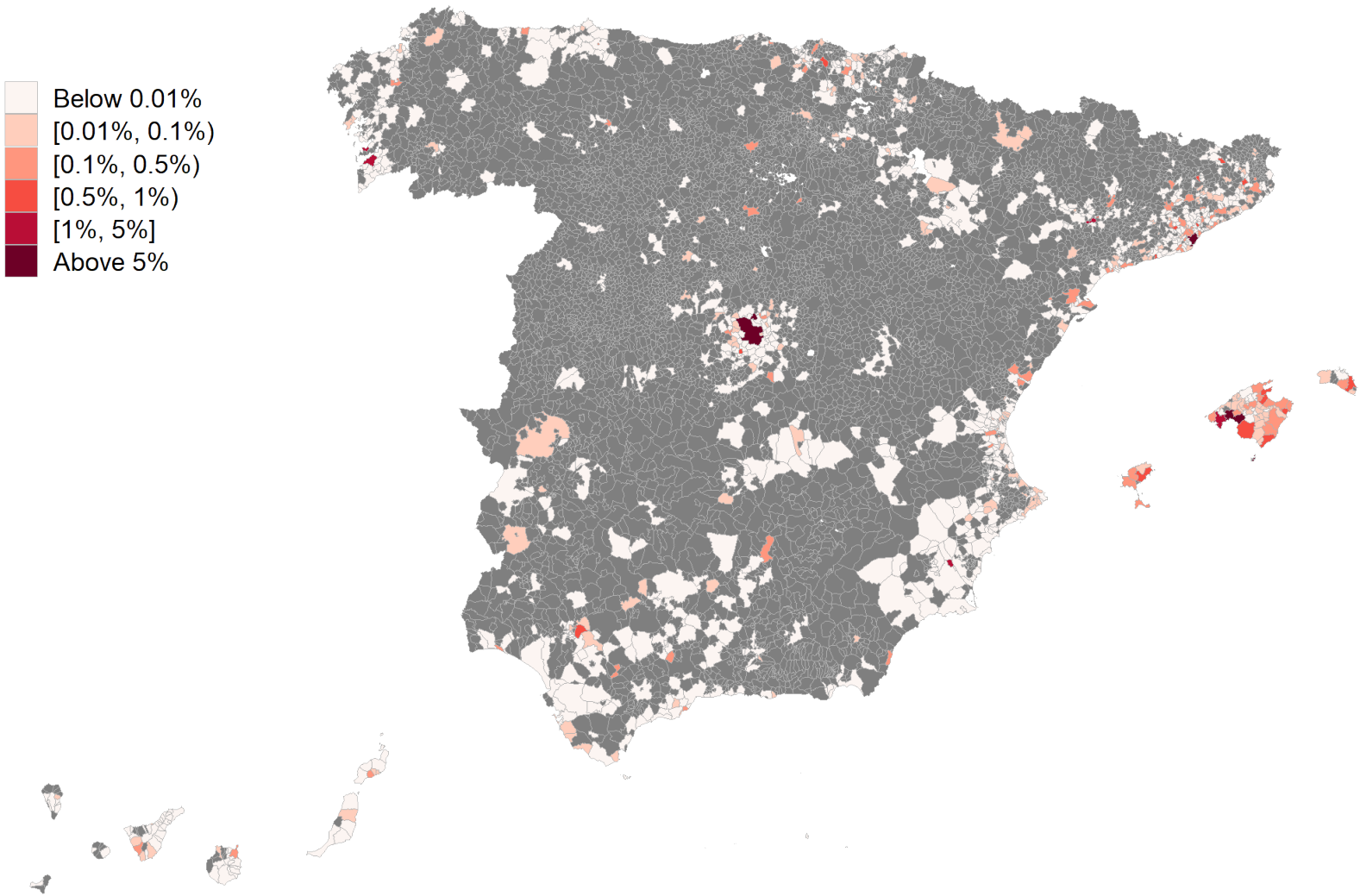
Data: Filters and sample

- Main filters of loans
  - Keep loans with information on loan rates (drop non-reliable values)
  - Keep loans with information on sector and municipality of the firm
  - Keep loans with a single direct risk holder
- Main sample of firms
  - Drop firms in the financial and insurance sectors
- Main sample of banks
  - Focus on commercial and cooperative banks
  - Results robust to focus only in IRB banks
- Adjustment for M&As
  - We replace acquired banks for the acquirer backwards in the sample

▸ Back

Data: Alt. group of banks (2024q2) local excess spec



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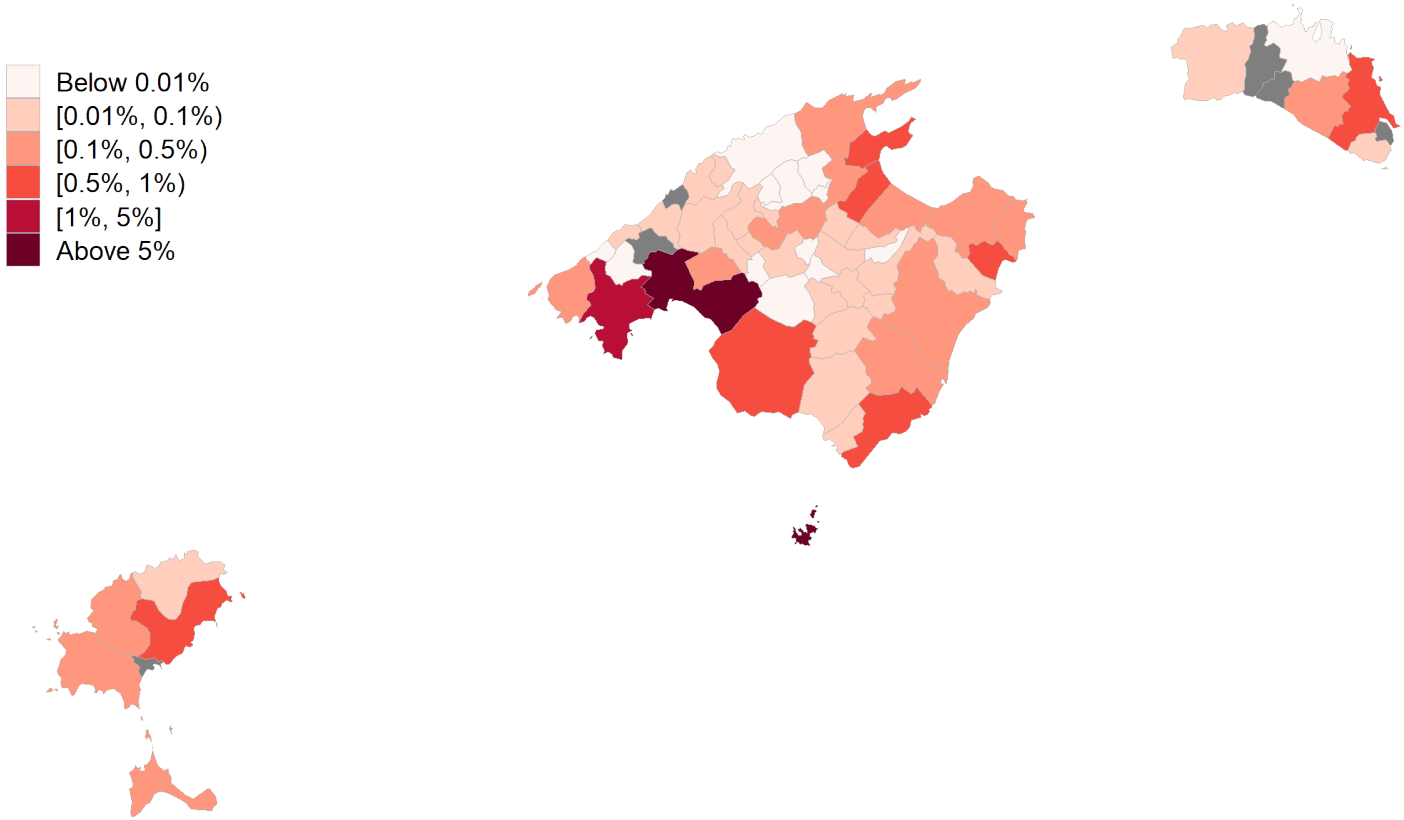

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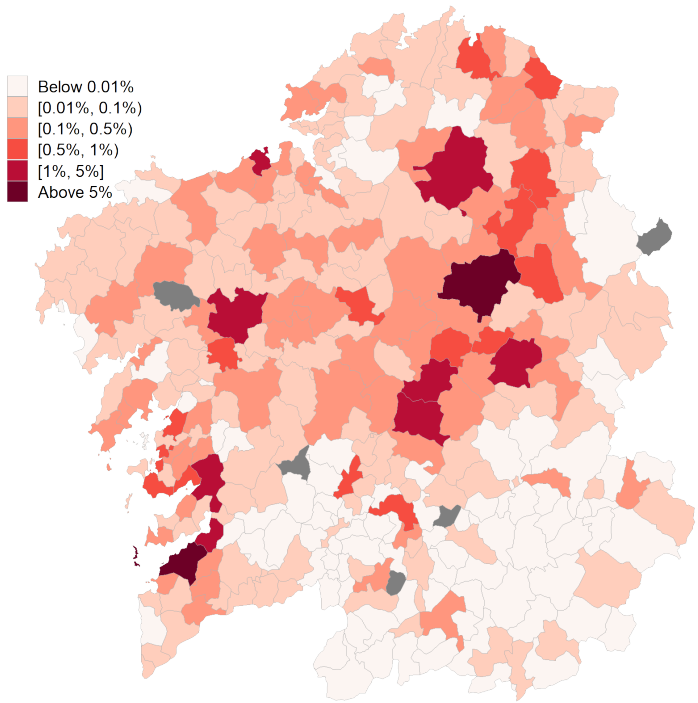
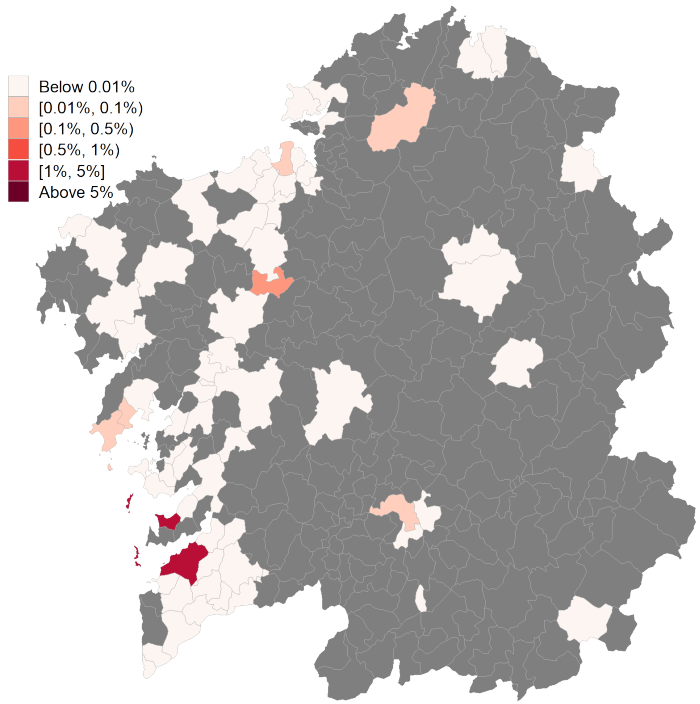
Data: Group 1 vs. alt. Group in Galicia (2024q2)





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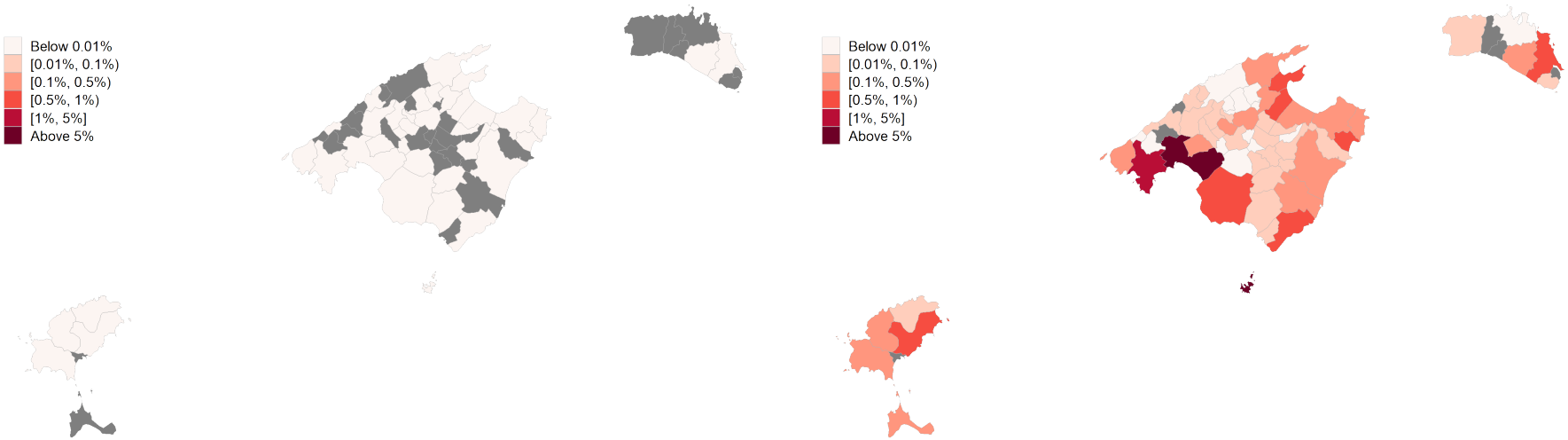
Data: Group 1 vs. alt. Group in Baleares (2024q2)



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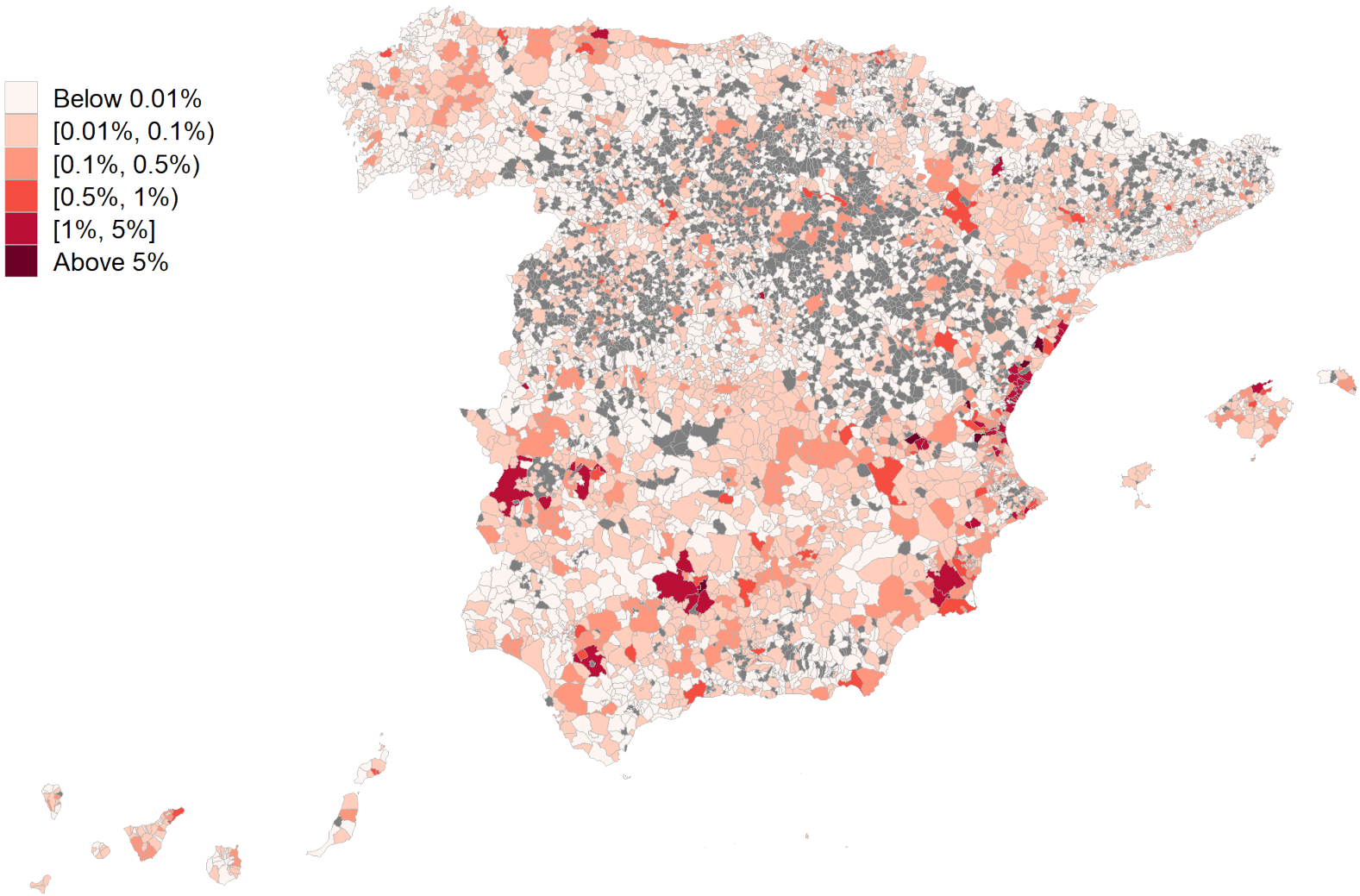
Data: Average (2024q2) local excess spec



