Natural Bank Reliance

ESM-EUI-CEPR Conference

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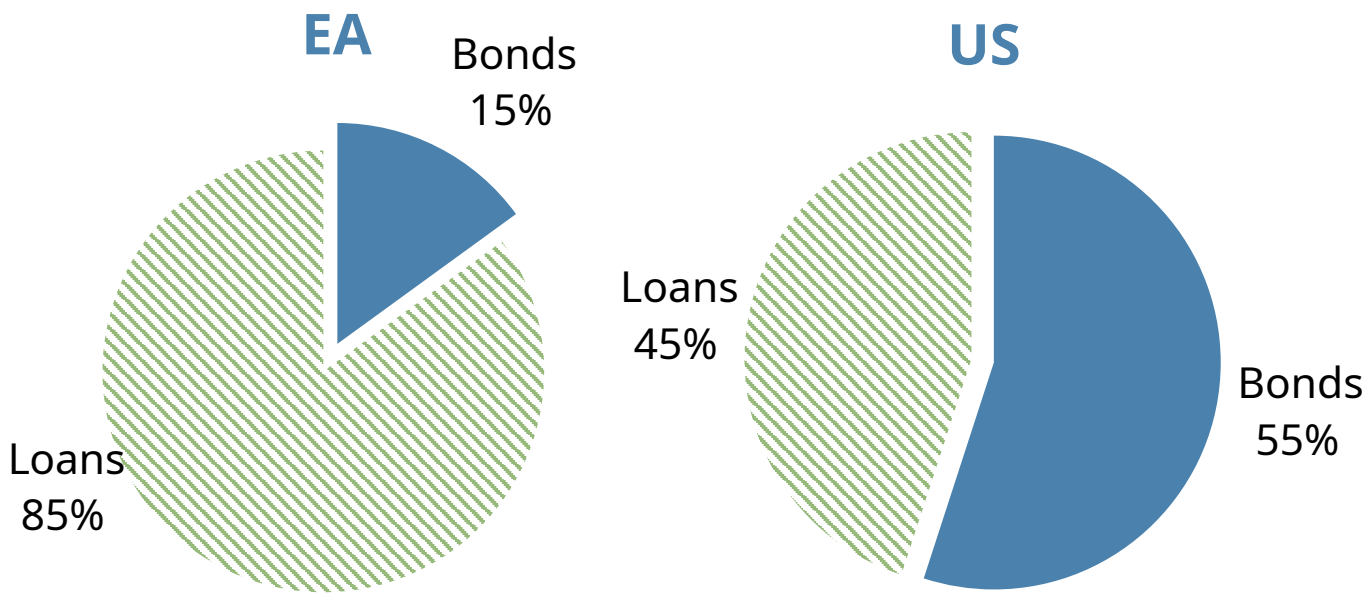
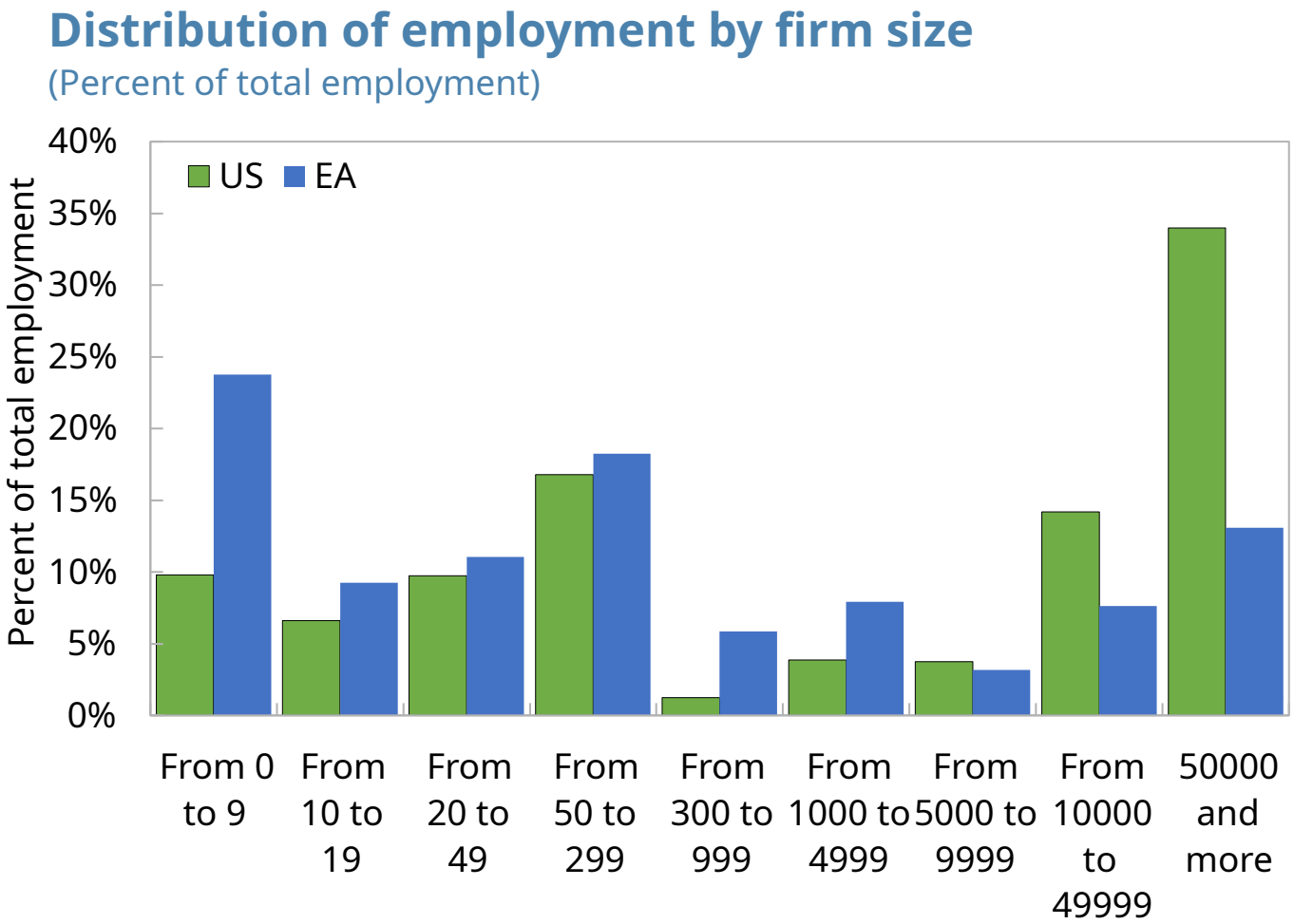
Motivation



Different Types of Borrowers



Paper in a Nutshell

Research Question: Analyze firms' funding choice between bank loans and bond funding in the euro area (EA) vs the US.

