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## Financing the low-carbon transition in Europe

Evidence from the EU ETS



### INTRODUCTION

We study how European firms' debt finance relates to their low-carbon transition. We rely on historical data for close to 4000 European firms subject to the European Union's Emissions Trading System.

#### Motivation:

- The European Commission set the goal to reduce greenhouse gas emissions by 55% by 2030 and to reach carbon neutrality by 2050. The goal is enforced by the European Climate Law.
- To correct for firms' pollution (i.e., their negative externalities) the EU has introduced an emissions trading system (ETS).
- The EU ETS imposes a cap on emissions of highly polluting firms in Europe (e.g., in the sectors of aviation, electricity supply and manufacturing of metals). The system reduces the cap every year and allows firms to trade their emissions for a price.
- The EU's 2019 Green Deal acknowledges that financing is central for achieving emission reduction. Finance allows firms to invest in the adoption of clean technologies.
- In the EU, most firms are non-listed and rely on debt as the primary source of external financing. Thus, the understanding of the debt-emissions nexus is crucial to efficiently reach carbon neutrality.

#### Economic mechanism:

- Corporate finance theory poses that there is a non-linear relationship between leverage (or debt financing) and investments.
- We test the hypothesis of a non-linear relationship between leverage and transition performance of firms subject to a pressure on their emissions (i.e., firms subject to the EU ETS).
- In other words, we test if debt financing helps reduce emissions for all firms or only for firms that are not highly indebted.

#### Our analysis:

- We use a difference-in-differences approach to investigate firms' transition performance following the steep increase in emissions' prices caused by exogenous events. Highly indebted firms constitute the treated sub-sample.
- We employ a panel regression analysis to discern the effect of high indebtedness on the low-carbon transition.



### RESULTS

- We find a non-linear relationship between leverage and emissions. A firm with high leverage has lower emissions in subsequent years. However, when leverage exceeds 50%, a further increase in leverage is associated with higher emissions.
  - When firms' leverage is below 50%, an increase in leverage equal to 1-STD of the median yearly  $\Delta$ leverage is associated with -4.5% emissions in the following year and +8.8% emissions efficiency in the following year.
  - When firms' leverage is above 50%, an increase in leverage equal to 1-STD of median yearly  $\Delta$ leverage is associated with +1.6% emissions in the following year and -7.8% emissions efficiency in the following year.
- The non-linear relationship between leverage and transition performance is driven by non-listed firms (approximately 96% of the sample) and it is significant across both the sub-sample of firms that are considered to be at risk of carbon-leakage and the remaining sub-sample.
- As a response to the steep increase in the cost of emissions under the EU ETS triggered by reforms of the ETS regulation occurred in 2018, highly indebted firms facing these rising costs did not improve their transition performance. Instead, other firms successfully did so.

Figure 1: Magnitude of the impact of an increase in leverage on transition performance