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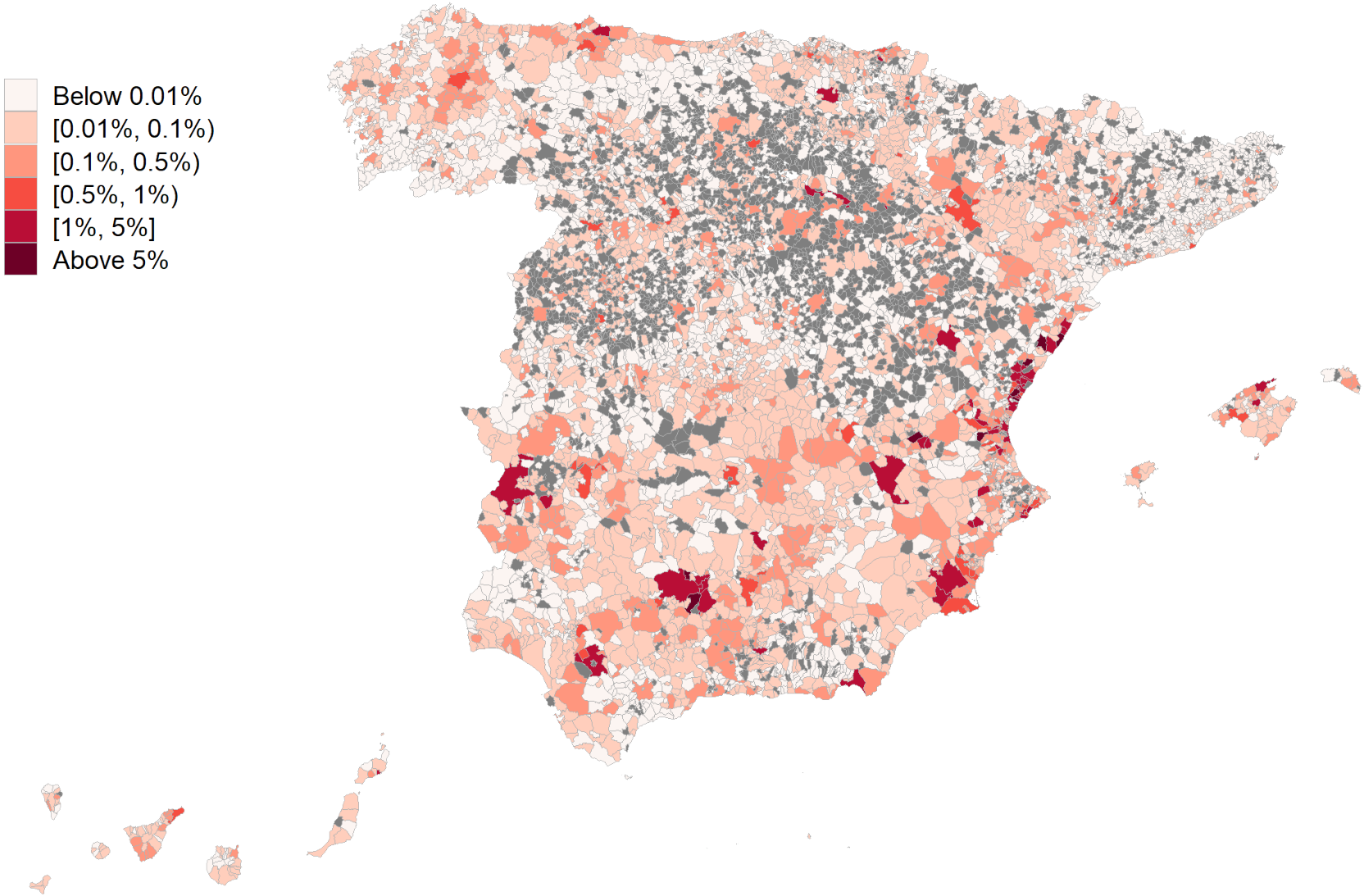
Data: Avg. local excess spec micro&small firms (2024q2)



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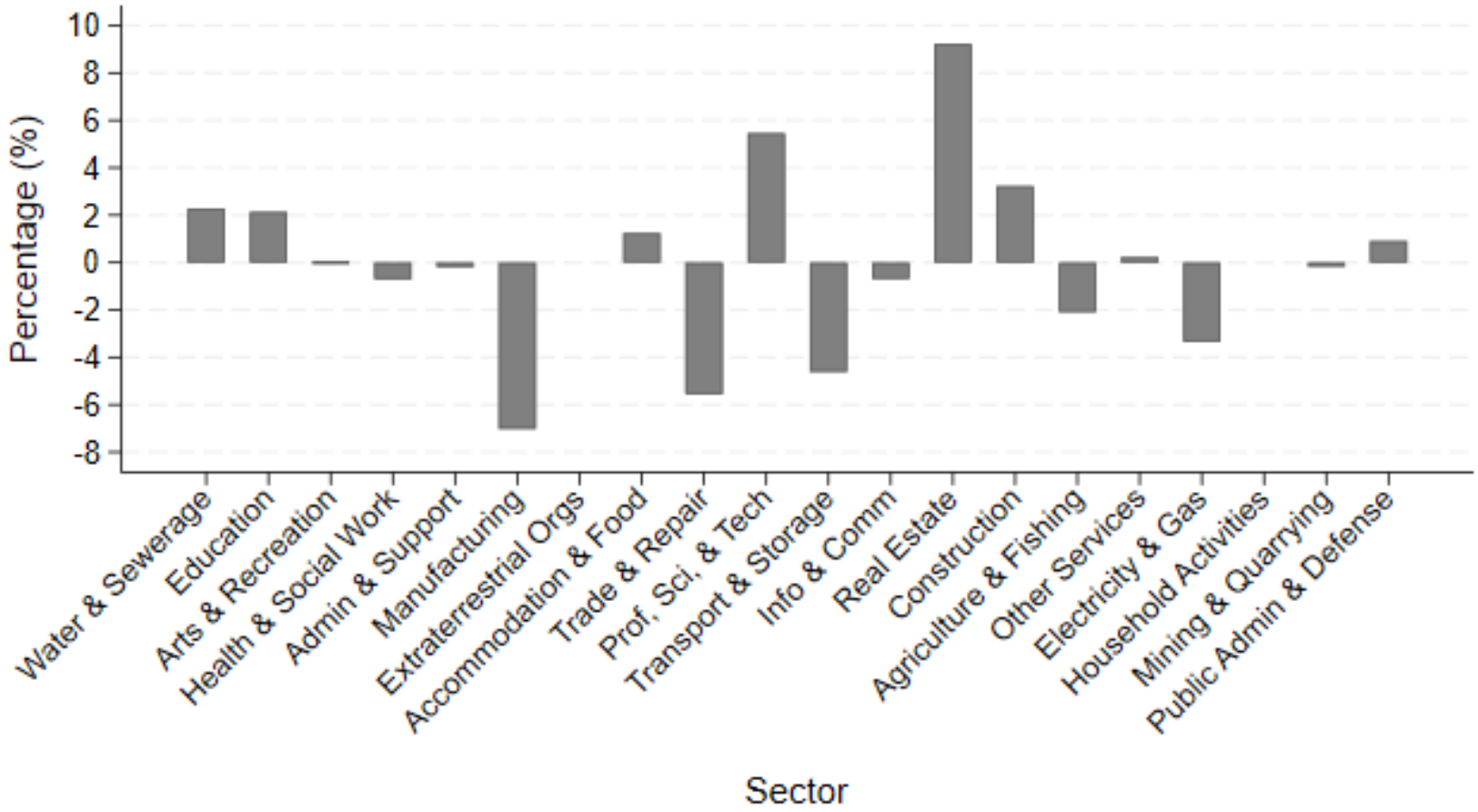
Data: Alt. group (2024q2) sector excess spec



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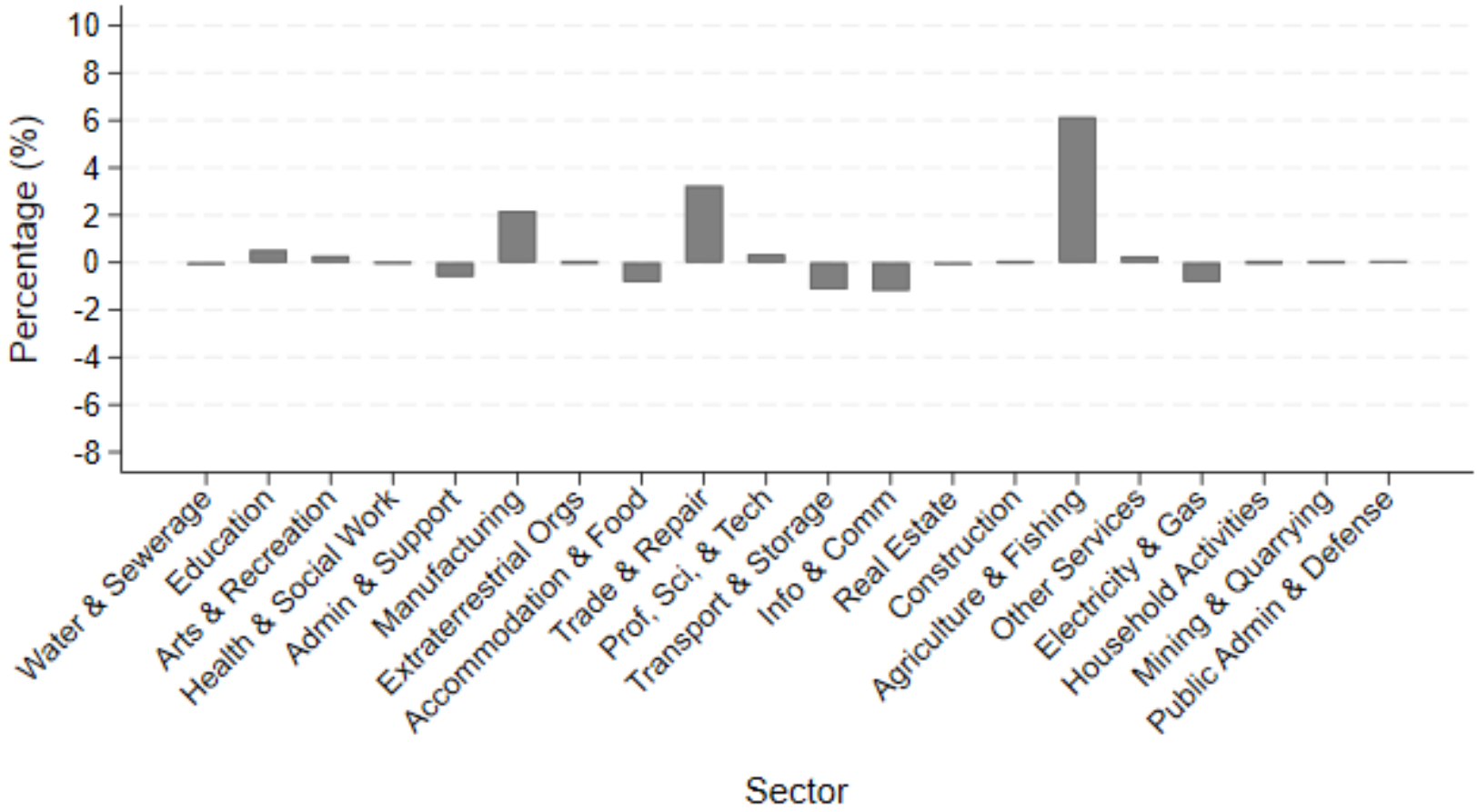
Data: Average (2024q2) sector excess spec



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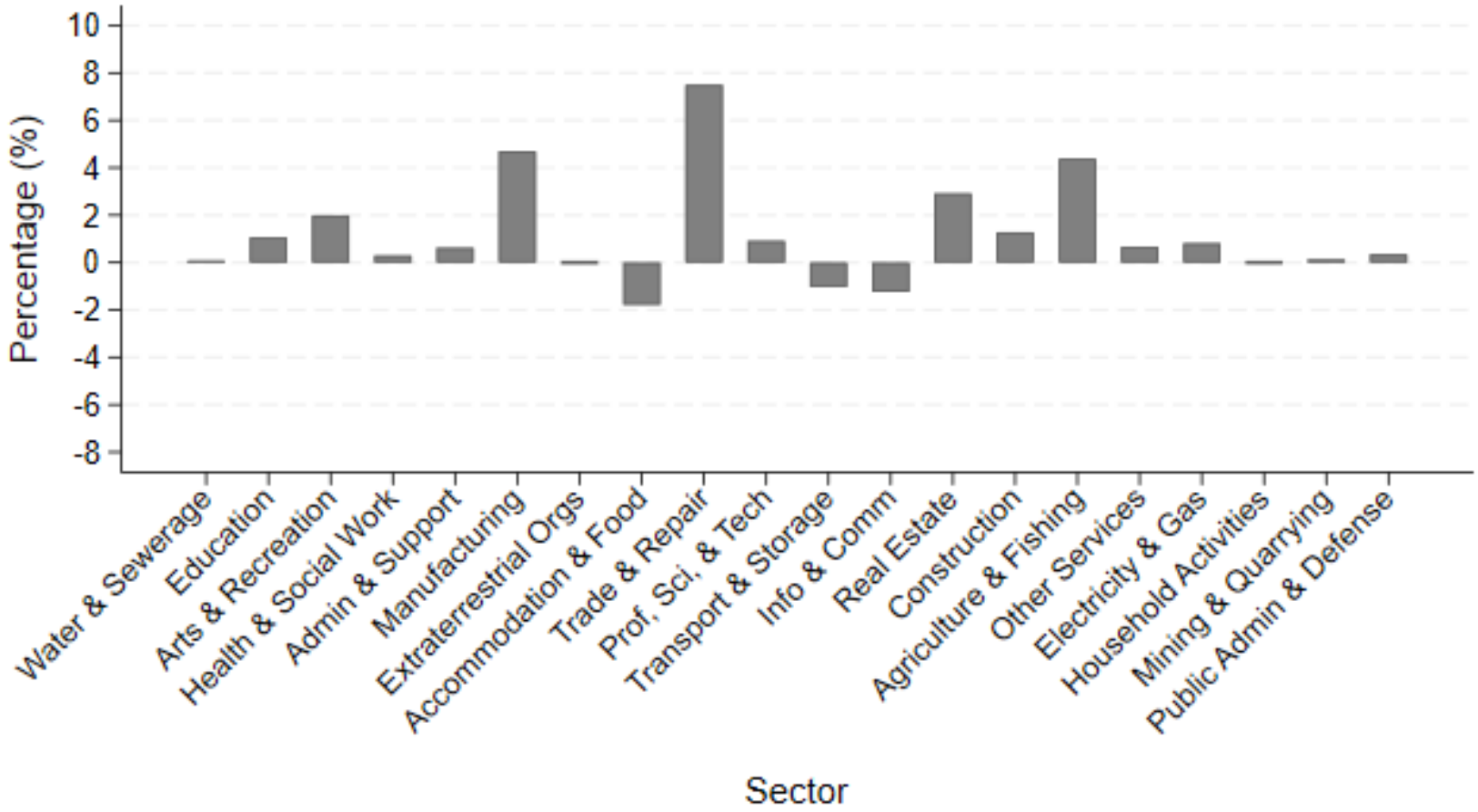
Data: Avg sector spec medium & large firms (2024q2)



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Data: Excess specialization in top munis and sectors

	Top municipality or industry					All other municipalities or industries				
Specialization type	mean	p25	p50	p75	sd	mean	p25	p50	p75	sd
Local Excess Spec (municipality)	0.336	0.130	0.250	0.538	0.259	0.000	0.000	0.000	0.000	0.001
Sector Excess Spec (20 sectors)	0.231	0.116	0.172	0.290	0.178	-0.010	-0.029	-0.006	0.002	0.046

▸ Back

Data: Presistence of local specialization

	Local Spec				
	(1)	(2)	(3)	(4)	(5)
Local Spec t-1	0.981***				
	(0.00345)				
Local Spec t-4		0.947***			
		(0.0102)			
Local Spec t-8			0.909***		
			(0.0174)		
Local Spec t-12				0.883***	
				(0.0243)	
Local Spec t-16					0.864***
					(0.0310)
Observations	1,104,438	913,671	697,025	502,421	322,856
R-squared	0.971	0.926	0.886	0.853	0.832
Quarter FE	Y	Y	Y	Y	Y
Cluster s.e.	Bank-Local	Bank-Local	Bank-Local	Bank-Local	Bank-Local

▸ Back

Data: Presistence of sector specialization

	Sector Spec				
	(1)	(2)	(3)	(4)	(5)
Sector Spec t-1	0.971***				
	(0.00394)				
Sector Spec t-4		0.922***			
		(0.0117)			
Sector Spec t-8			0.866***		
			(0.0199)		
Sector Spec t-12				0.835***	
				(0.0260)	
Sector Spec t-16					0.812***
					(0.0330)
Observations	33,524	28,528	22,430	16,595	10,907
R-squared	0.947	0.850	0.766	0.716	0.682
Quarter FE	Y	Y	Y	Y	Y
Cluster s.e.	Bank-Sector	Bank-Sector	Bank-Sector	Bank-Sector	Bank-Sector