Approach:

- *Empirical*: Collect a unique data set of firms funding choices.
- *Theoretical*: Compute counterfactuals using a theoretical model.

Results:

- Higher utilization of bank funding in the EA is driven by (i) permanent structural differences and (ii) different financial market settings.
- If EA firms had access to a financial market similar to the US, their bank funding share would remain **significantly higher** due to different firm characteristics.

Implications:

- Bank funding will remain central in the EA, a phenomenon which I label "**Natural Bank Reliance.**"
- Efforts to improve banks' access to capital markets (e.g., securitization) are key.

Literature and Contribution

Contribution:

- First data set that covers (to a large degree) **smaller firms**, so far, analyses of bank vs. bond debt funding choices in the euro area have mostly been based mainly on public firms (e.g., Darmouni, Giesecke, and Rodnyansky 2019; Darmouni and Papoutsi 2020).
- First counterfactual estimation of funding choice in the euro area.
- Informs the policy discussion on the **EU's Capital Market Union project** and provides insights for EA banks.

Closest papers:

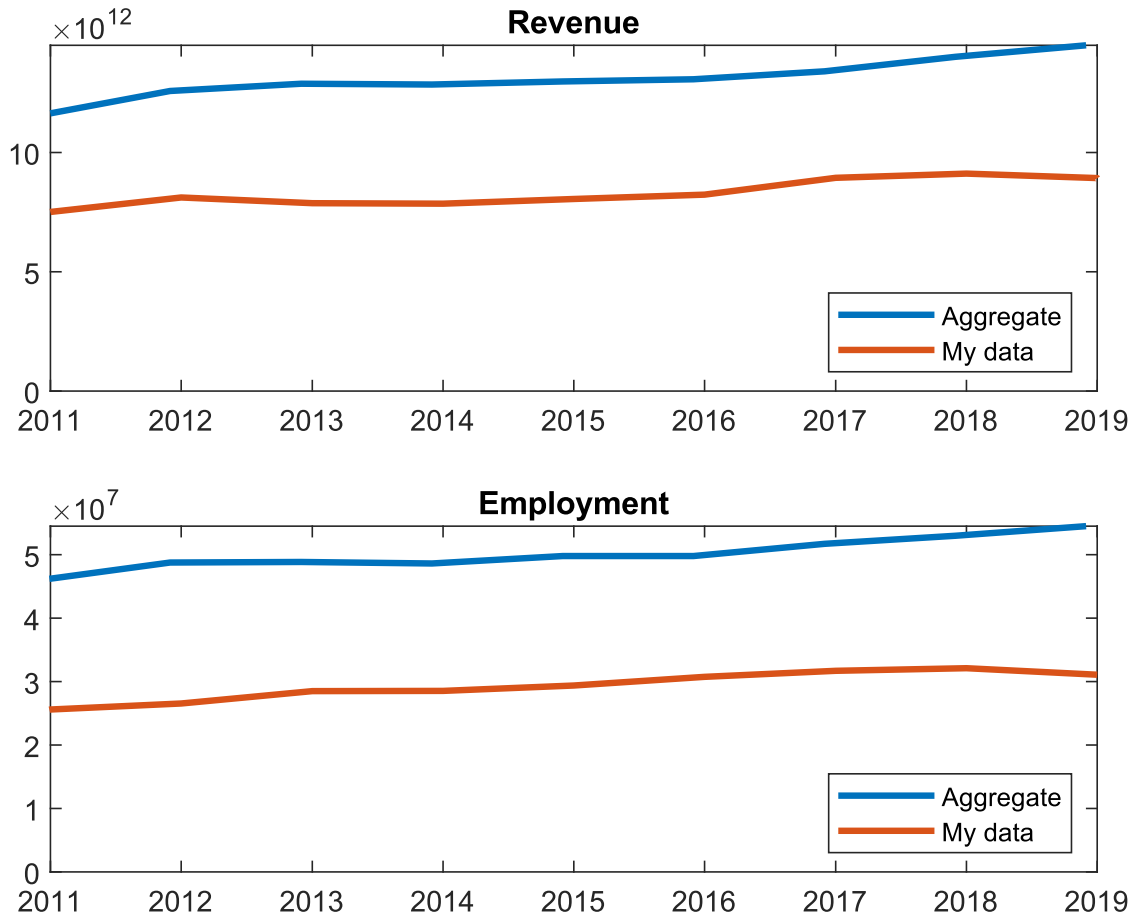
- Allen, Bartiloro, Gu, and Kowalewski (2018).
- De Fiore and Uhlig (2011, 2015).

Data

I compile a unique dataset by combining firm data from Orbis (BvD) with bond data from Refinitiv which covers the euro area and the US.

- Balance sheet data for **1.23 million firms**.
- Data on more than **300'000 bond issues**, corrected for
  - prepayments,
  - option executions,
  - defaults.
- Datasets need to be matched (matched via LEI, Name, Industry).
- Time period: 2010 - before Covid.
- **Key variables**: bond funding share / loan funding share.
- Add information on each firm's primary bank to assess whether small firms tend to be served more by small banks.