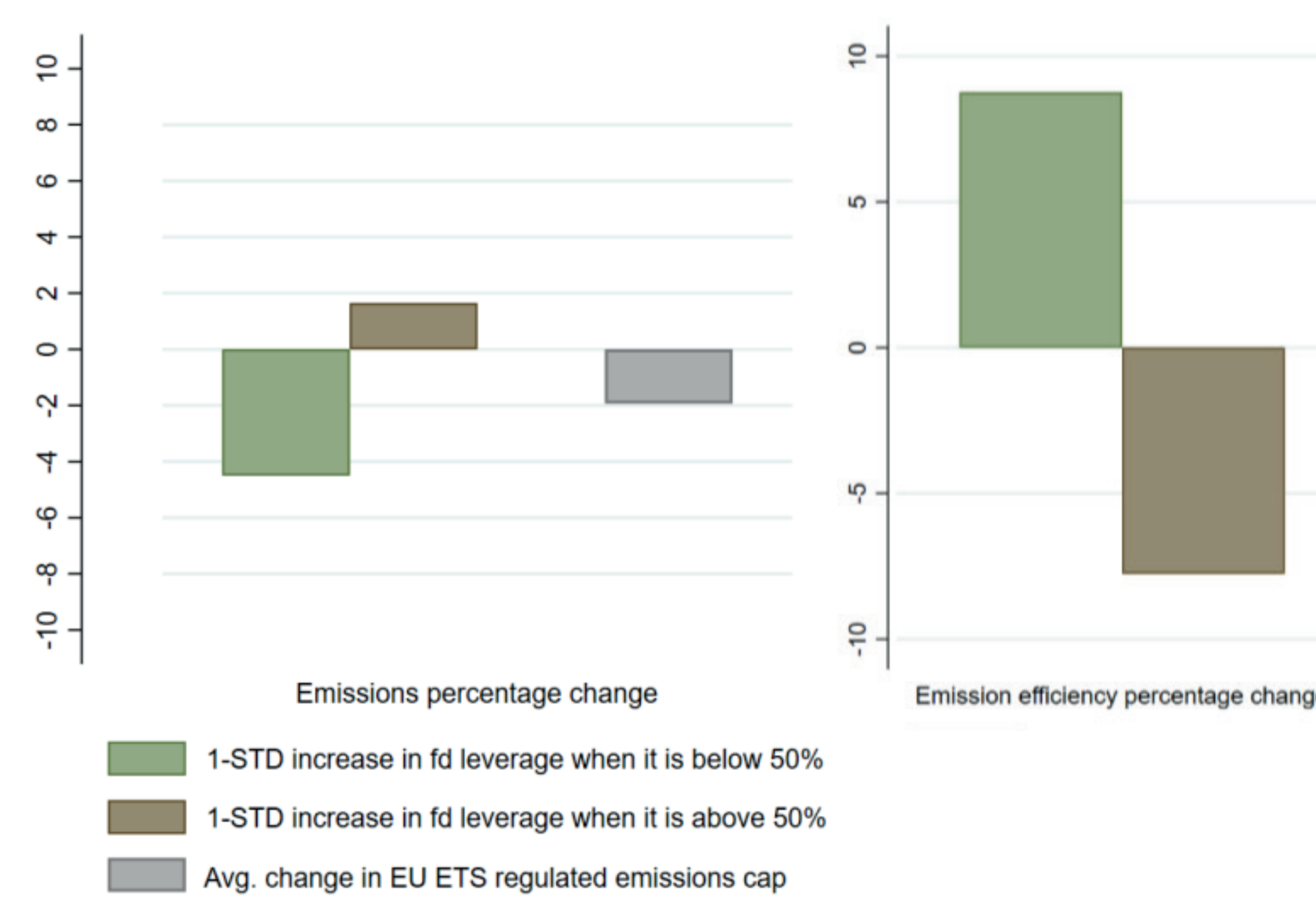
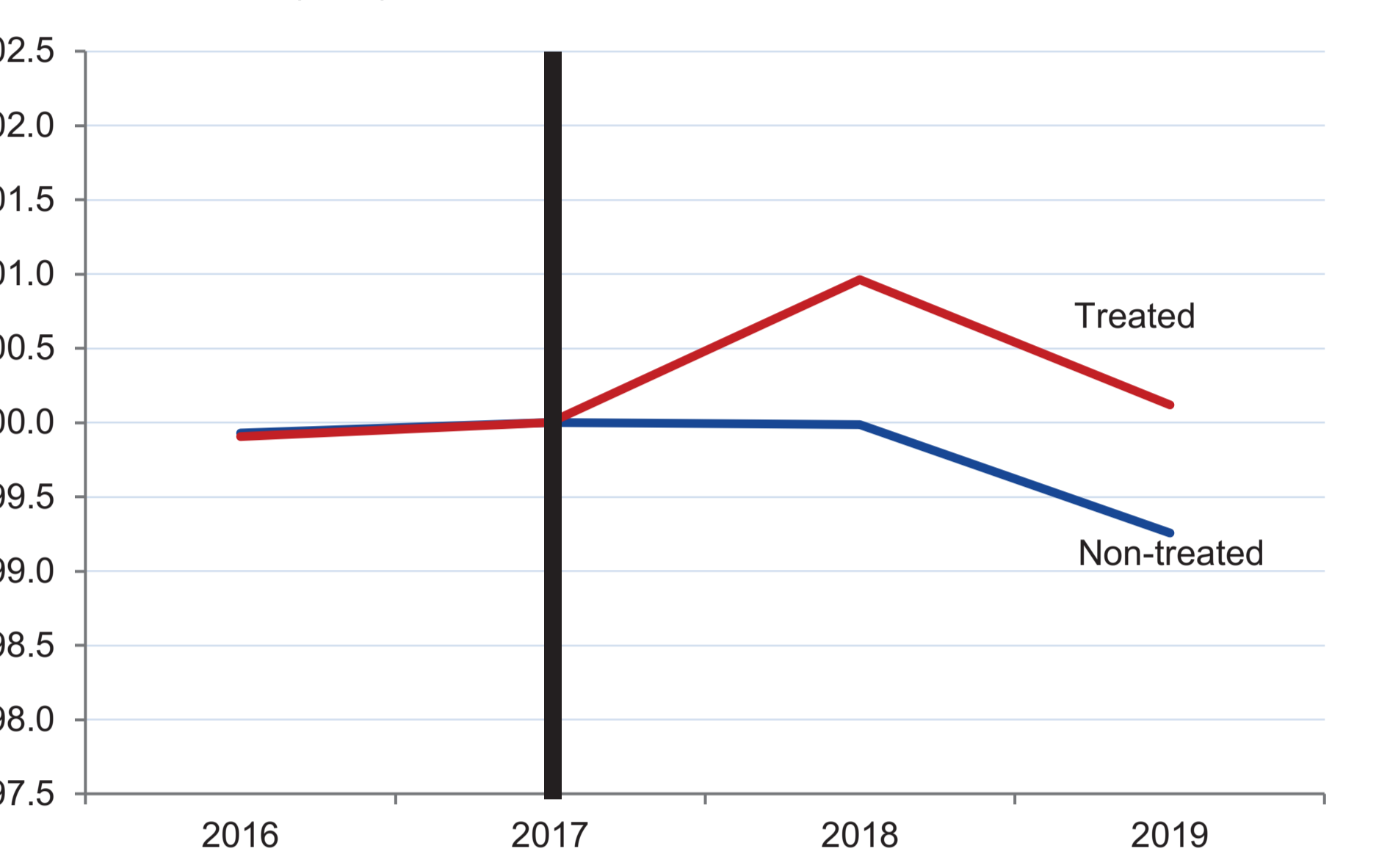