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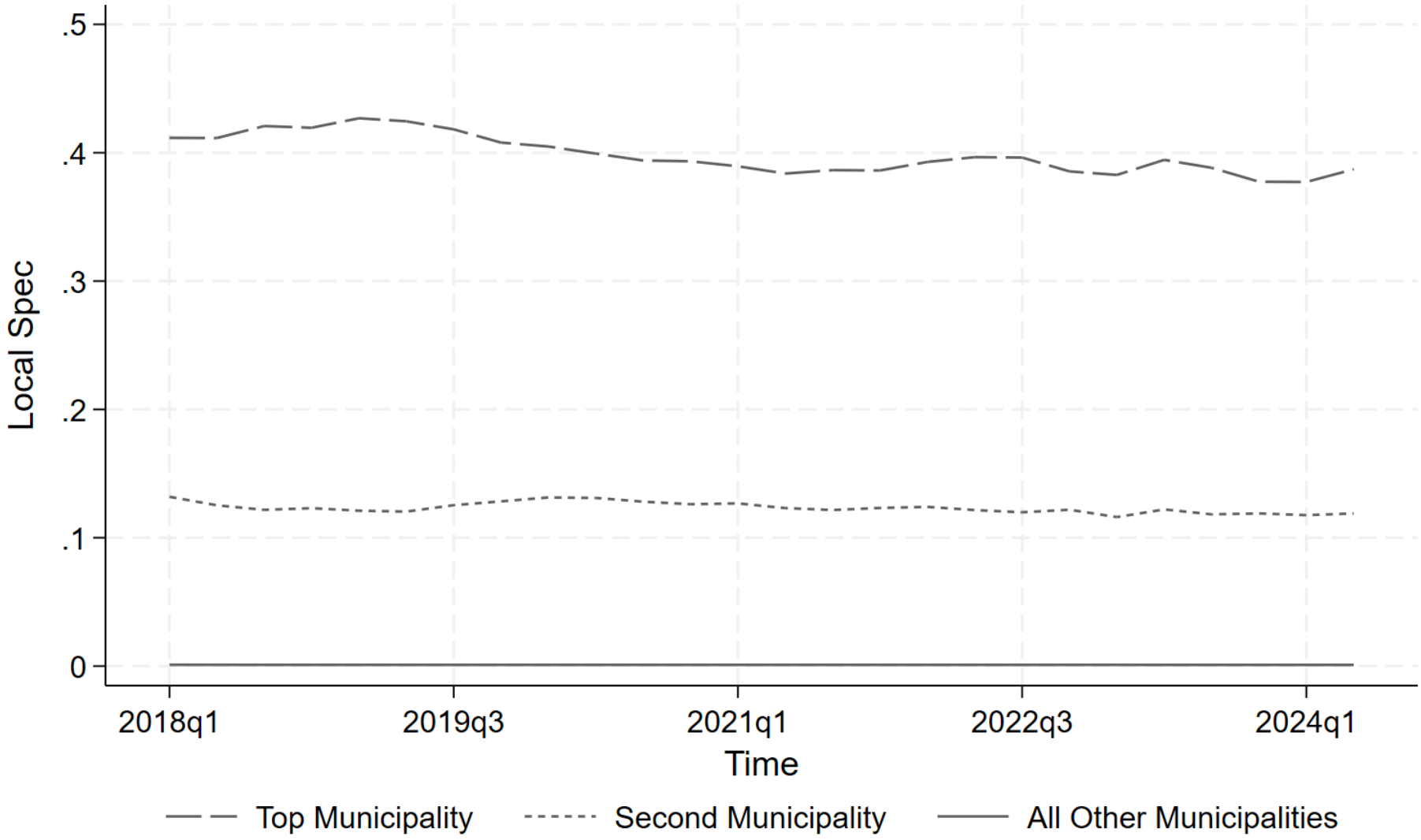
Data: Top munis



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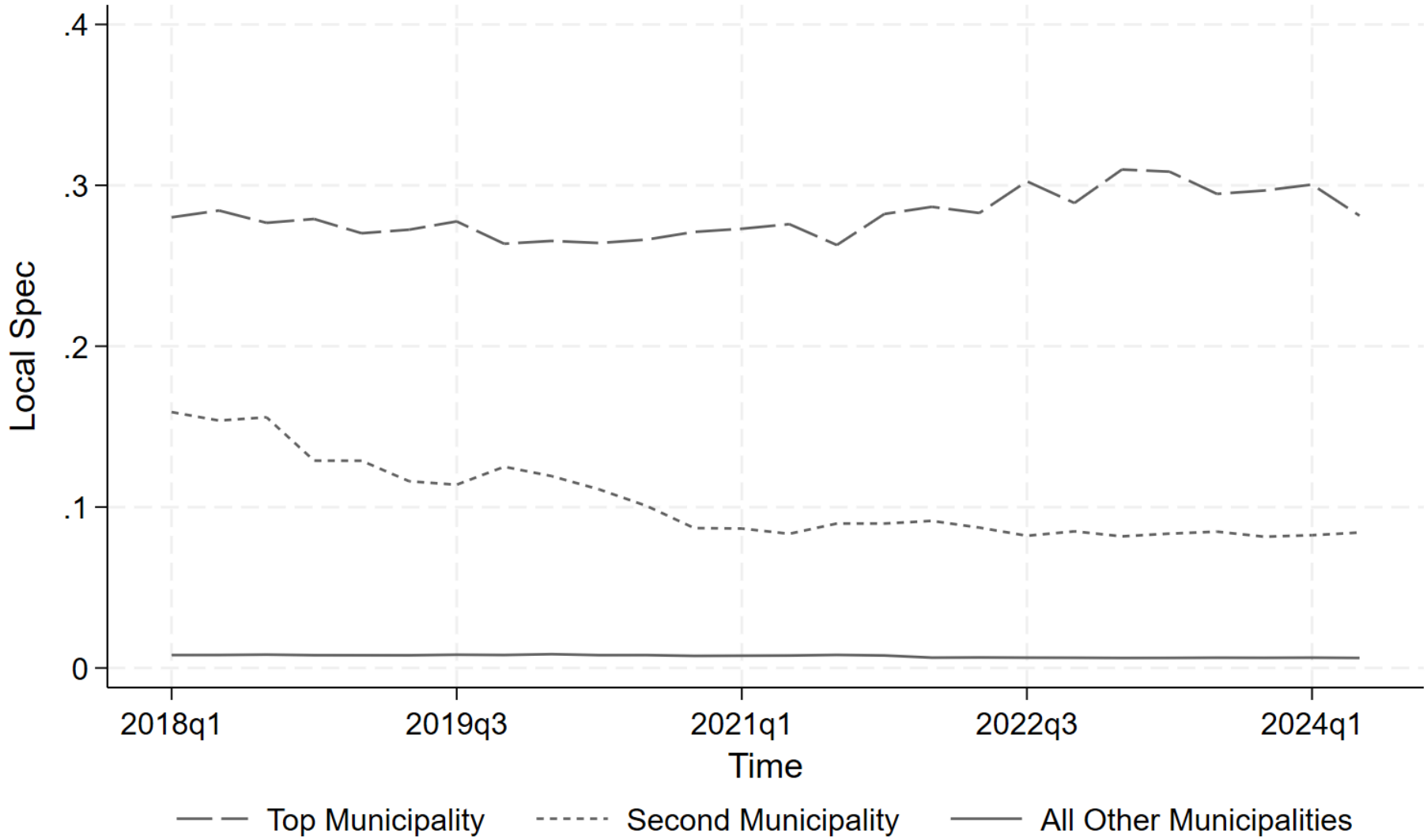
Data: Top munis (weighted average)



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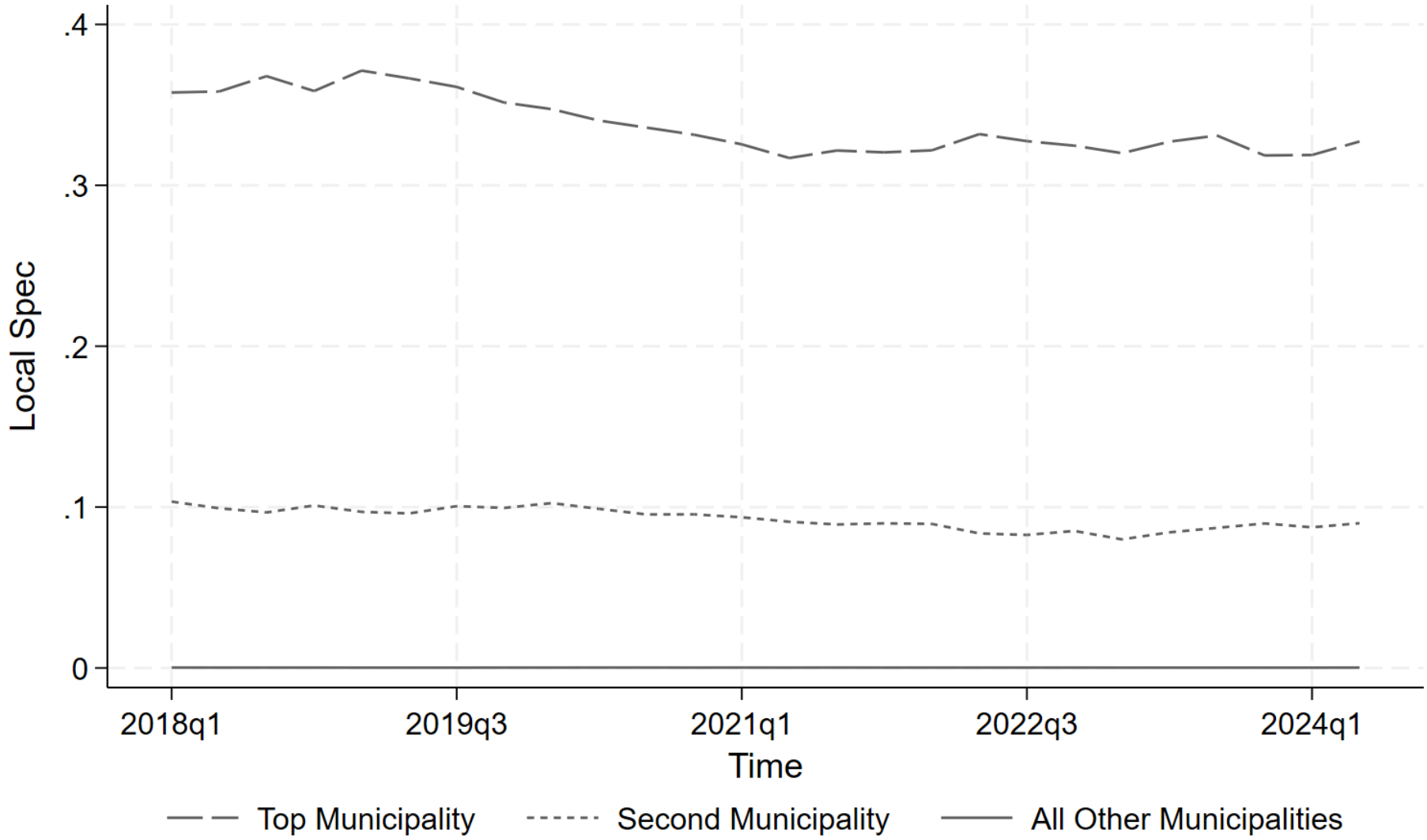
Data: Top munis (excess)



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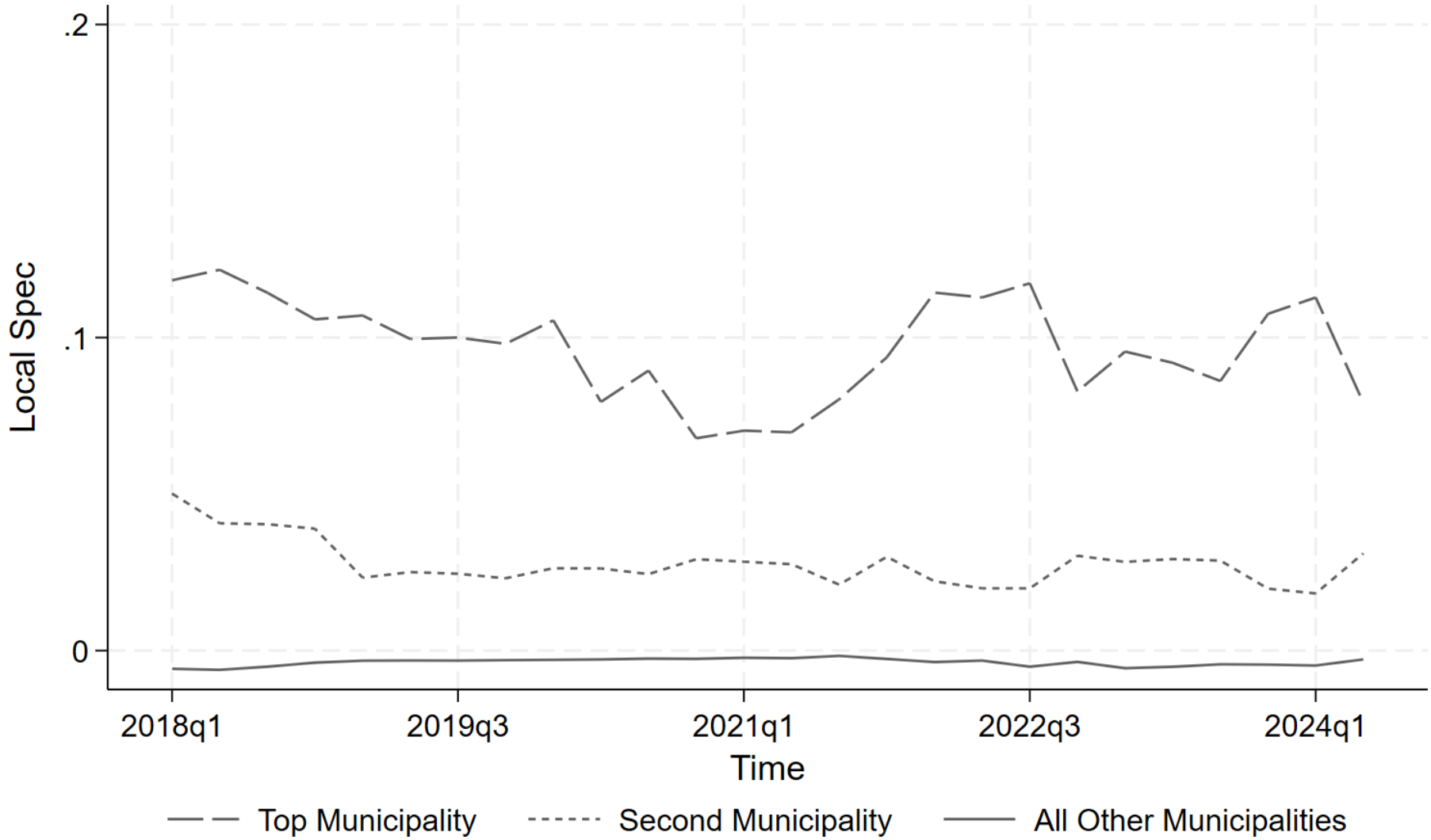
Data: Top munis (excess weighted average)



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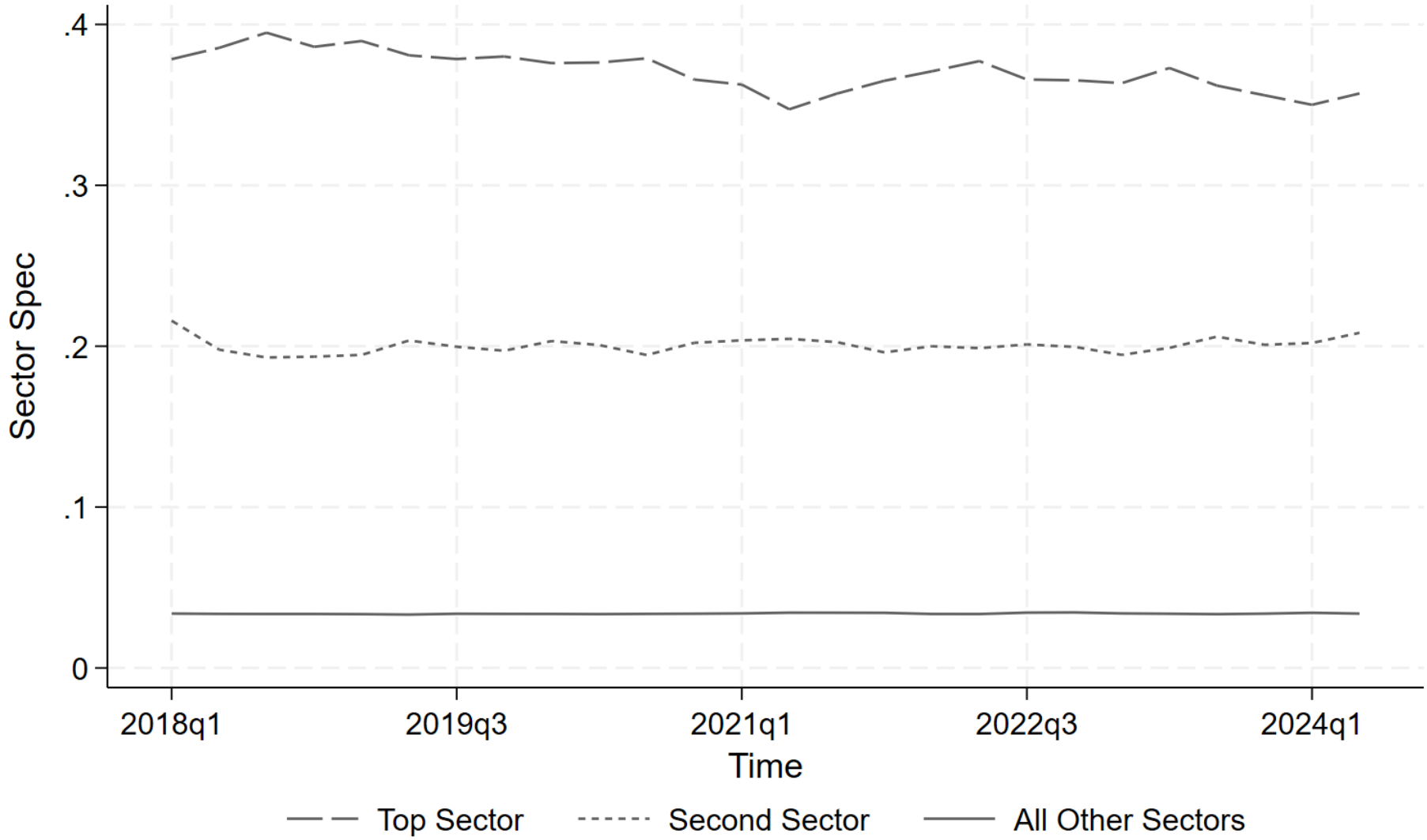
Data: Top sectors