Data Coverage



bond coverage

Bond Funding Share

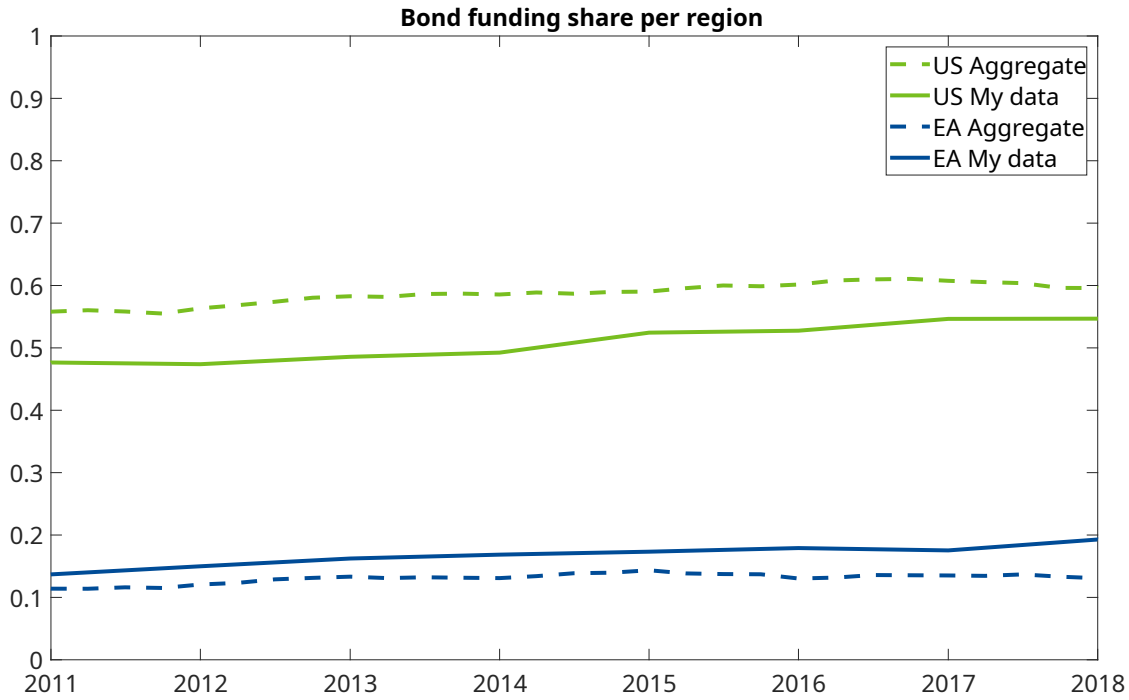


Figure: Coverage comparison

Drivers of Funding Choice

Firm-specific factors and financial market structure:

- **Firm-specific** factors:
  - Firm size.
  - Fixed asset share.
  - Control for past performance and capital market structure.
- **Financial market structure** is *independent* of firm characteristics (e.g., market liquidity, disclosure and compliance requirements, local financial regulation).

What Determines Funding Choices? Motivation

	(1) Bond share	(2) Bond share
Size (Total assets)	0.5535***	
	(7.7146)	
Size (Employees)		0.1579***
		(2.7004)
Fixed assets	0.0070***	0.0080***
	(21.5361)	(17.8216)
Profitability	-0.0373	-0.0460
	(-1.3539)	(-1.3223)
Leverage	-0.0010	-0.0000
	(-0.3383)	(-0.0055)
Observations	2'492'759	2'492'759
R^2	0.1424	0.0764
Fixed Effects	year	year

***, **, and * shows significance at a 1, 5, and 10% level, respectively.

Regressions include standard errors corrected for clustering at firm-level.

Fixed assets refers to the share of fixed assets in total assets, shown as a percent.

Total assets is in euro millions. Employees is measured in thousands. Profitability refers to return on assets. Leverage refers to debt/equity. *t*-stats in parentheses.

↑ Firm size ⇒ ↑ bond funding

↑ Fixed assets ⇒ ↑ bond funding

↑ Information asymmetries ⇒
↑ advantage of relationship banking

Firm Size

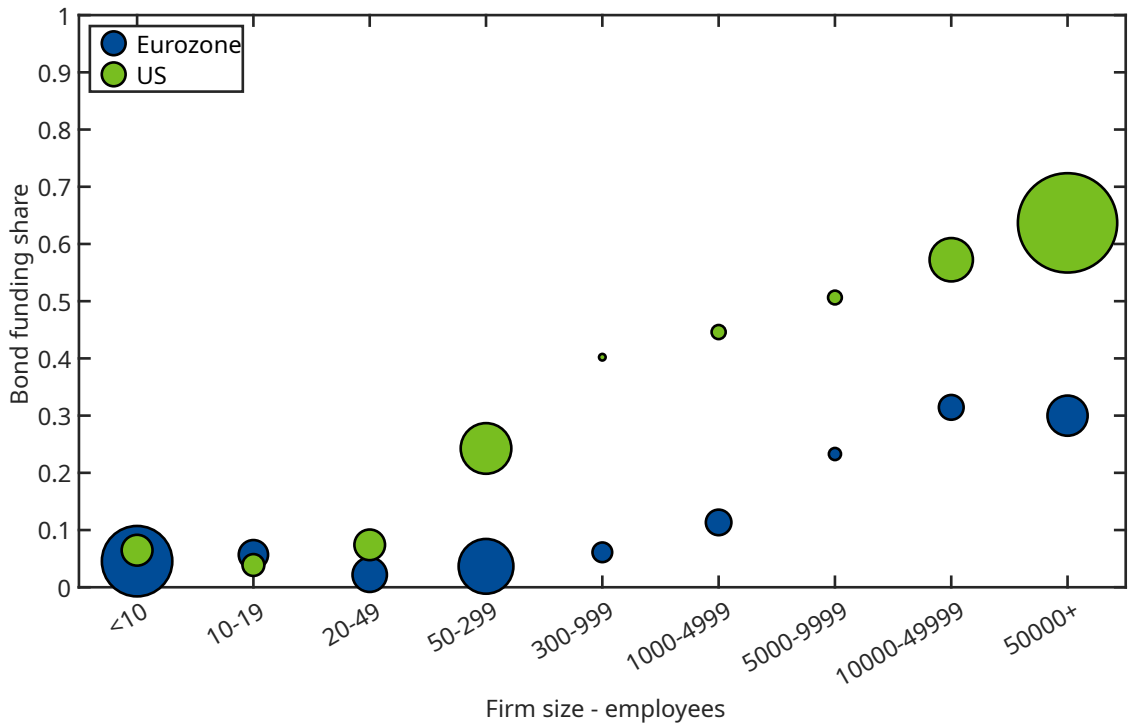


Figure: Bond funding share across the firm size distribution

Prevalence of savings banks

Firm Size and Modelling Choice

Firm size is the most important determinant of a firm's funding choice.

- The firm size distribution (FSD) is a structural feature of the economy.
- According to Angelini and Generale (2008), in OECD economies, financial constraints have no impact on the aggregate FSD.
- The FSD is strongly shaped by *nonfinancial* factors:
  - Size-based regulation (Garicano, Lelarge, and Van Reenen, 2016).
  - Antitrust laws (Philippon and Gutierrez, 2018; Covarrubias, Gutiérrez, and Philippon, 2020; Grullon, Larkin, and Michaely, 2019).
  - Prevalence of certain industries (Beck et al., 2008).
- Across periods of low and ample credit, the firm size distribution is unchanged.