Figure 2: Average emissions of treated and control firms across time relative to the year prior to the event



### CONCLUSIONS

Higher leverage is associated with lower emissions, but only up to a certain threshold of leverage. Moreover, an increase in leverage is associated with a decrease in emissions, but only up to a certain threshold of initial leverage.

- Debt financing of firms subject to a constraint on their emissions contributes to emissions reduction and cleaner production as long as leverage is below 50%, while the relation is inverse for levels of leverage above this threshold.
- An increase in leverage is associated with an improvement in the transition performance of the firm in the next years when the firm is not highly indebted.
- This is achieved throughout an improvement in emission efficiency driven by emissions reduction and not merely by economic activity contraction.

The study sheds light on the existence of a group of firms that are too indebted for the low-carbon transition. These firms do not reduce their emissions even when they are exposed to the steeply increasing cost of their pollution.

- Our difference-in-differences analysis concludes that firms reduced their emissions on average in response to the steep increase in emissions prices triggered by the introduction of the EU ETS Directive in March 2018.
- However, this is not observed for the sub-sample of highly indebted firms that were exposed to the same growing price of emissions.

Our findings contribute to policy discussions related to the scope and role of the EU ETS within the low-carbon transition, firms' access to transition finance and the role of debt as a driver of emission reduction.

- With rising emissions prices, after 2018, the EU ETS has proven its ability to encourage firms with adequate leverage to reduce emissions.
- High debt financing is associated with improved transition performance for firms that are active in the EU ETS while not being highly indebted. Debt proves to be an essential source of transition finance.
- In this context, the development of green and sustainable debt markets might be essential. By the means of these instruments, highly indebted firms could still obtain access to transition finance by committing to a green use of proceeds.



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