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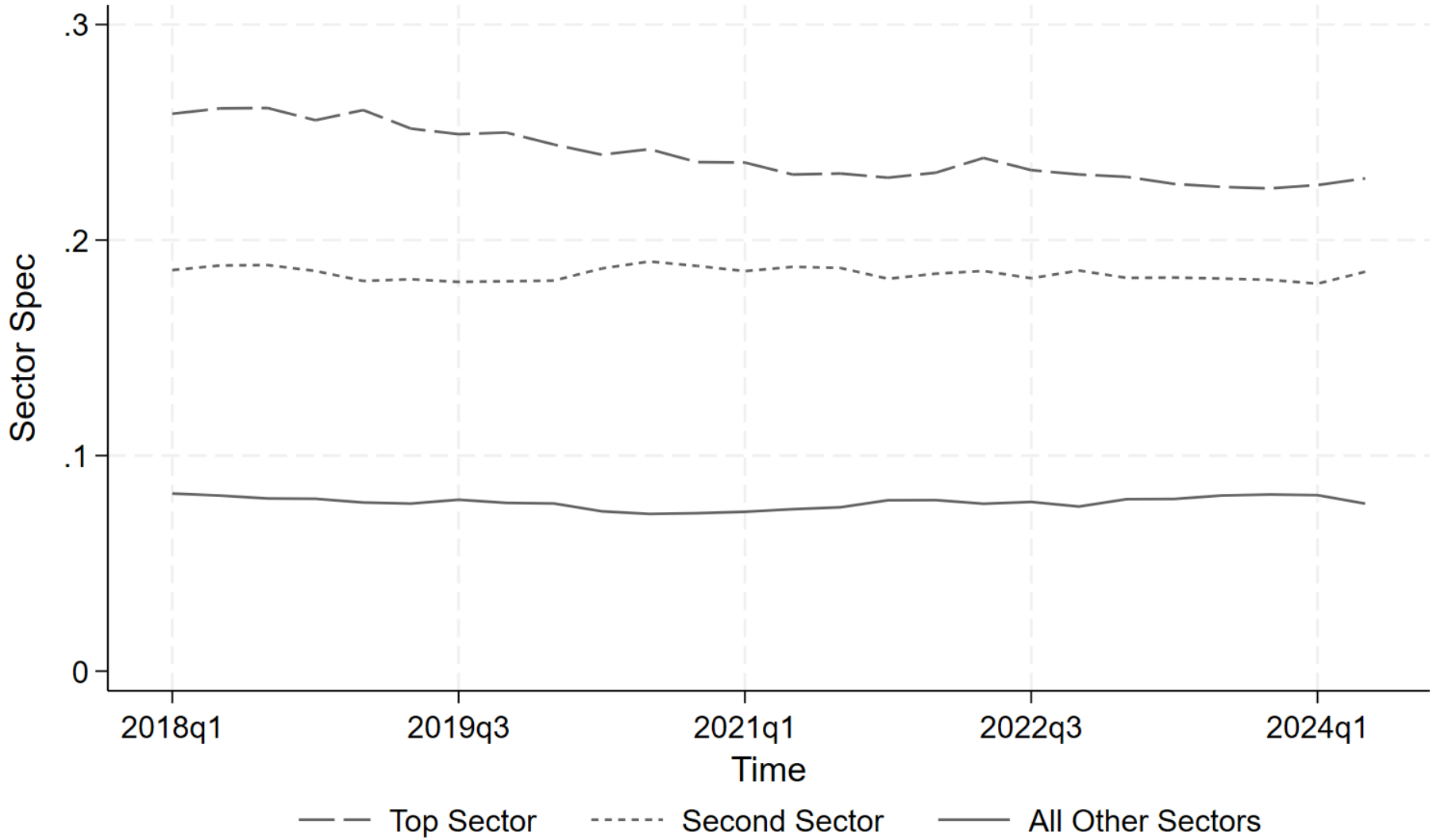
Data: Top sectors (weighted average)



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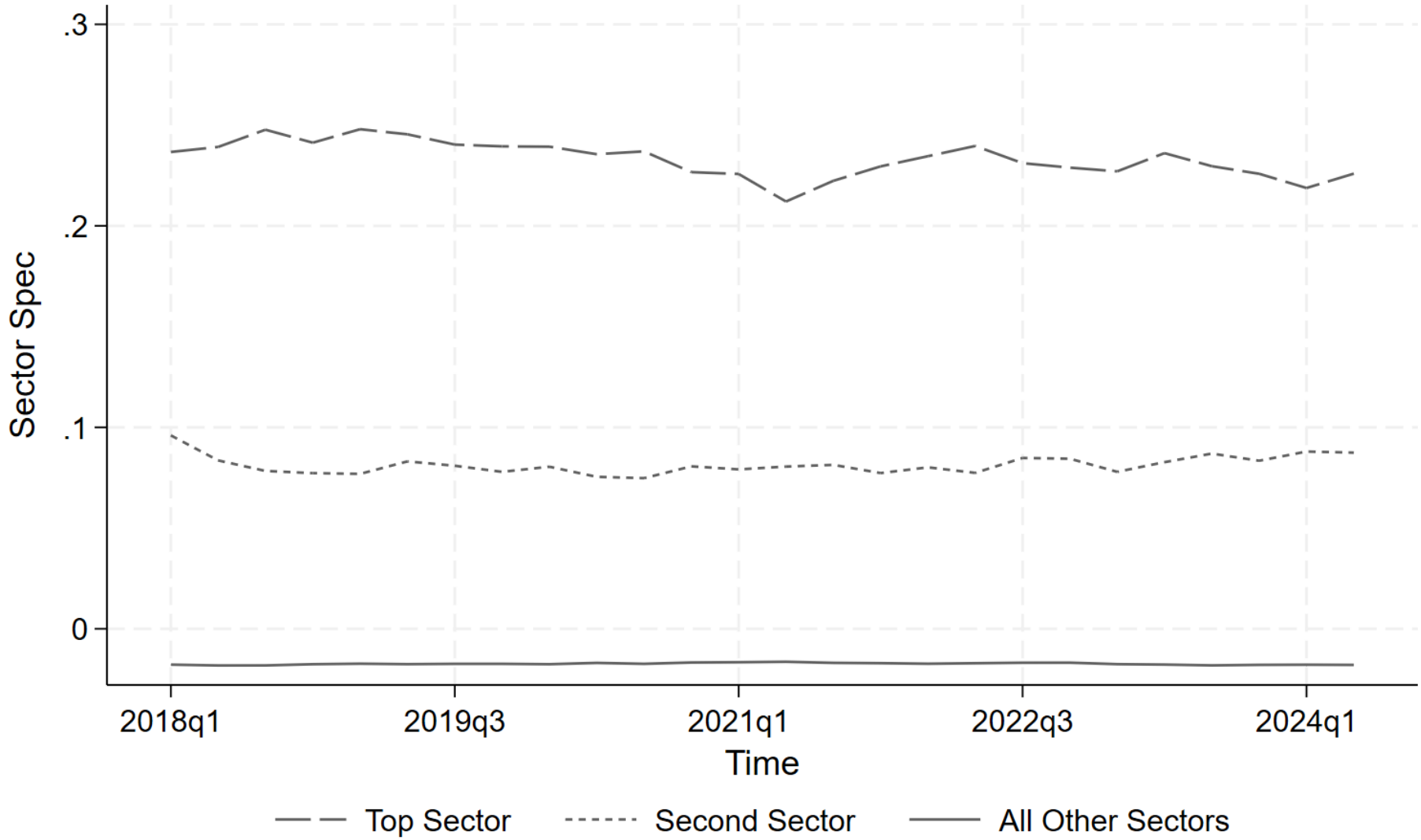
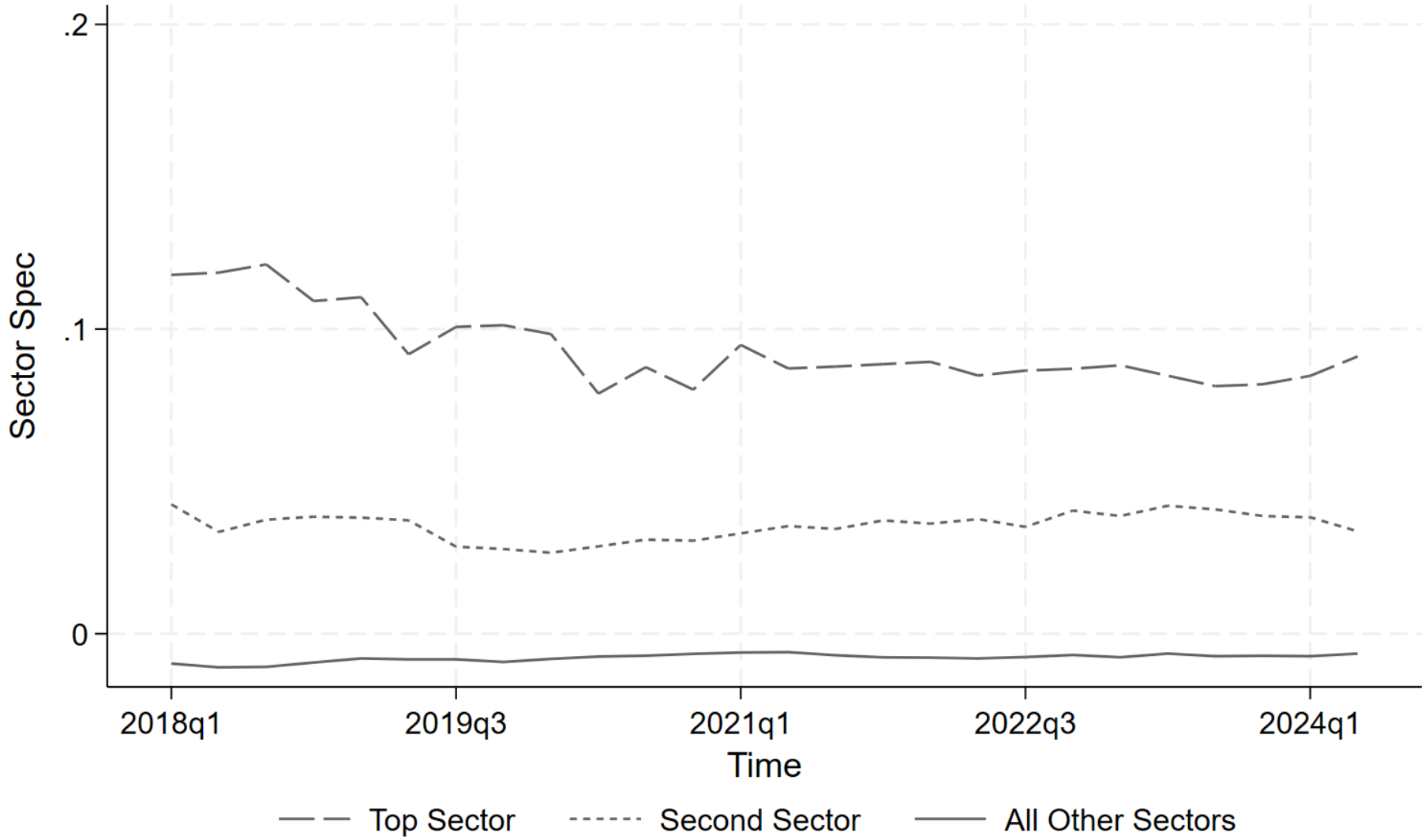
Data: Top sectors (excess)



▸ Back

Data: Top sectors (excess weighted average)



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Loan default: Firm size

- Firm size distinction
  - **Micro**: Fewer than 10 persons & whose annual turnover and/or annual balance sheet total does not exceed €2 million
  - If not micro, **small**: Fewer than 50 persons & whose annual turnover and/or annual balance sheet total does not exceed €10 million
  - If not small, **medium**: Fewer than 250 persons & whose annual turnover does not exceed €50 million and/or annual balance sheet total does not exceed €43 million
  - If not medium, **large**

- *Circular 2/2023, de 17 de marzo, del Banco de España*
  - Applying the criteria on the *European Commission Recommendation of 6 May 2003 (2003/361/EC)*

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Loan default: Interpretation main result (excess spec)

- Micro & small firms (column 1) ▸ Table
  - ▷ New loan in bank's **fav. muni** would be **0.71 p.p.** less likely to default than a loan in any other muni & bank
  - ▷ Average default rate of new loans to micro & small firms = 1.7%
  - ▷ In fav. muni 41.8% less likely to default than avg. loan

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Loan default: Interpretation main result (excess spec)

- Medium & large firms (non-reported)
  - ▷ New loan in bank's **fav. sector** would be **0.48 p.p.** less likely to default than a loan in any other sector & bank
  - ▷ Average default rate of new loans to medium & large firms = 0.5%
  - ▷ In fav. muni 95.5% less likely to default than avg. loan

- *Blickle et al. (2023)* U.S. sample
  - ▷ Column 3 Table 3: Bank-time & sector-time f.e., loan amount & interest rate controls
  - ▷ New loan in bank's **fav. sector** would be **0.97 p.p.** less likely to default than a loan in any other sector & bank
  - ▷ Average default rate of new loans = 4%
  - ▷ In fav. sector 24.25% less likely to default than avg. loan

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Loan default: Examples of main result

- Bank specializing in **Alcobendas** and **Trade & Repair** sector (NT)
- Within this municipality and sector
  - 1 innovative **small** firm selling electric motorcycles
  - 1 prominent **large** firm with a focus on electric variants and selling points across the country
- Local- & sector-specific info. advantages for assessing credit risk
  - **Local** info. (might be) particularly relevant for assessing **micro** firm
  - E.g., regional economic conditions, local car pollution restrictions
  - **Sector** info. (might be) particularly relevant for assessing **large** firm
  - E.g., advancements in battery pollution efficiency, fluctuations in lithium-ion battery prices, and supply chain disruptions

▸ Back

Loan default: Examples of main result

- Bank specializing in **Yecla** and **Manufacturing** sector (T)

- Within this municipality and sector
  - 1 **micro** firm manufacturing furniture
  - 1 **large** firm manufacturing furniture

- Local- & sector-specific info. advantages for assessing credit risk
  - **Local** info. (might be) particularly relevant for assessing **micro** firm
  - E.g., regional changes in demand related to house construction and supply, increased competition from new local manufacturers, local economic downturns that can reduce consumer spending on non-essential items like furniture
  - **Sector** info. (might be) particularly relevant for assessing **large** firm
  - E.g., technological advancements and innovations, changes in global economic conditions such as trade policies, tariffs, and international market dynamics

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Province of investment: 2024q2

- Micro & small firms
  - Only 8.3% of active loans granted to invest in diff. province to firm HQ
  - 201,123 loans out of 2,424,580
  - Micro firms only 7.7%

- Medium & large firms
  - 17.6% of active loans granted to invest in diff. province to firm HQ
  - 157,686 loans out of 738,433
  - More than the double relative to micro & small firms
  - Large firms 19.72%

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Loan default: Sector heterogeneity

- Loan default, local specialization and sector heterogeneity
- T/NT classification in the spirit of *Mian et al. (2020)* ▸ Figure & Table
- Micro and small firms
  - ▷ Negative relationship for 11/17 main sectors (7 stat. sign. 10% level)
  - ▷ Negative relationship for 6/9 NT sectors (water and sewerage and trade and repair stat. sign. 10% level)
  - ▷ Negative relationship for trade & repair (NT) and manufacturing (T) that account for over 60% of new loans (stat. sign. 1% level)
- Medium and large firms
  - ▷ Negative relationship for 7/17 main sectors (1 stat. sign. 10% level)
  - ▷ Negative relationship for 3/9 NT sectors (none stat. sign. 10% level)
  - ▷ NO negative relationship for trade & repair and manufacturing