Illustration

Fixed Asset Share and Industry

Industry	Avg. Firm Size	Avg. Bond Share
 Water & Waste Management	210	28%
 Professional Services	206	11%

Fixed Asset Share and Industry

Industry	Avg. Firm Size	Avg. Bond Share	Avg. Fixed Assets
 Water & Waste Management	210	28%	74%
 Professional Services	206	11%	57%

Fixed Asset Share and Modelling Choice

In addition to firm size, **fixed assets** are important determinant of a firm's funding choice:

- Fixed asset share differs by industry, firms rarely change industries.
- Consider also Beck et al. (2008) on the topic of a firm's industry and funding decisions.

Model Intuition

Setting:

- Banks and bond investors compete to provide funding to firms.
- Informational advantage of banks: If a project fails, banks are able to work with the firm on restructuring, while bond holders need to rely on in-court bankruptcy procedures. Restructurings are quicker, preserving firm value.

Main mechanism: Equilibrium depends on firms' *size* and *fixed asset share*:

- Banks' capital costs increase in loan size.
- Drawn-out bankruptcy procedures destroy less firm value for firms with more fixed assets (easier to redeploy).

Equilibrium:

- Small firms are exclusively served by banks.
- Firms' bond funding share increases in its size / fixed asset share.
- Model parameters differ between the EA and the US to reflect different financial market settings. Counterfactual is computed using US parameters for the EA.

Details

Model Fit

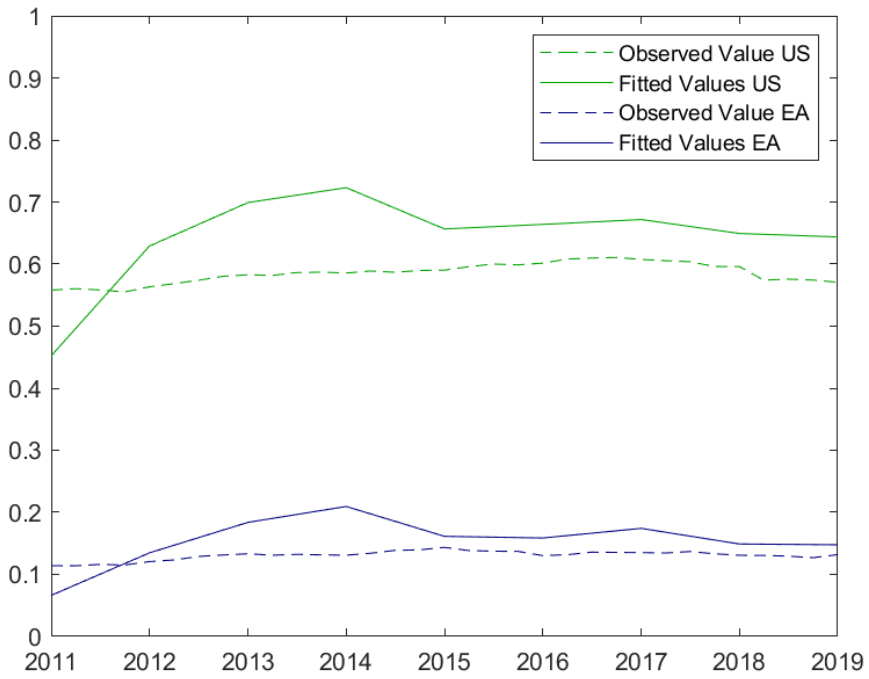


Figure: Model Fit

Calibration

Counterfactual Funding Choice

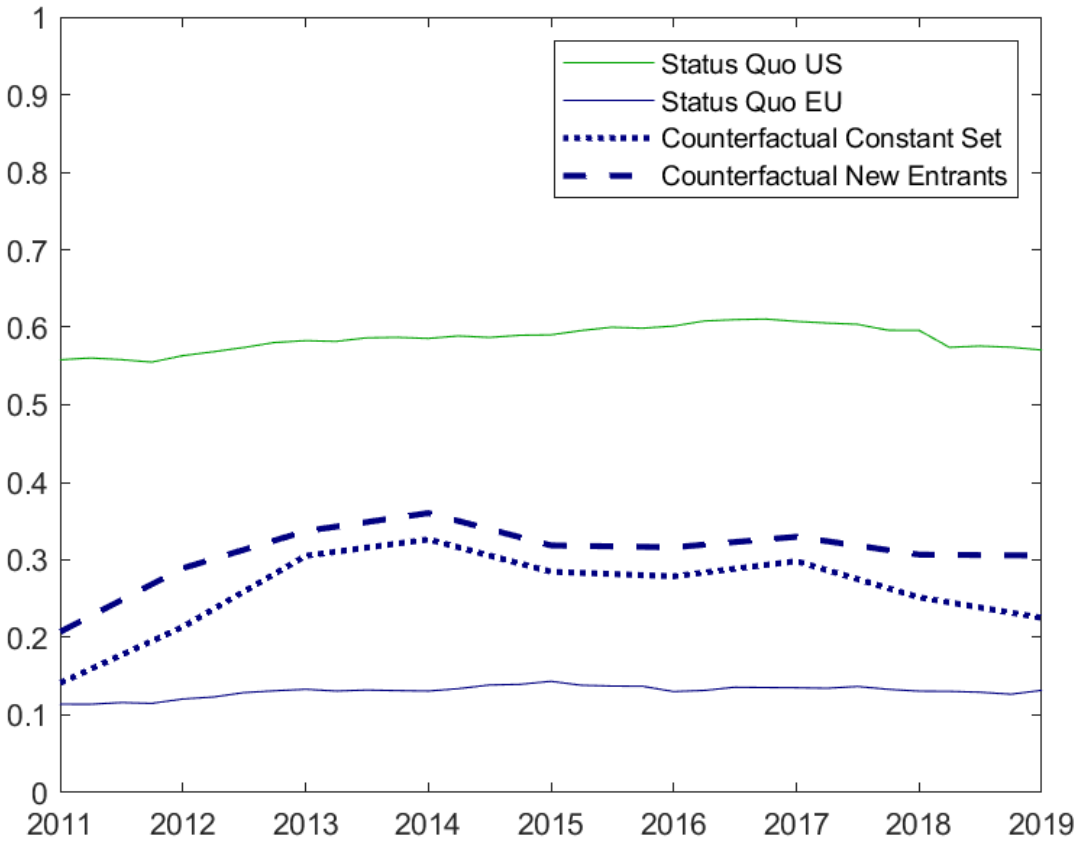


Figure: Counterfactural

Conclusion

If the capital market structure in the euro area is improved (e.g., due to efforts surrounding the capital market union), **euro area firms would still rely heavily on bank funding**.

