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FINANCIAL CONSTRAINTS AND EMISSION INTENSITY

EUROPEAN CENTRAL BANK

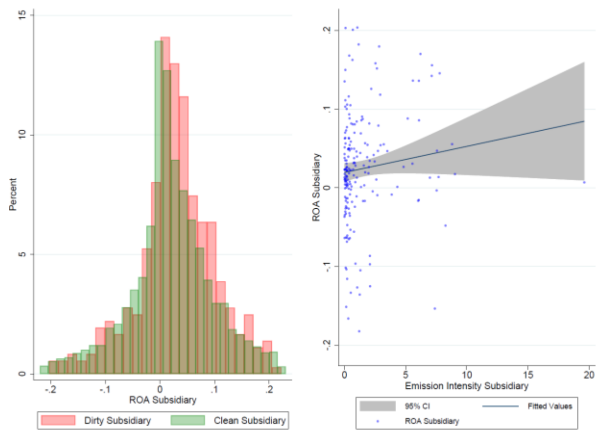
EUROSYSTEM

How do high-emitting firms adjust to tighter financial constraints? And what happens to their emission intensity when they adjust?

Winner-Picking in Dirty Firms:

- Headquarters can reallocate scarce resources within the firm to fund relatively more profitable projects (Stein, 1997) → **Winner Picking**
- When dirty subsidiaries are more profitable: ↑ **Emission intensity**
- Are dirty subsidiaries more profitable?

Across Firms



Within Firms

	(1) ROA	(2) Ln Total Assets
Dirty Subs	0.012*	0.886***
	(0.006)	(0.102)
Observations	3166	3166
Parent-Year FE	Yes	Yes
Subs. Industry FE	Yes	Yes
Subs. Country FE	Yes	Yes
Adjusted R^2	0.136	0.579
Clustering	Country	Country

Data

European firms active in emission-intensive sectors:

Financial and Ownership: Bureau van Dijk Ownership Database

- Historical parent-subsidiary links 2009-2019
- At subsidiary and parent level

Emissions: EU Emission Trading Scheme Data

- Installation-level data mapped to parents and subsidiaries

Banking Relationships: AMADEUS Bankers

1st Natural Experiment: The EBA Capital Exercise

- In 2011, 61 EU banks had to increase their Tier 1 capital ratios to 9%
- This led to a reduction in corporate lending (Gropp et al., 2018) and a credit crunch (Mésonnier and Monks, 2015) for borrowers of participating banks
- Difference-in-Difference approach where *Treated* are borrowers of EBA Banks

Do treated firms engage in winner-picking?

	ROA	Emission Intensity	Ln Total Assets	Ln Emissions
Treated × Post	0.015***	0.290*	-0.042**	0.075
	(0.003)	(0.144)	(0.018)	(0.076)
Observations	735	735	735	735
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.514	0.930	0.973	0.956
Number of firms	241	241	241	241
Clustering	Country	Country	Country	Country

First Results: Winner Picking in Dirty Firms

- Treated firms engage in Winner-picking and shrink at the margin: ↑ **profitability**
- The marginal project is clean: ↑ **emission intensity**

Is this about within-firm capital allocation choices?

- Subsidiary level: Decline in size for clean subsidiaries, not dirty ones

An alternative mechanism: Constraint-Minimization

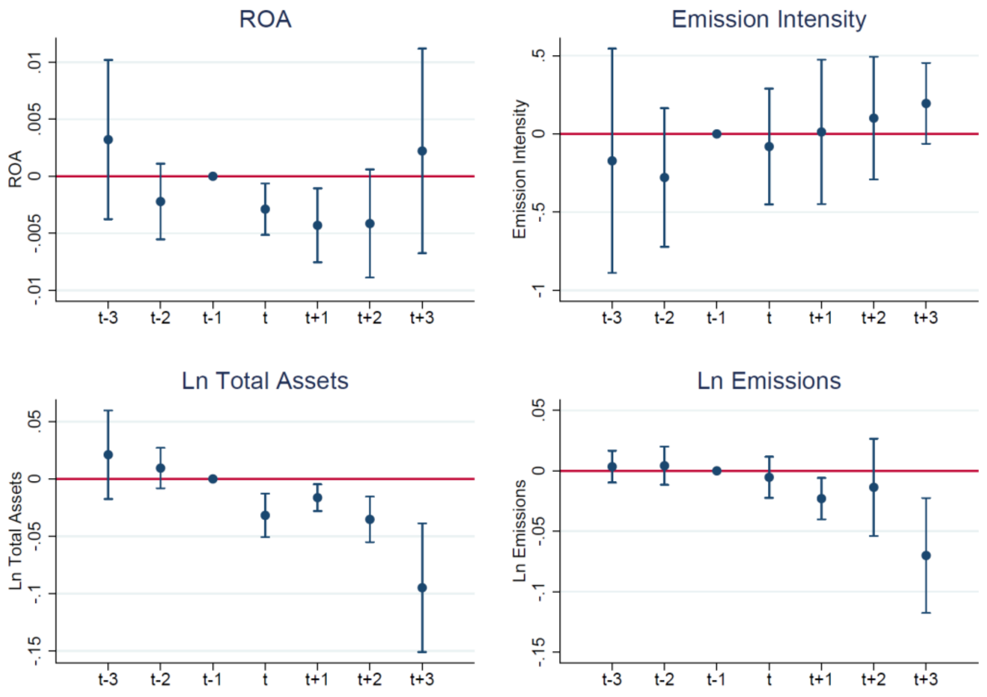
- High emitting firms can face tighter financial constraints due to their dirty status: a carbon premium in equity markets (Bolton and Kacperczyk, 2021) and higher loan (Delis et al., 2021) and bond prices (Seltzer et al., 2022)
- When the constraints are a consequence of firms' dirty status, firms can divert funding to cleaner projects to improve access to funding: ↓ **Emission intensity**

2nd Natural Experiment: Banks' SBTi commitments

- Between 2015 and 2019, 12 banks join the Science Based Carbon Initiative (SBTi) and pledge to a target of portfolio decarbonization
- This led to a reduction in credit supply to high-emitting borrowers of committed banks (Kacperczyk and Peydró, 2022)
- Staggered DiD approach following Sun and Abraham (2021):

$$Y_{ft} = \sum_{l \in \{-3,-2,0,1,2,3\}} \beta_l L^l_{ft} + \zeta_f + \zeta_{it} + \zeta_{lt} + \varepsilon_f$$

Do treated firms engage in winner-picking? Or rather constraint-minimization?



Further Results: Constraint-Minimization

- No winner-picking and no shrinking at the margin: ↓ **profitability**
- Firms cater to lenders' sustainable preferences: ↓ **emissions**

Are treated firms engaging in constraint-minimization?

- Emission reductions are concentrated at the parent level: where *visible*
- Parents *distance themselves* from *less visible* emissions by increasing the number of intermediary ownership relationships to dirty subsidiaries

Take-Aways

How firms adjust to financial constraints matters for environmental performance:

- **I link the idea of winner-picking to an increase in emission intensity** for dirty firms
- I **propose the alternative mechanism of constraint-minimization** when the constraint is correlated with firms' environmental performance and show this incentive at play in an empirical setting
- In the paper, I also provide a **simple theoretical framework** to highlight the trade-offs between winner-picking and constraint-minimization

Policy Relevance

- Interventions to manage transition risks in the financial sector could worsen financial constraints for dirty firms
- Policy design should preserve dirty firms' incentives to invest in clean projects