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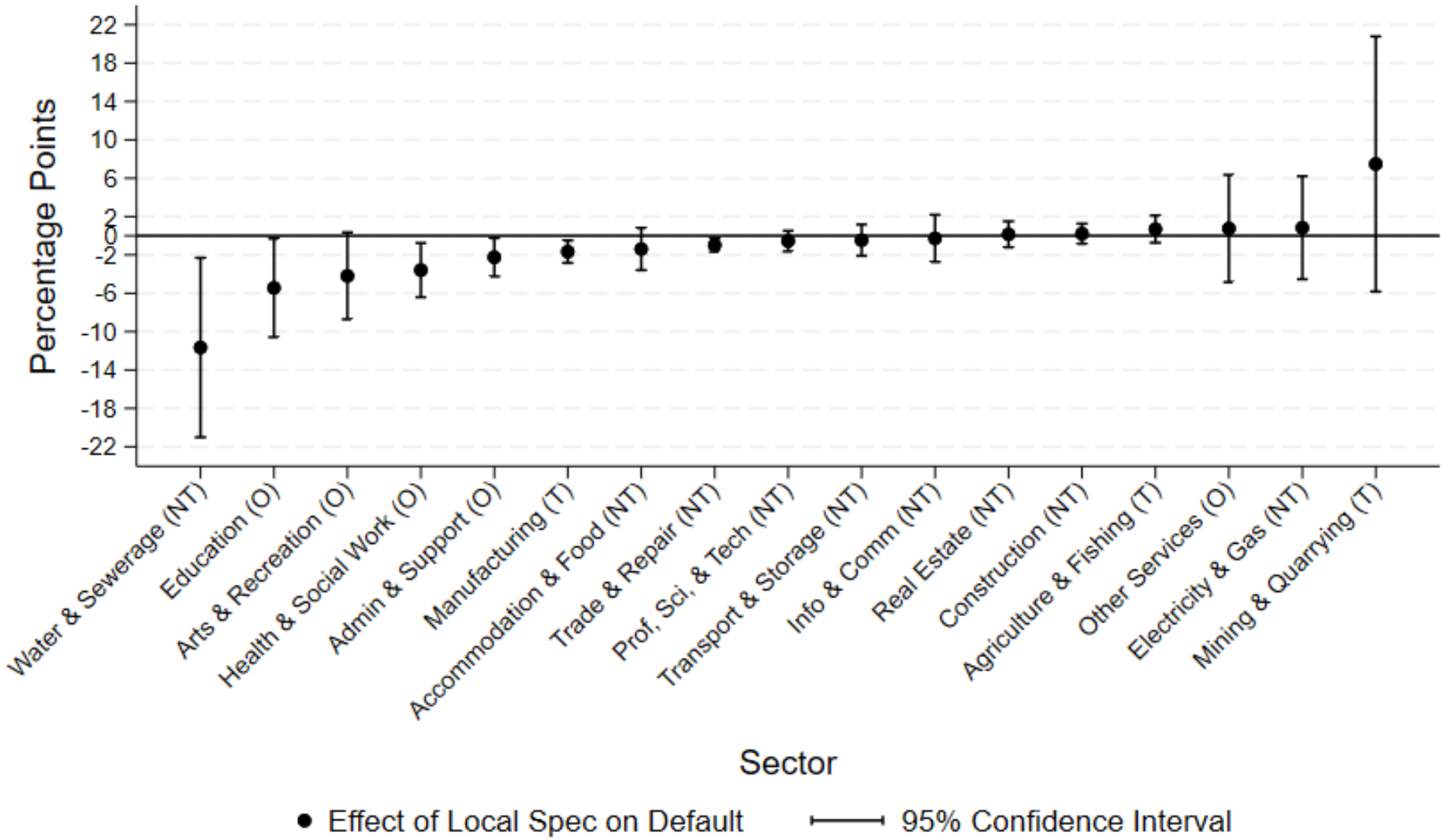
Loan default: Local spec & sectors (MicroSmall)



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Loan default: Local spec & sectors (MicroSmall)

	Default									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Local Spec	-0.295**	-0.138**	-0.106*	-0.0907**	-0.0569**	-0.0421***	-0.0413	-0.0351	-0.0245***	-0.0142
	(0.121)	(0.0663)	(0.0584)	(0.0365)	(0.0258)	(0.0152)	(0.328)	(0.0284)	(0.00897)	(0.0138)
Observations	18,654	37,025	42,425	61,893	152,951	1,149,108	212	208,115	2,431,291	308,269
R-squared	0.468	0.272	0.254	0.199	0.233	0.208	0.577	0.173	0.126	0.157
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall
Sector	Water & Sewerage	Education	Arts & Recreation	Health & Social Work	Admin & Support	Manufacturing	Extraterrestrial Orgs	Accomodation & Food	Trade & Repair	Prof, Sci, & Tech
Sector Type	NT	O	O	O	O	T	O	NT	NT	NT

	Default								
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Local Spec	-0.0117	-0.00689	0.00379	0.00538	0.0175	0.0190	0.0211	0.178	0.189
	(0.0211)	(0.0317)	(0.0175)	(0.0135)	(0.0184)	(0.0722)	(0.0693)	(0.307)	(0.172)
Observations	318,753	106,597	103,574	551,234	146,553	53,735	12,750	226	10,083
R-squared	0.270	0.191	0.171	0.211	0.319	0.345	0.439	0.542	0.614
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall
Sector	Transport & Storage	Info & Comm	Real Estate	Construction	Agriculture & Fishing	Other Services	Electricity & Gas	Household Activities	Mining & Quarr
Sector Type	NT	NT	NT	NT	T	O	NT	O	T

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Loan default: Local spec & sectors (MediumLarge)

	Default								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Local Spec	0.0442	0.0495	0.205**	-0.0889	0.0788	0.0141*	0.0318	0.00584	0.0139
	(0.0695)	(0.0406)	(0.0894)	(0.0572)	(0.0538)	(0.00823)	(0.0607)	(0.00856)	(0.0285)
Observations	27,256	9,387	8,465	34,752	230,496	967,517	69,358	1,467,494	78,630
R-squared	0.736	0.434	0.446	0.359	0.368	0.319	0.357	0.338	0.238
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge
Sector	Water & Sewerage	Education	Arts & Recreation	Health & Social Work	Admin & Support	Manufacturing	Accomodation & Food	Trade & Repair	Prof, Sci, & Tech
Sector Type	NT	O	O	O	O	T	NT	NT	NT

	Default							
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Local Spec	-0.00326	0.0868*	-0.0284	0.0617	-0.0402	-0.253**	-0.0181	-0.0731
	(0.0185)	(0.0466)	(0.0720)	(0.0461)	(0.0358)	(0.128)	(0.0125)	(0.263)
Observations	163,139	53,038	13,122	386,211	49,459	7,672	57,632	6,016
R-squared	0.435	0.308	0.334	0.439	0.438	0.396	0.403	0.651
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge	MedLarge
Sector	Transport & Storage	Info & Comm	Real Estate	Construction	Agriculture & Fishing	Other Services	Electricity & Gas	Mining & Quarr
Sector Type	NT	NT	NT	NT	T	O	NT	T

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Loan default: Showing controls

	Default						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local Spec	-0.0103***	-0.0210***	0.0109	-0.0213***	-0.0189**	0.0115	0.00142
	(0.00395)	(0.00500)	(0.00672)	(0.00613)	(0.00842)	(0.00865)	(0.0119)
Local MktSh	-0.00809***	-0.0105***	-3.91e-05	-0.0139***	-0.00844***	-0.00401	0.00797**
	(0.00115)	(0.00136)	(0.00203)	(0.00184)	(0.00205)	(0.00252)	(0.00335)
Sector Spec	0.00214	0.0100***	-0.0198***	0.0159***	-0.00267	-0.0143*	-0.0374**
	(0.00260)	(0.00303)	(0.00682)	(0.00389)	(0.00531)	(0.00739)	(0.0174)
Sector MktSh	0.00660	-0.00299	0.0354**	-0.00845	0.0141	0.0676***	-0.0145
	(0.00540)	(0.00559)	(0.0173)	(0.00659)	(0.0107)	(0.0237)	(0.0200)
Secured	0.00183	0.00324**	-0.00212	0.00146	0.00707***	0.000153	-0.00453***
	(0.00125)	(0.00159)	(0.00135)	(0.00200)	(0.00260)	(0.00221)	(0.00148)
RelLength	-0.000197***	-0.000250***	-6.37e-05***	-0.000379***	-0.000118***	-6.11e-05***	-6.14e-05***
	(3.66e-06)	(4.12e-06)	(7.49e-06)	(5.61e-06)	(6.15e-06)	(1.10e-05)	(9.61e-06)
Amount	-8.72e-05*	-0.000221***	-7.89e-05	-3.14e-05	-0.000361***	0.000172	-0.000313***
	(4.75e-05)	(8.17e-05)	(5.60e-05)	(0.000111)	(0.000116)	(0.000122)	(4.83e-05)
Interest rate	0.00181***	0.00185***	0.00182***	0.00189***	0.00188***	0.00171***	0.00200***
	(5.03e-05)	(5.49e-05)	(0.000139)	(6.76e-05)	(9.47e-05)	(0.000152)	(0.000291)
ProductType2	-0.0291***	-0.0402***	-0.00661***	-0.0552***	-0.0228***	-0.00626**	-0.00701***
	(0.00135)	(0.00169)	(0.00164)	(0.00216)	(0.00274)	(0.00254)	(0.00211)
ProductType3	0.00101***	0.00101***	0.00158**	-0.000715*	0.00325***	0.00250***	-0.000439
	(0.000270)	(0.000313)	(0.000640)	(0.000380)	(0.000530)	(0.000963)	(0.000944)
ProductType4	-0.00253***	-0.00311***	-0.00226***	-0.00434***	-0.00219***	-0.00246***	-0.00290***
	(0.000402)	(0.000564)	(0.000564)	(0.000965)	(0.000691)	(0.000761)	(0.000967)
ProductType5	-0.0124***	-0.0146***	-0.00527***	-0.0162***	-0.0125***	-0.00426***	-0.00787***
	(0.000476)	(0.000560)	(0.000867)	(0.000836)	(0.000712)	(0.00105)	(0.00152)
Maturity	0.00113***	0.00130***	0.000565***	0.00142***	0.00113***	0.000630***	0.000417***
	(1.25e-05)	(1.48e-05)	(2.44e-05)	(1.85e-05)	(2.58e-05)	(3.21e-05)	(3.63e-05)
Observations	9,350,812	5,717,604	3,633,052	2,868,821	2,848,603	1,842,658	1,790,200
R-squared	0.204	0.180	0.337	0.158	0.229	0.325	0.370
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	All	MicroSmall	MedLarge	Micro	Small	Medium	Large

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Loan default: Interpretation main result

- **Micro & small firms** (column 2)
  - New loan in bank's **fav. muni** would be **0.83 p.p.** less likely to default than a loan in any other muni & bank
  - $-0.83\% = -0.0083 = -0.0210 \times (0.396 - 0.001)$
  - Average default rate of new loans to micro & small firms $= 1.7\%$
  - In fav. muni **48.82%** less likely to default than avg. loan
  - $-48.82\% = -0.4882 = -0.0083/0.017$

- **Medium & large firms** (column 3)
  - New loan in bank's **fav. sector** would be **0.64 p.p.** less likely to default than a loan in any other sector & bank
  - Average default rate of new loans to medium & large firms $= 0.5\%$
  - In fav. sector **128%** less likely to default than avg. loan

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Loan default: Micro & small different fixed effects

	Default				
	(1)	(2)	(3)	(4)	(5)
Local Spec	-0.0155***	-0.0198***	-0.0210***	-0.00800	
	(0.00455)	(0.00490)	(0.00500)	(0.00537)	
Local Spec d4					-0.00536***
					(0.000930)
Local Spec d3					-0.00445***
					(0.000826)
Local Spec d2					-0.00400***
					(0.000800)
Observations	5,921,551	5,783,376	5,717,604	5,714,426	5,714,426
R-squared	0.065	0.144	0.180	0.189	0.189
Bank-Quarter FE	Y	Y	Y	N	N
Bank-Province-Quarter FE	N	N	N	Y	Y
MT FE	Y	N	N	N	N
IT FE	Y	N	N	N	N
MIT FE	N	Y	N	N	N
MIST FE	N	N	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MicroSmall	MicroSmall	MicroSmall	MicroSmall	MicroSmall
Period	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2

- **Local** specialization associated with better loan default of **micro & small** firms
  - ▷ Holds for different set of fixed effects included

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Information: Regulation EU 575/2013

- Determined in accordance with articles 160, 173, 179, and 180 of Regulation (EU) number 575/2013

- "An institution's own estimates of the risk parameters PD, LGD, conversion factor and EL shall incorporate all relevant data, information and methods"
  - "The estimates shall be derived using both historical experience and empirical evidence, and not based purely on judgemental considerations"
  - "The less data an institution has, the more conservative it shall be in its estimation"
  - "An institution's estimates shall reflect the implications of technical advances and new data and other information, as it becomes available"
  - "Institutions shall review their estimates when new information comes to light but at least on an annual basis"

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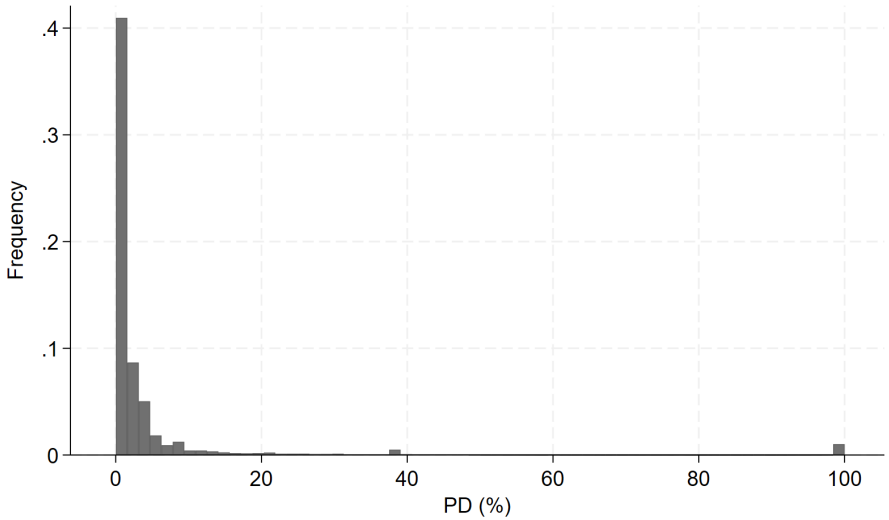
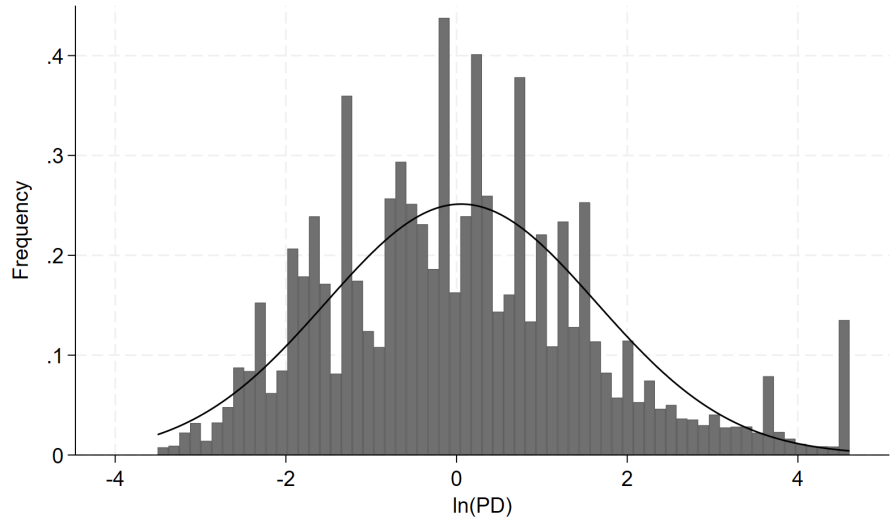
Information: PD MicroSmall





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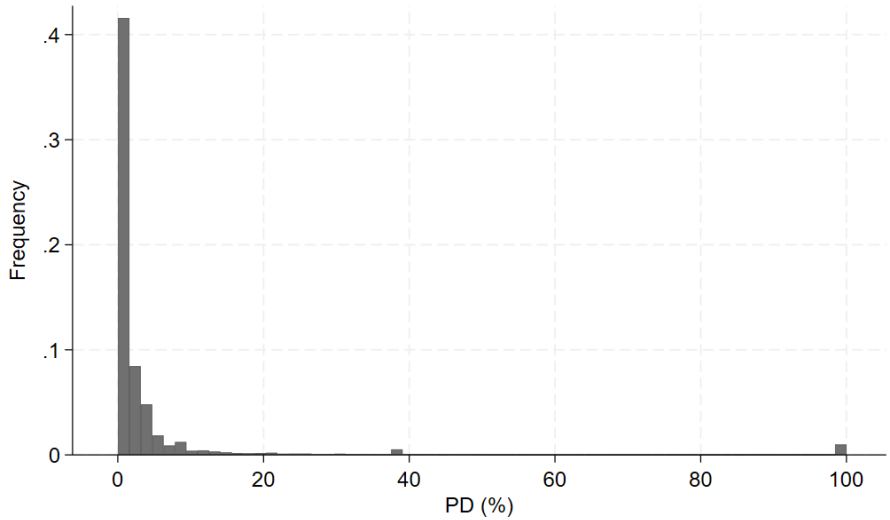
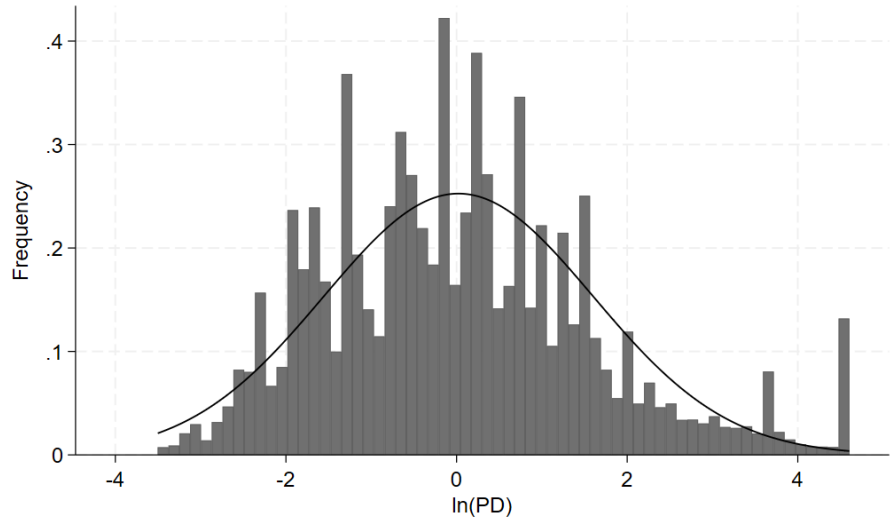
Information: PD All firms