- The EA bond funding share would still be *at least one third lower* due to different firm characteristics.
- The increase in market-based financing will mostly come from large firms (-> banks might provide brokerage services).
- However, smaller firms in the euro area will continue to rely on bank funding, highlighting the key role of small banks in funding the euro area economies.
- Instead of firms funding themselves via capital markets, one solution can be *originate-to-distribute* models in which banks continue to originate SME loans but sell and securitize them afterwards via capital markets.

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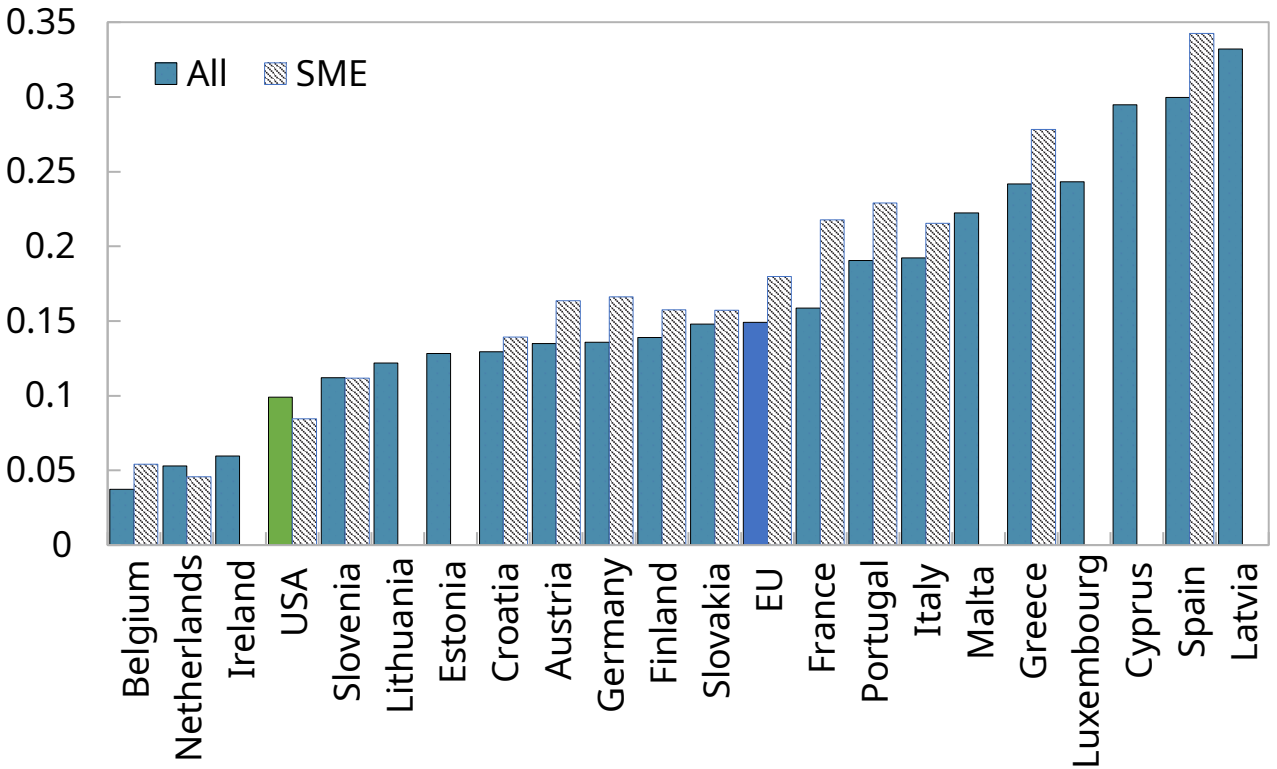
Appendix

Financing as an obstacle to investment

Availability of financing as a major business obstacle

(Share of firms reporting)



Sources: EIB Investment Survey, 2023.

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Data Collection - Issuance Through Subsidiaries

Which legal entity issues a bond?

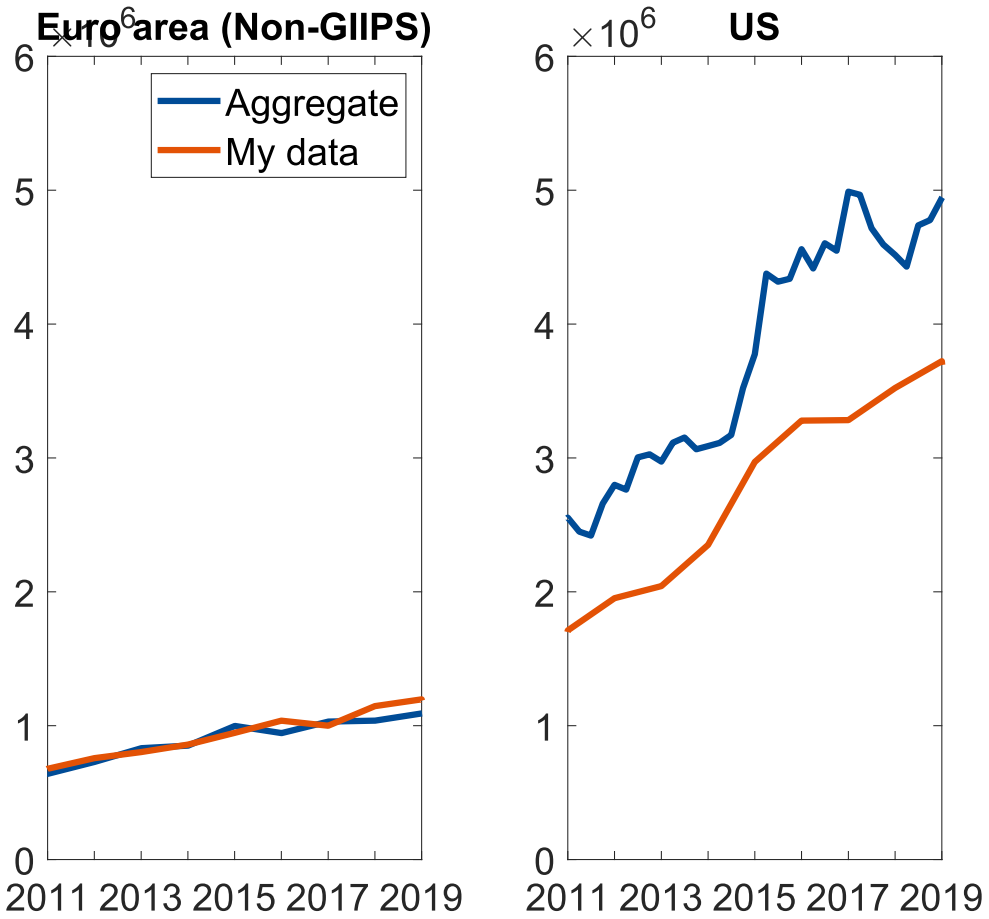
- Many firms issue bonds through subsidiaries.
- These subsidiaries often publish no financial accounts.
- Headquarters include provisions for guarantees for bond-issuing subsidiaries.

