

Financial Constraints and Emission Intensity

Research Question

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?



Data

A sample of European firms active in emission-intensive sectors:

- Financial and Ownership: *Bureau van Dijk Ownership Database*
 - Historical parent-subsidiary links 2009-2019
 - Financial and descriptive characteristics at subsidiary and parent level
- Emissions: *EU Emission Trading Scheme Data*
 - Installation level emission data mapped to parents and subsidiaries
- Banking Relationships: *AMADEUS Bankers*

1st Natural Experiment: The EBA Capital Exercise

- A plausibly exogenous shock to credit constraints unrelated to firms' social cost
- 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*** (0.003)	0.290* (0.144)	-0.042** (0.018)	0.075 (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?

- At the subsidiary level: Relative decline in size for clean subsidiaries, dirty ones are not impacted.

An alternative mechanism: Constraint-Minimization

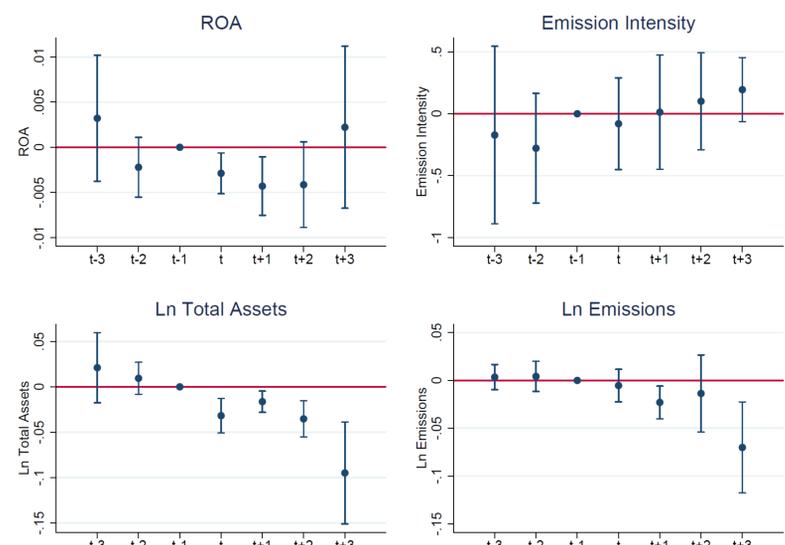
- High emitting firms can face tighter financial constraints due to their dirty status: a carbon premium in equity markets (Bolton and Kacperczyk, 2021) and higher loan (Delis et al., 2021) and bond prices (Seltzer et al., 2022)
- When the constraints are a consequence of firms' dirty status, firms can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

2nd Natural Experiment: Banks' SBTi commitments

- A shock to firms credit constraints related to firms' environmental performance
- 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):

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

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



Further Results: Constraint-Minimization

- Treated firms do not engage in winner-picking and do not shrink at the margin: **↓ profitability**
- Emission intensity is not affected, but firms cater to their lenders' sustainable preferences: the relative decline in size is matched with a proportional reduction in 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

I argue that **within-firm capital allocation matters for firms' environmental performance** when firms face a tightening in financial constraints:

- I link the idea of winner-picking from the literature to an increase in emission intensity for dirty firms and show that this is the case using empirical evidence.
- I propose the alternative mechanism of constraint-minimization which arises when the constraint is correlated with firms' environmental performance and show that this incentive can prevail over winner-picking in an empirical setting.
- In the paper, I also provide a simple theoretical framework to highlight the internal capital market decision of the firm and show the trade-offs between engaging in winner-picking and constraint-minimization

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