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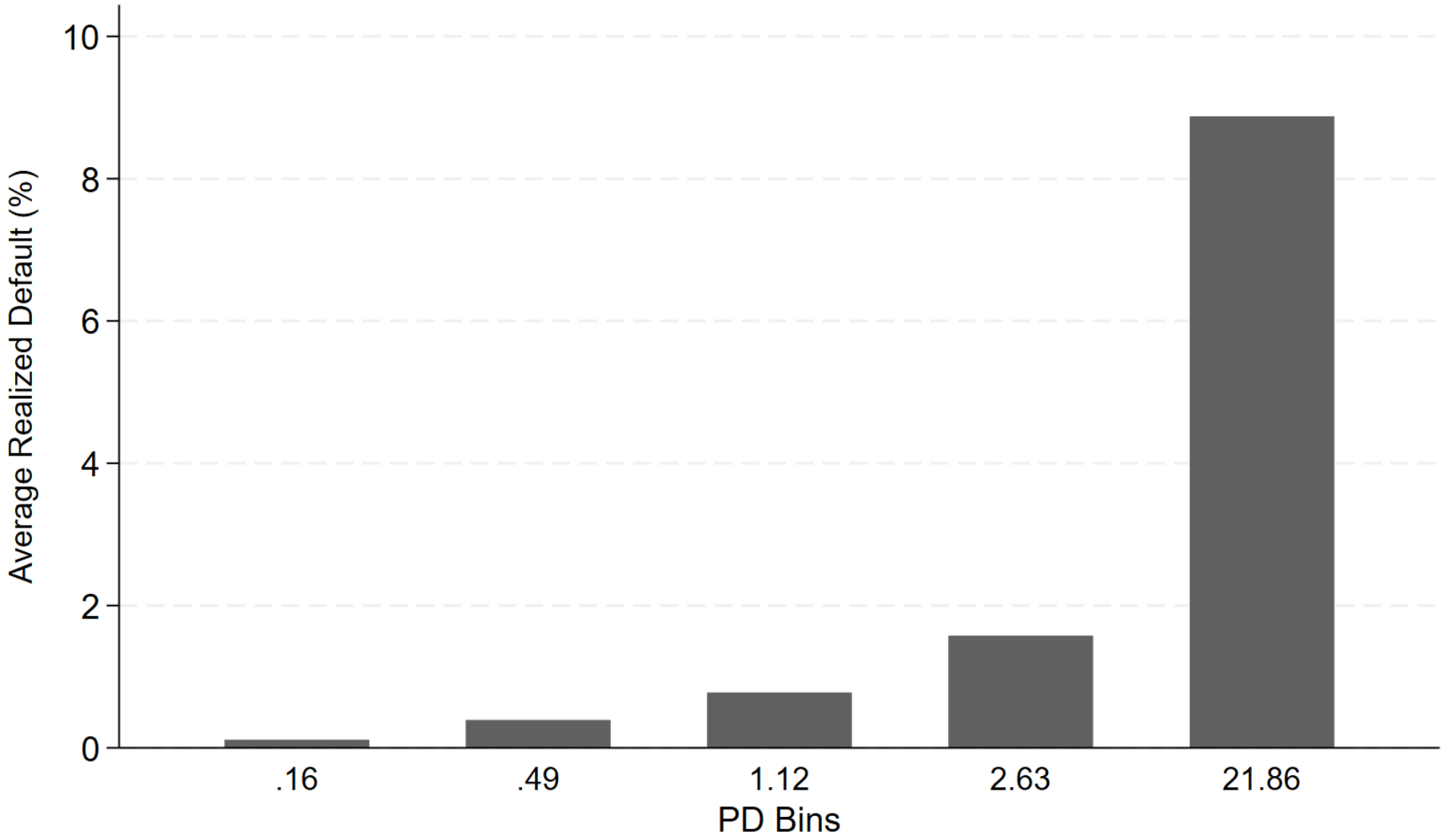
Information: PD and 1 year default micro & small firms



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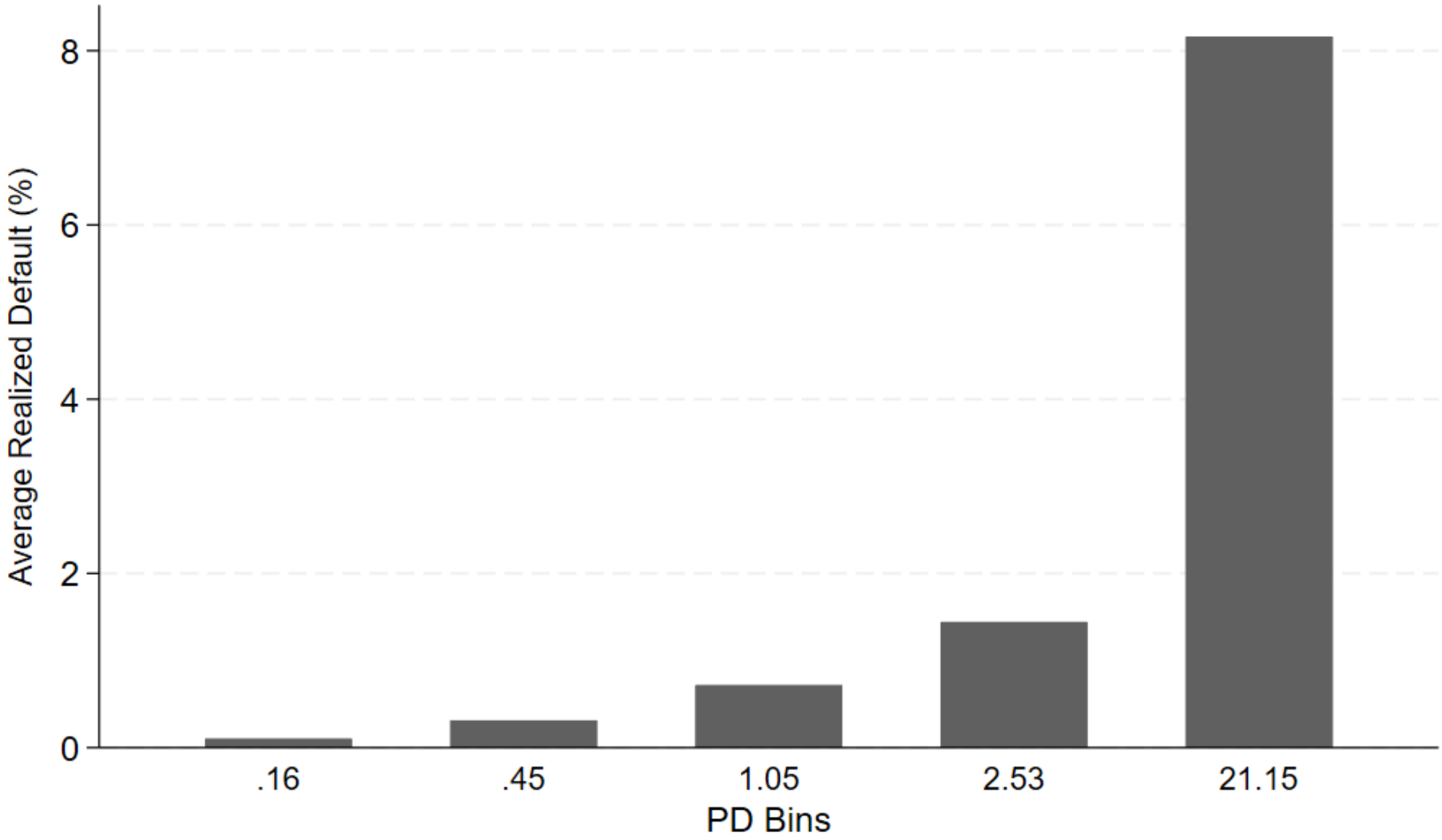
Information: PD and 1 year default



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Information: Local & sector specialization of IRB banks

	Top municipality or sector					All other municipalities or sectors				
Specialization type	mean	p25	p50	p75	sd	mean	p25	p50	p75	sd
Local Spec (municipality)	0.255	0.231	0.254	0.276	0.044	0.000	0.000	0.000	0.000	0.002
Sector Spec (20 sectors)	0.206	0.183	0.196	0.226	0.031	0.042	0.006	0.022	0.062	0.049
Local Excess Spec (municipality)	0.054	0.020	0.038	0.079	0.044	0.000	0.000	0.000	0.000	0.001
Sector Excess Spec (20 sectors)	0.043	0.020	0.031	0.043	0.033	-0.002	-0.004	0.000	0.002	0.011

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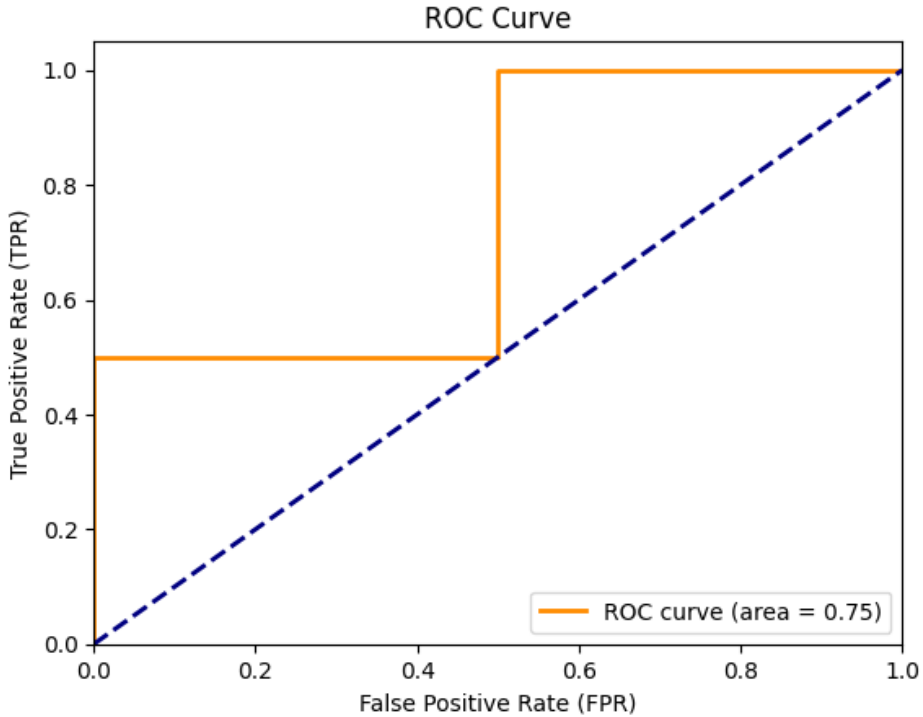
Information: Example of a simple ROC curve

- Realized ex-post default: [0, 0, 1, 1]
  - Estimated PD: [0.1, 0.4, 0.35, 0.8] → Thresholds: [0.8, 0.4, 0.35, 0.1]

- TPR=TP/(TP+FN) and FPR=FP/(FP+TN) for every threshold
  - If PD>=threshold → classified as defaulting ex-post
  - E.g., threshold=0.8 → Classification: [0, 0, 0, 1]
  - TP=1, FP=0, TN=2, FN=1 → TPR=0.5 FPR=0



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Information: Example of a simple ROC curve

- Thresholds: [0.8, 0.4, 0.35, 0.1] + threshold higher than max PD
- Threshold>0.8 → Classification: [0, 0, 0, 0]
  - ▷ TP=0, FP=0, TN=2, FN=2 → TPR=0 FPR=0
- Threshold=0.8 → Classification: [0, 0, 0, 1]
  - ▷ TP=1, FP=0, TN=2, FN=1 → TPR=0.5 FPR=0
- Threshold=0.4 → Classification: [0, 1, 0, 1]
  - ▷ TP=1, FP=1, TN=1, FN=1 → TPR=0.5 FPR=0.5
- Threshold=0.35 → Classification: [0, 1, 1, 1]
  - ▷ TP=2, FP=1, TN=1, FN=0 → TPR=1 FPR=0.5
- Threshold=0.1 → Classification: [1, 1, 1, 1]
  - ▷ TP=2, FP=2, TN=0, FN=0 → TPR=1 FPR=1

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Information: Local specialization micro & small firms

	Default1y									
	Main		Province		Spec MicroSmall		Defaultdud1y		Controls	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PDMax	PDMin	PDMax	PDMin	PDMax	PDMin	PDMax	PDMin	PDMax	PDMin
ROC area	0.8338	0.8247	0.8352	0.8261	0.8354	0.8208	0.8383	0.8315	0.7817	0.7730
S.e.	(0.0028)	(0.0029)	(0.0028)	(0.0029)	(0.0028)	(0.0029)	(0.0016)	(0.0016)	(0.0036)	(0.0036)
Observations	399,457	399,457	399,474	399,474	399,448	399,448	399,457	399,457	399,457	399,457
H0: area(PDMax)=area(PDMin)										
Chi2(1)	7.67***		7.77***		19.58***		10.90***		10.06***	
Prob>chi2	0.0056		0.0053		0.0000		0.0010		0.0015	

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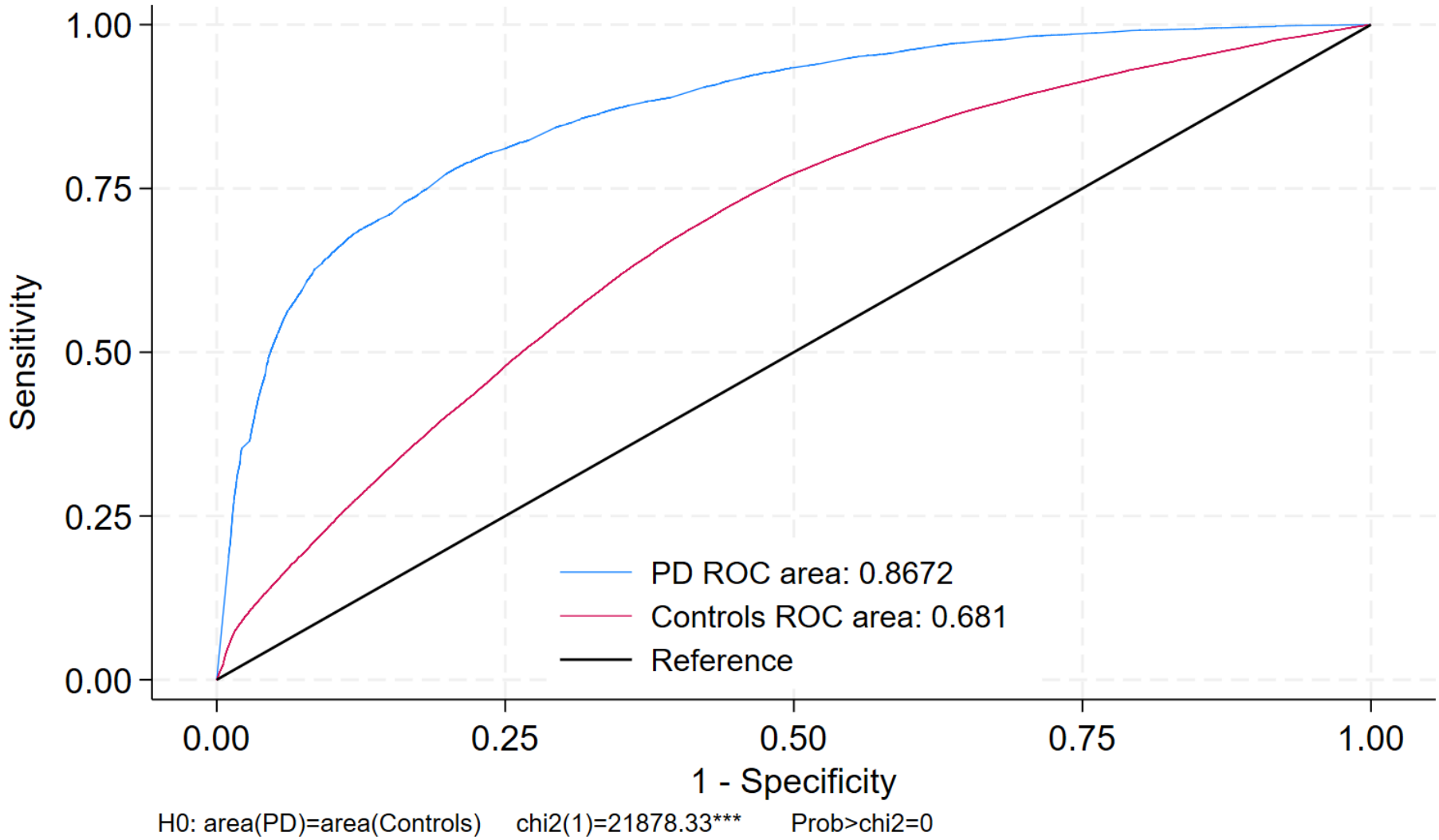
Information: PD vs. controls MicroSmall firms