Treatment of subsidiaries:

- Collect data on intra-group ownership relationships.
- Roll-up bond debt to the majority-owner (50%+).
- Drop all majority-owned subsidiaries from the data to avoid double-counting.
- In line with Caglio, Darst, and Kalemli-Özcan (2021) for loans in the United States.

Bond Coverage

Figure: Bond data vs. aggregate debt securities



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Firm Size and Banking Relationships

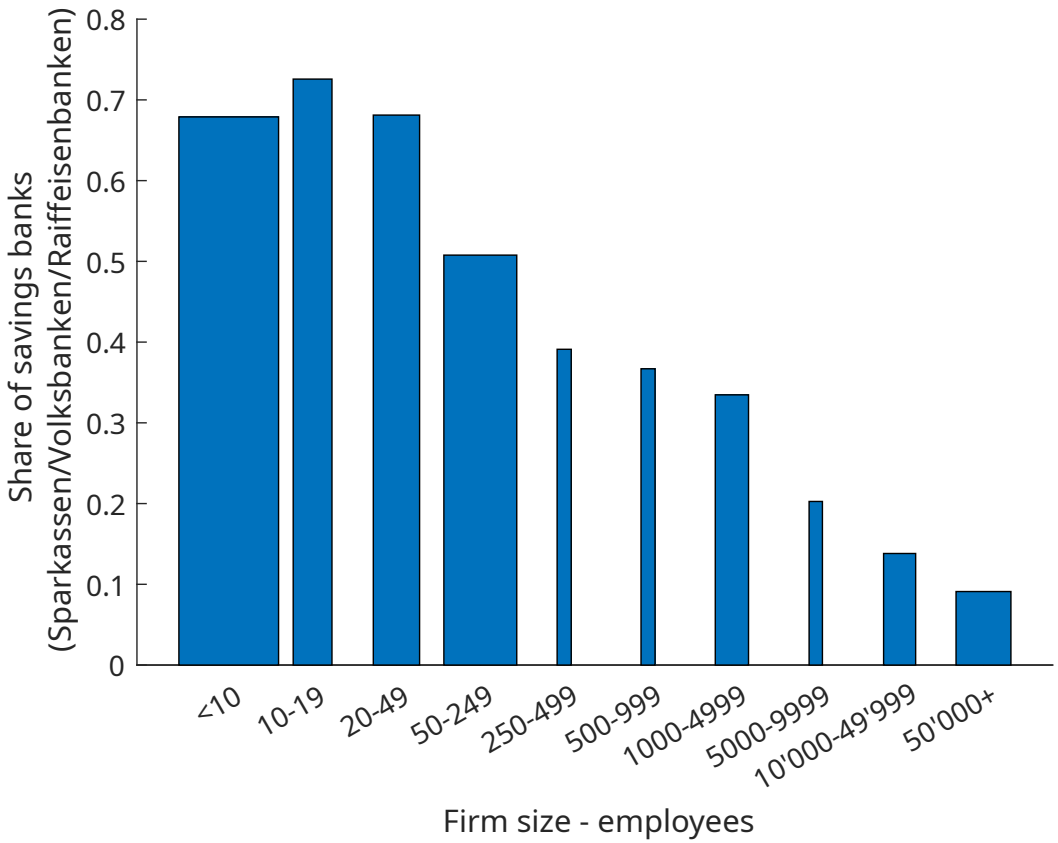

Figure: Banking relationships across the firm size distribution

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Firm size - Trends?