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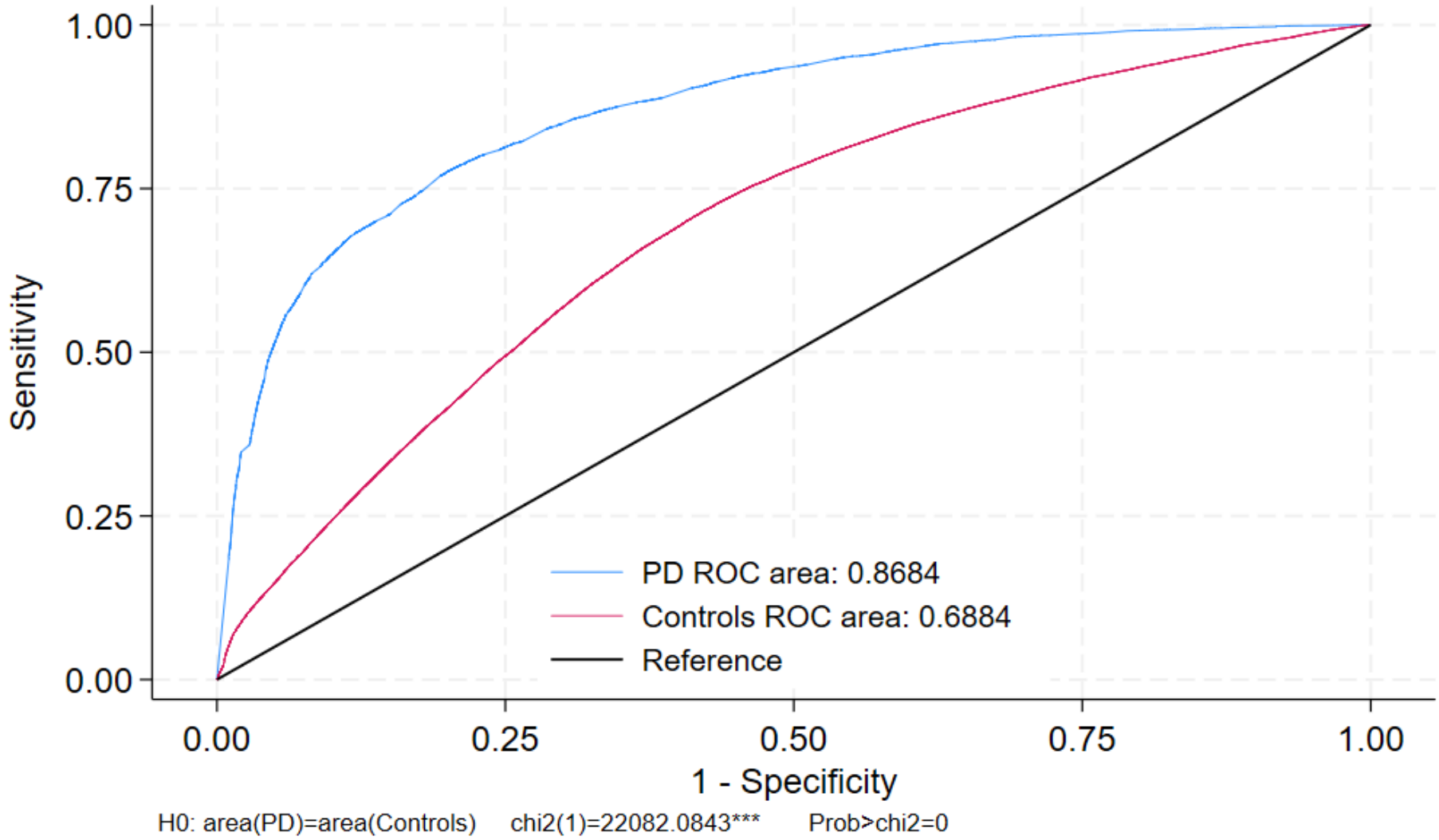
Information: PD vs. controls All firms



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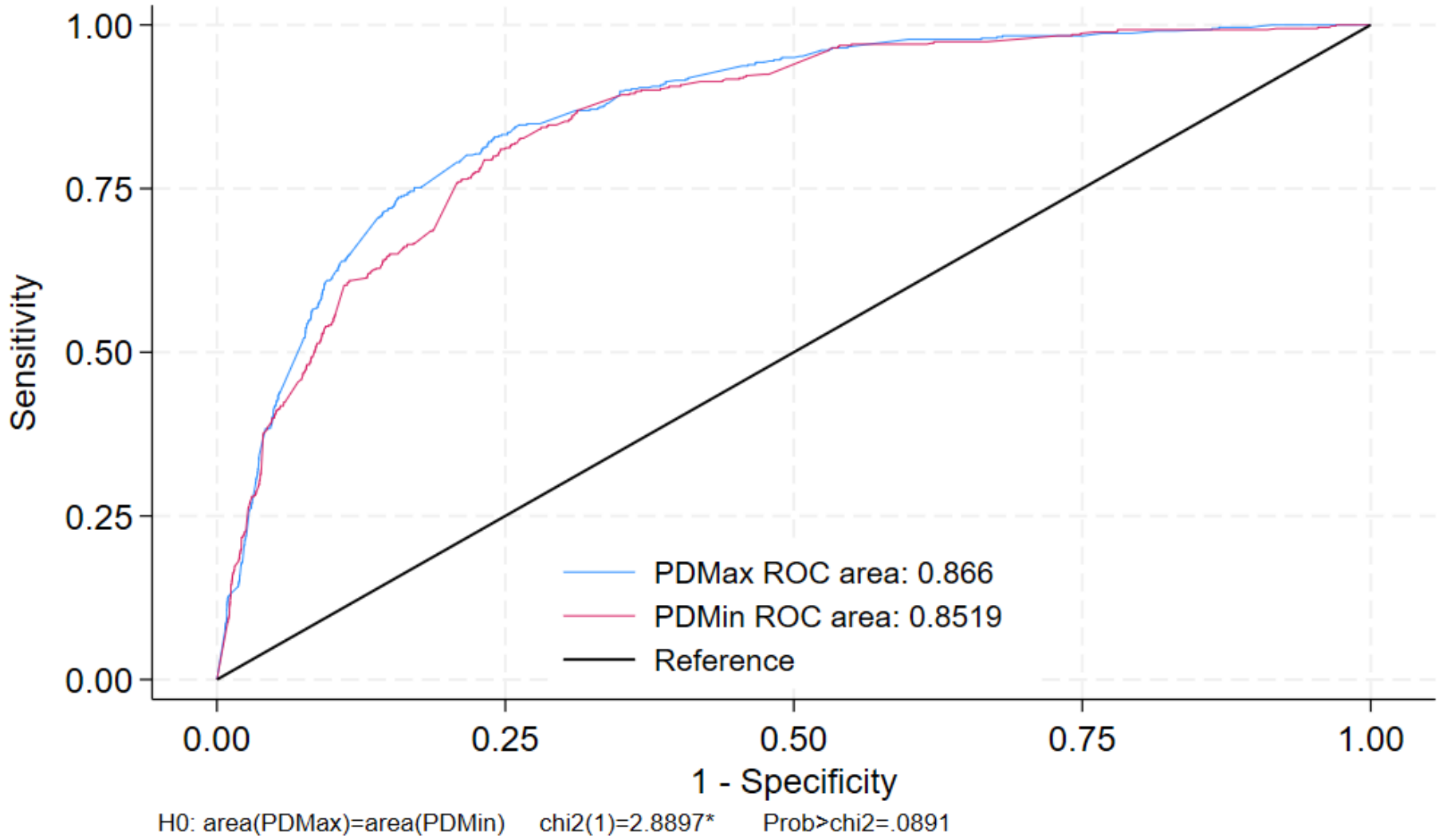
Information: NACE2d specialization medium & large firms



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Loan supply: Analysis

- Prior research was unable to identify a supply effect
  - ▷ "Unfortunately, we observe only originated loans and not loan applications" "Do not measure loan demand - only ex-post outcomes"
  - ▷ *Blickle et al. (2023)*

- **Suggestive evidence on supply related to bank specialization**
  - ▷ With the caveat that identifying assumption might not hold
  - ▷ "Firm credit demand is bank- and activity-specific"
  - ▷ *Paravisini et al., (2023)*

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Loan supply: Analysis

- Loan applications
  - In the spirit of *Jiménez et al. (2012, 2014, 2017)*
  - Credit information requests to CR if borrower applies for a loan
  - Within-firm comparison

- Simple example:
  - **Firm F** in muni M, year 2023 & month 1
  - Applies to both Bank 1 (local spec=0.2) & Bank 2 (local spec=0.05)
  - Both banks ask the CR for the SAME applicant info
  - If supply effect, Bank 1 grants with higher probability than Bank 2
  - In 2023 during months 1, 2, 3, or 4

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Loan supply: Baseline estimates

- Similar approach to *Jiménez et al. (2012)*

- Baseline regression:

$$\begin{aligned} AppGranted_{abfmit} = \omega_{bt} + \alpha_{ft} + \beta_1 LocalSpec_{bm,t-1} \\ + \beta_2 SectorSpec_{bi,t-1} \\ + \gamma Controls_{bfmit} + \epsilon_{abfmit} \end{aligned} \tag{2}$$

  - $AppGranted_{abfimt}$=1 if loan application (a) made by firm (f) to bank (b) at month (t) is granted from t to t+3
  - Firm is located in municipality (m) & belongs to sector (i)

- **Firm-month** (α_{ft}) **fixed effects**
  - In the spirit of *Khwaja and Mian (2008)*

- **Bank-month** (ω_{bt}) **fixed effects**

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Loan supply: **Micro & small** firms

	LoanGranted			
	(1)	(2)	(3)	(4)
Local Spec	0.204***	0.160***	0.0861**	0.109***
	(0.0348)	(0.0338)	(0.0425)	(0.0419)
Observations	200,031	200,031	198,810	198,810
R-squared	0.506	0.532	0.548	0.560
Bank-Month FE	N	N	Y	Y
Firm-Month FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Control RelLength	N	Y	N	Y
Cluster s.e.	Firm-Month	Firm-Month	Firm-Month	Firm-Month
Sample of firms	MicroSmall	MicroSmall	MicroSmall	MicroSmall
Period	2018m9-2024m6	2018m9-2024m6	2018m9-2024m6	2018m9-2024m6

- Column 4
  - Application in bank's **fav. muni** would be **4.3 p.p.** more likely to be granted than application by any other bank & muni
  - $4.3\% = 0.043 = 0.109 \times (0.396 - 0.001)$

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Loan supply: Robustness micro & small firms

	LoanGranted			
	Province&NACE2d	Spec MicroSmall	LoanGranted4m	LoanGranted5m
	(1)	(2)	(3)	(4)
Local Spec	0.0784***	0.133***	0.0990**	0.0952**
	(0.0198)	(0.0461)	(0.0425)	(0.0426)
Observations	209,416	196,137	198,810	198,810
R-squared	0.560	0.560	0.556	0.555
Bank-Month FE	Y	Y	Y	Y
Firm-Month FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Control RelLength	Y	Y	Y	Y
Cluster s.e.	Firm-Month	Firm-Month	Firm-Month	Firm-Month
Sample of firms	MicroSmall	MicroSmall	MicroSmall	MicroSmall
Period	2018m9-2024m6	2018m9-2024m6	2018m9-2024m6	2018m9-2024m6

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Loan rate: Micro & small firms

	Interest Rate	
	(1)	(2)
Local Spec	-0.0551	-0.0474
	(0.0791)	(0.0791)
Default		0.366***
		(0.0102)
Observations	5,717,604	5,717,604
R-squared	0.559	0.559
Bank-Quarter FE	Y	Y
MIST FE	Y	Y
Controls	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter
Sample of firms	MicroSmall	MicroSmall

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Loan supply: **Medium & large** firms

	LoanGranted			
	(1)	(2)	(3)	(4)
Sector Spec	0.125**	0.0969*	0.117	0.0994
	(0.0583)	(0.0561)	(0.0775)	(0.0762)
Observations	38,669	38,669	37,337	37,337
R-squared	0.534	0.572	0.628	0.642
Bank-Month FE	N	N	Y	Y
Firm-Month FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Control RelLength	N	Y	N	Y
Cluster s.e.	Firm-Month	Firm-Month	Firm-Month	Firm-Month
Sample of firms	MediumLarge	MediumLarge	MediumLarge	MediumLarge
Period	2018m9-2024m6	2018m9-2024m6	2018m9-2024m6	2018m9-2024m6

- Column 4
  - Application in bank's **fav. sector** would be **3.2 p.p.** more likely to be granted than application by any other bank & sector
  - Not statistically significant at conventional levels

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Loan rate: Medium & large firms

	Interest Rate	
	(1)	(2)
Sector Spec	-0.0505	-0.0444
	(0.105)	(0.105)
Default		0.416***
		(0.0361)
Observations	3,582,657	3,582,657
R-squared	0.849	0.849
Bank-Quarter FE	Y	Y
MIST FE	Y	Y
Controls	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter
Sample of firms	MedLarge	MedLarge

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Relationship lending

- Validity of results & benchmark
  - Using relationship lending
  - Extensively analyzed as a potential source of information for banks
  - *Bharath et al. (2011), Puri et al. (2017), Claessens et al. (2024)*

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Relationship lending

- Validity of results & benchmark
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  - *Bharath et al. (2011), Puri et al. (2017), Claessens et al. (2024)*

- Relationship length
  - Negative relationship with loan default
  - PD from rel. lender predicts better ex-post realized default
  - Loan application granted with higher prob. by the rel. lender
  - Stronger results for smaller firms

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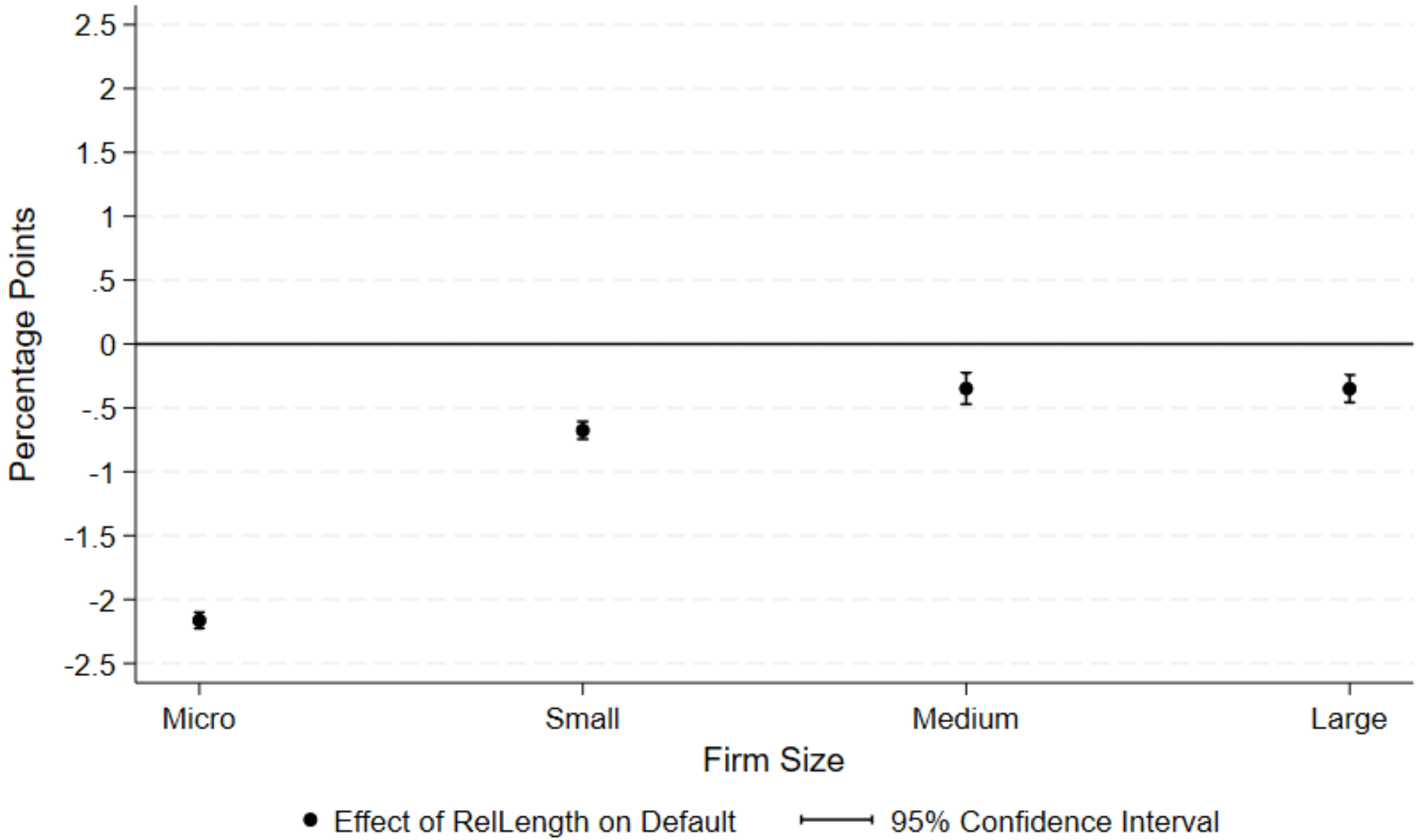
Relationship lending: Loan default



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Relationship lending: Loan default

	Default						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
RelLength	-0.000197***	-0.000250***	-6.37e-05***	-0.000379***	-0.000118***	-6.11e-05***	-6.14e-05***
	(3.66e-06)	(4.12e-06)	(7.49e-06)	(5.61e-06)	(6.15e-06)	(1.10e-05)	(9.61e-06)
Observations	9,350,812	5,717,604	3,633,052	2,868,821	2,848,603	1,842,658	1,790,200
R-squared	0.204	0.180	0.337	0.158	0.229	0.325	0.370
Bank-Quarter FE	Y	Y	Y	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	All	MicroSmall	MedLarge	Micro	Small	Medium	Large

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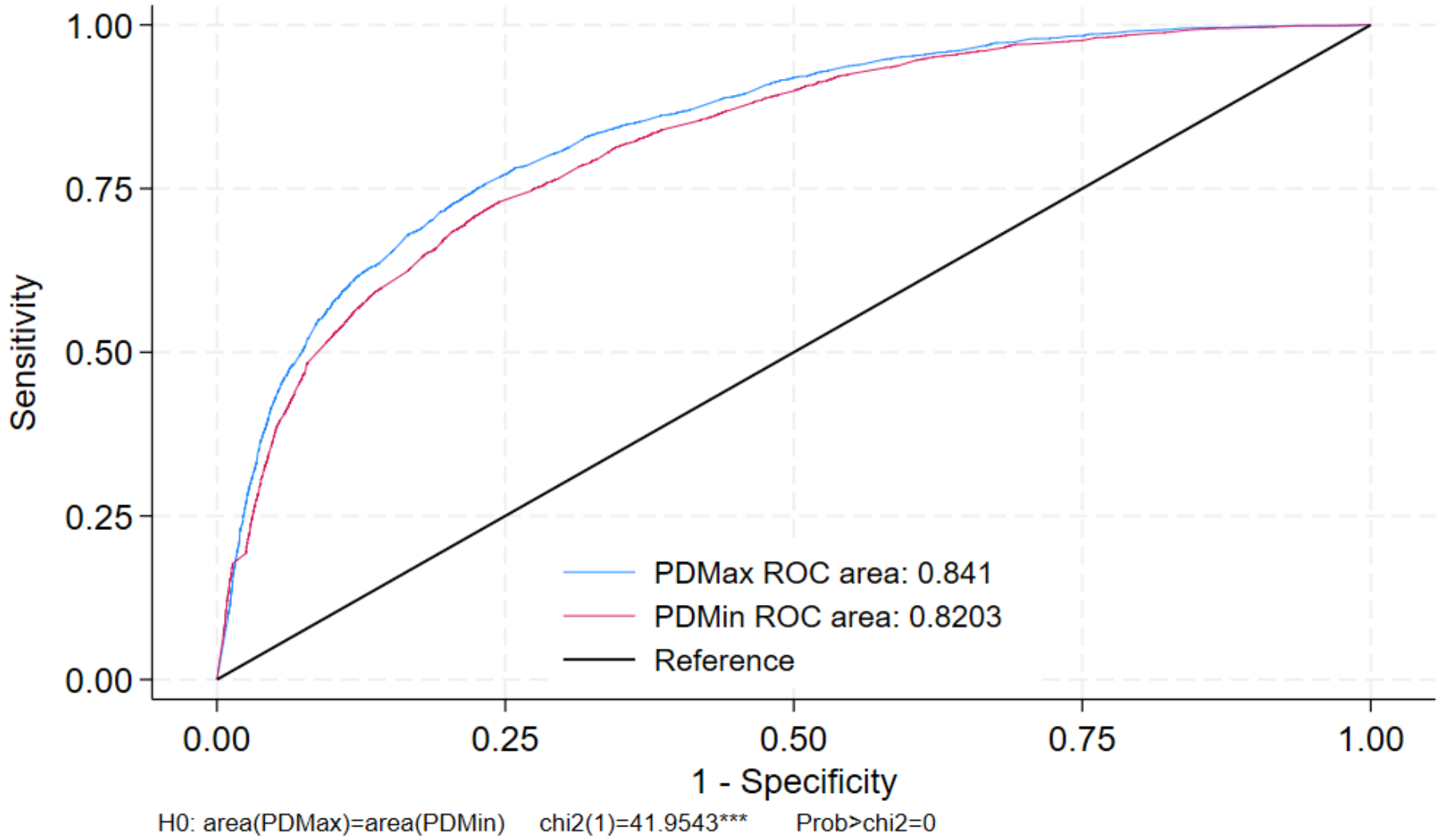
Relationship lending: Information micro & small firms



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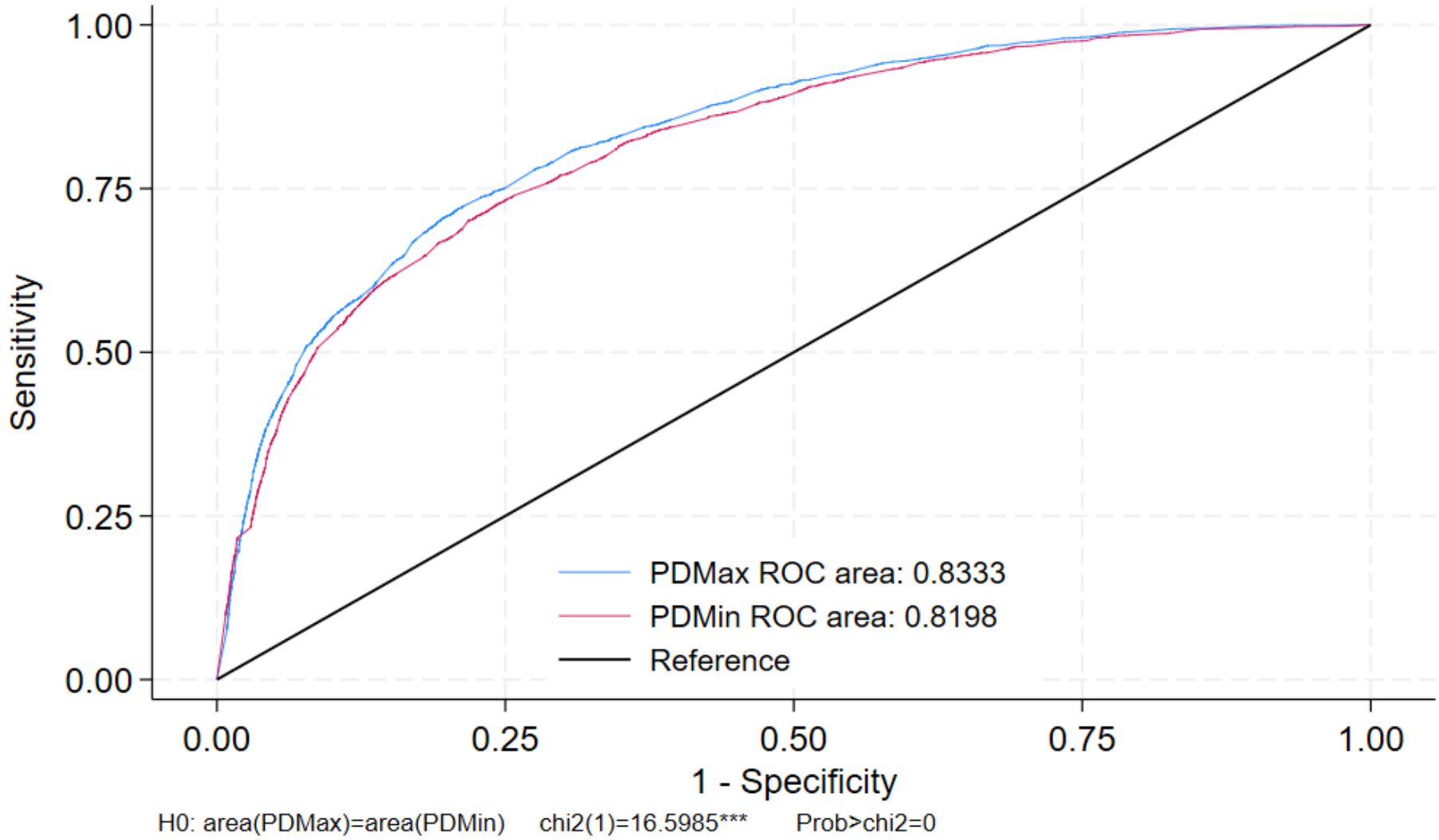
Information: Relationship amount micro & small firms



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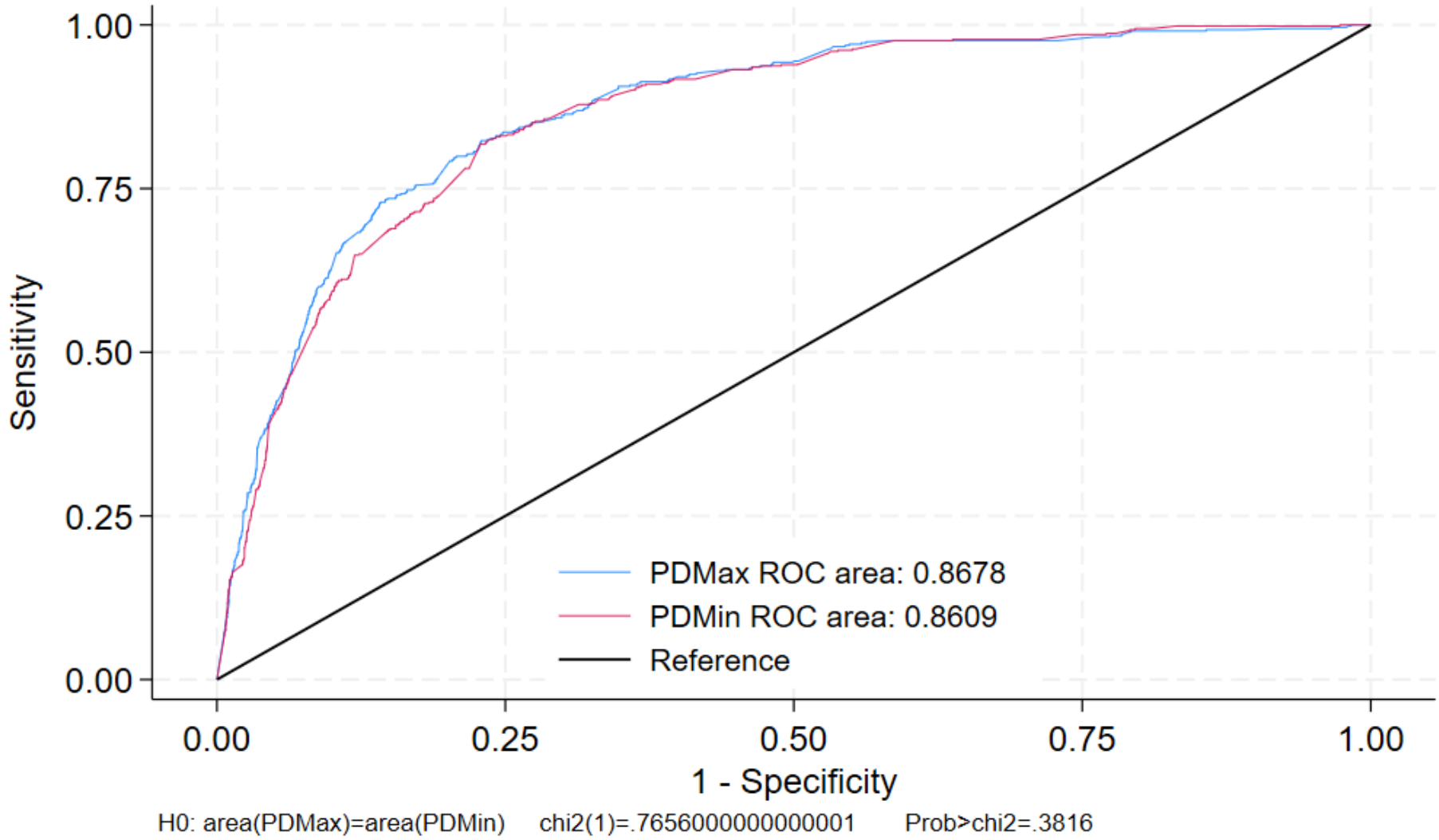
Relationship lending: Information medium & large firms



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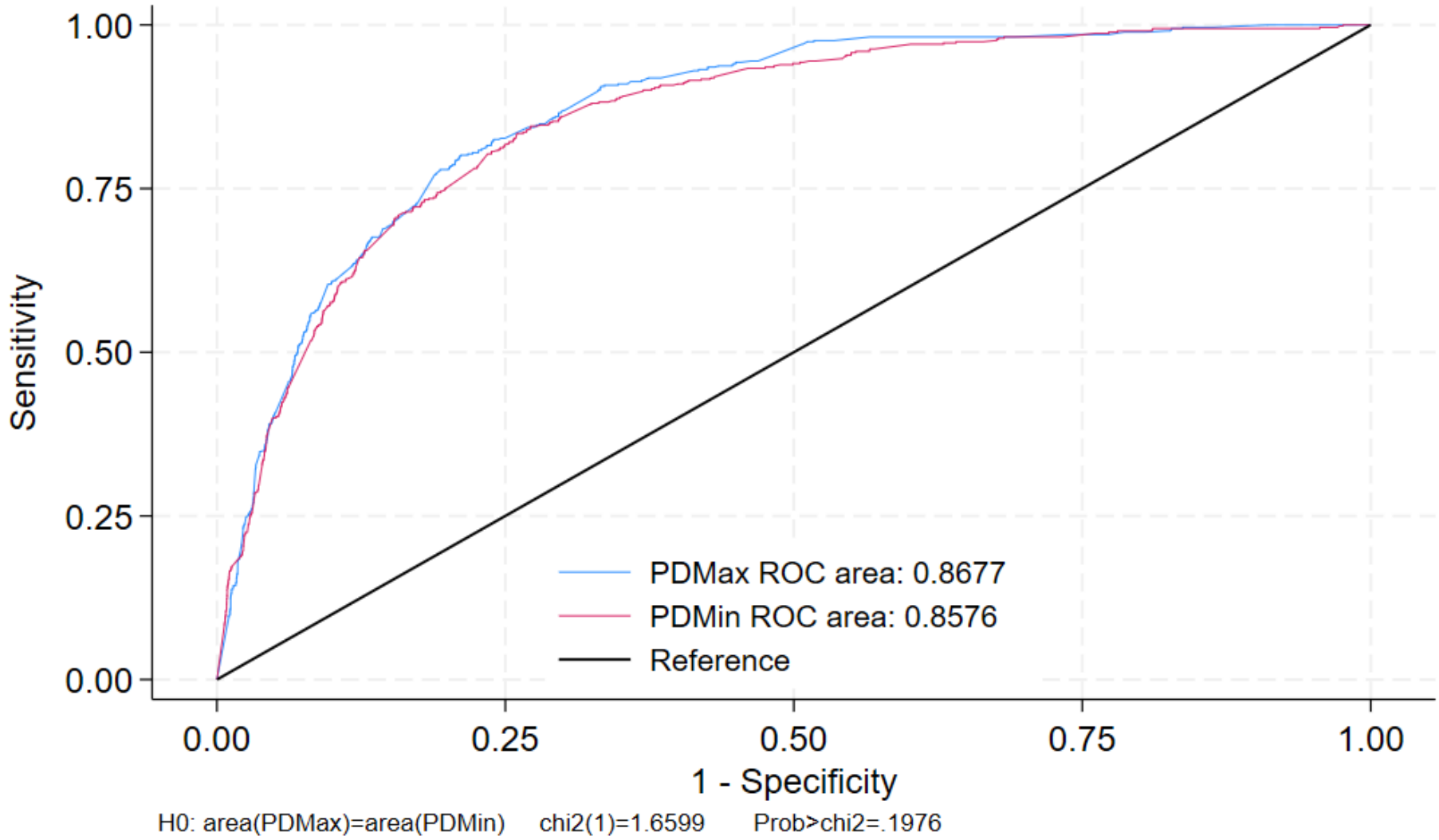
Information: Relationship amount medium & large firms



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Relationship lending: Loan supply

	LoanGranted			
	(1)	(2)	(3)	(4)
RelLength	0.00825***	0.00650***	0.00809***	0.00582***
	(0.000106)	(0.000119)	(0.000195)	(0.000235)
Observations	200,031	198,810	38,669	37,337
R-squared	0.532	0.560	0.572	0.642
Bank-Month FE	N	Y	N	Y
Firm-Month FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Cluster s.e.	Firm-Month	Firm-Month	Firm-Month	Firm-Month
Sample of firms	MicroSmall	MicroSmall	MedLarge	MedLarge
Period	2018m9-2024m6	2018m9-2024m6	2018m9-2024m6	2018m9-2024m6

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Relationship lending: Loan rate

	Interest Rate			
	(1)	(2)	(3)	(4)
RelLength	-0.00266***	-0.00256***	-0.00183***	-0.00181***
	(0.000121)	(0.000122)	(0.000387)	(0.000387)
Default		0.366***		0.416***
		(0.0102)		(0.0361)
Observations	5,717,604	5,717,604	3,582,657	3,582,657
R-squared	0.559	0.559	0.849	0.849
Bank-Quarter FE	Y	Y	Y	Y
MIST FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MicroSmall	MicroSmall	MedLarge	MedLarge
Period	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2

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Relationship lending: Loan default

	Default		
	(1)	(2)	(3)
RelLength	-0.000253***	-0.000256***	-0.000250***
	(4.00e-06)	(4.08e-06)	(4.12e-06)
Observations	5,921,551	5,783,376	5,717,604
R-squared	0.065	0.144	0.180
Bank-Quarter FE	Y	Y	Y
MT FE	Y	N	N
IT FE	Y	N	N
MIT FE	N	Y	N
MIST FE	N	N	Y
Controls	Y	Y	Y
Cluster s.e.	Firm-Quarter	Firm-Quarter	Firm-Quarter
Sample of firms	MicroSmall	MicroSmall	MicroSmall
Period	2018q3-2024q2	2018q3-2024q2	2018q3-2024q2

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Relationship lending as benchmark: Micro & small firms

- Loan default
  - Compared to other loans, a loan granted by the
  - **Locally specialized** bank is **0.83 p.p.** less likely to default
  - **Relationship** bank is **1.43 p.p.** less likely to default

- Information
  - Prob. that a non-defaulting firm has higher PD than defaulting firm
  - Is **83.38%** for the **locally specialized** bank and **82.47%** for the locally non-specialized bank (**0.91 p.p.** difference)
  - Is **84.1%** for the **relationship** bank and **82.03%** for the non-relationship bank (**2.07 p.p.** difference)

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Relationship lending as benchmark: Medium & large firms

- Loan default
  - Compared to other loans, a loan granted by the
  - **Sectoral specialized** bank is **0.64 p.p.** less likely to default
  - **Relationship** bank is **0.36 p.p.** less likely to default

- Information
  - Prob. that a non-defaulting firm has higher PD than defaulting firm
  - Is **86.9%** for the **sectoral specialized** bank and **85.49%** for the sectoral non-specialized bank (**1.41 p.p.** difference)
  - Is **86.78%** for the **relationship** bank and **86.09%** for the non-relationship bank (**0.69 p.p.** difference)

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