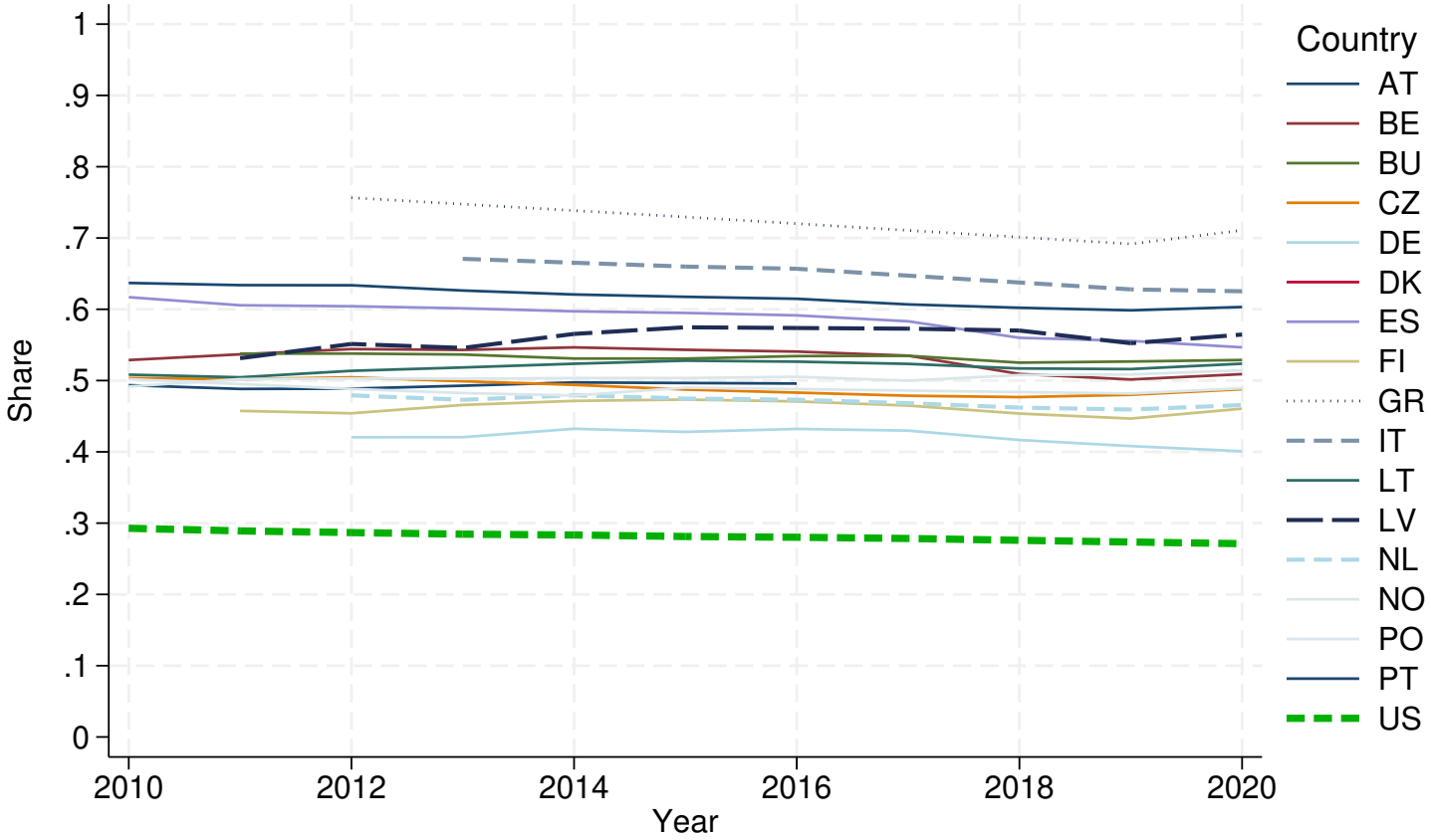

Figure: Employment share of small firms (below 50 employees)

→ This paper considers firm size as exogenous. Back to presentation

Model: Firm

$\rightarrow$ **Model** based on Becker and Josephson (2016) used for the counterfactual analysis considers firm size and fixed assets as **exogenous characteristics** and **incorporates** issues related to **insolvency**.

- Firm capital demand: $K(r) = A - B \cdot r$.
- Share of fixed assets (firm industry): θ_i.
- The firm's project is successful with a probability of $1 - q_i$.
- When the firm is not successful, its value in a restructuring is $(1 - \beta)K(r)$, while in a formal bankruptcy procedures it is $(1 - \beta - \sigma)K(r)$.
- The amount of funding demanded at r^* is called D_i.
- The default probability is defined by: $q_i(D_i, \theta_i) = q_0 + \tau_D \cdot D_i + \tau_\theta \cdot \theta_i$.[2]

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[2] τ_D and τ_θ are derived from CDS-implied default probabilities and are allowed to differ in the two regions.

Model: Banks

- n banks provide intermediation by accepting deposits and providing bank loans L_i.
- Banks have a convex cost function $C(L_i) = c\frac{L_i^2}{2}$.
- If the firm is in distress, the bank may engage in out-of-court restructuring. Restructurings conserve value compared to formal bankruptcy procedures. These gains amount to a share of σ of the investment:

$$\sigma_i = \alpha - \tau \cdot \theta_i, \tag{1}$$

- Profit-maximization leads to bank loan supply: $L = \sqrt{\frac{q*\sigma*D*(n-1)}{c}}$.
- Atomistic competition and risk-neutrality imply that bond investors are willing to lend at $r^* = q/(1-q)$, in which q denotes the firm's failure probability.

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Equilibrium

- For small firms, banks can offer lower rates than r^* and those firms only use bank funding.
- After a cutoff firm size, bond investors become the residual suppliers of funding.
- Cutoff follows from optimal bank loan supply:

$$D^{CutOff} = \frac{q * (n-1) * (\alpha - \tau \cdot \theta)}{c}. \tag{2}$$

- For firms above the cutoff firm size, the optimal bond share is:

$$\text{Bond Funding Share(BS)} = 1 - \frac{L}{D} = 1 - \sqrt{\frac{q * (n-1) * \sigma}{D * c}}. \tag{3}$$

Equilibrium visually, statistically.
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Parameter estimation

- The paper aggregates the micro-level data in yearly buckets of 9 size categories and 10 fixed asset categories (resulting in 90 observation of bond funding share per year per region).
- It estimate the model parameters (by minimizing the squared deviation of model equations 3 and 2) for the two regions.
- The estimated values for the United States are $c = 0.077^{***}$, and $\tau = 0.395^{***}$; as well as $c = 0.083^{***}$, and $\tau = -0.058$ for the euro area.
- The scaling parameters are set to $n = 10$ and $\alpha = .5$ in both regions.

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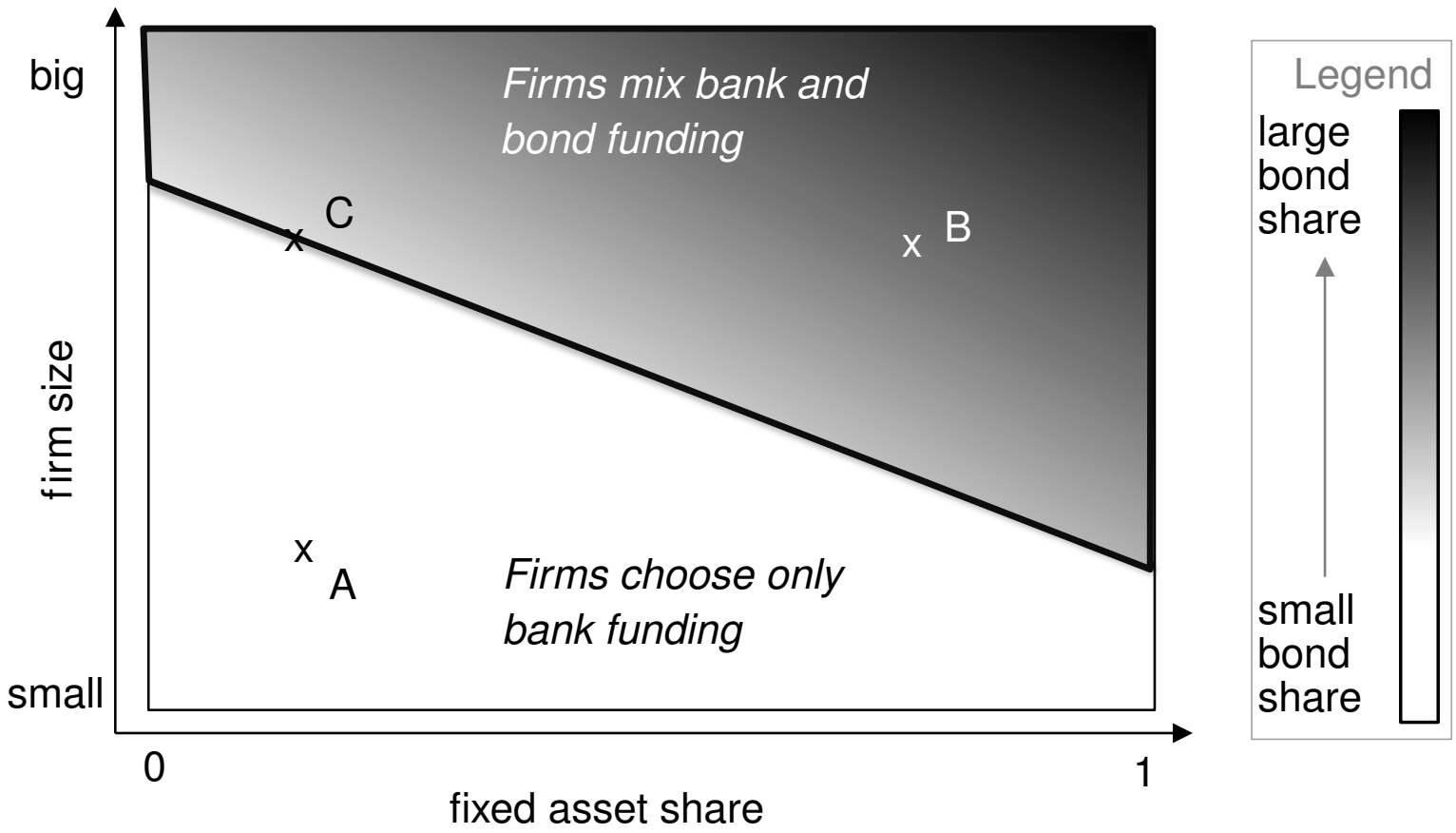
Equilibrium funding choice



Drivers of funding choice: Fixed assets

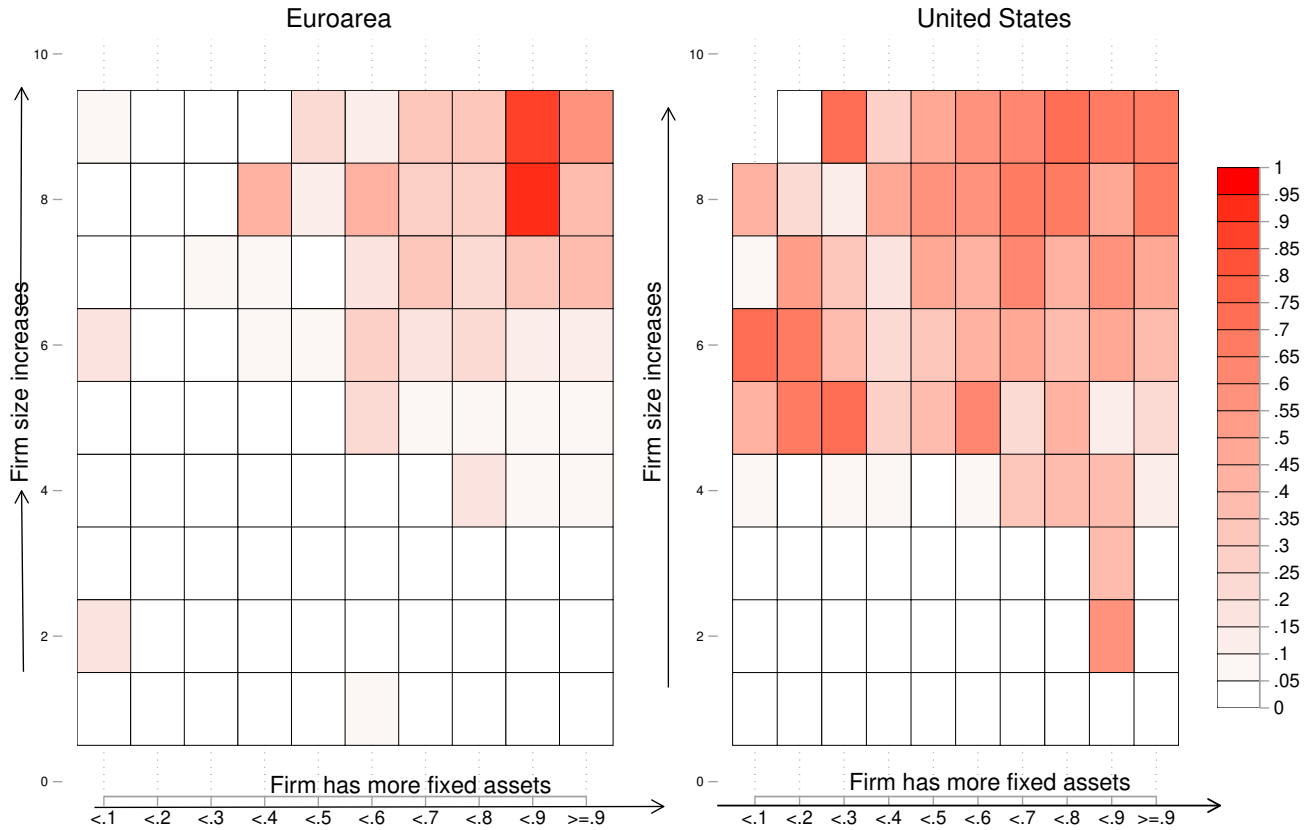


Figure: Bond funding share across the fixed asset and firm size distribution

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