Economic performance & climate policy in the EU:
Insights from firm-level data

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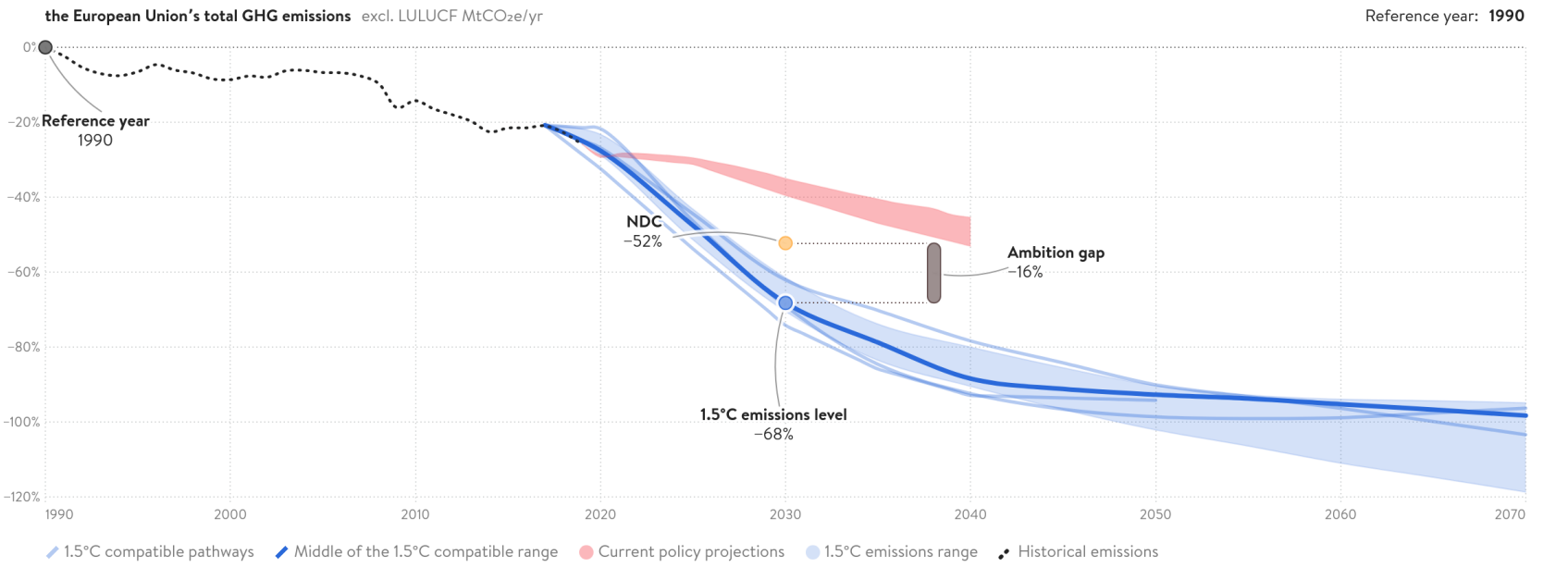
PRELIMINARY RESULTS

7 Feb. 2024

Climate vs competitiveness?

Need to increase stringency of climate policies



Source: Climate Analytics

Climate vs competitiveness?

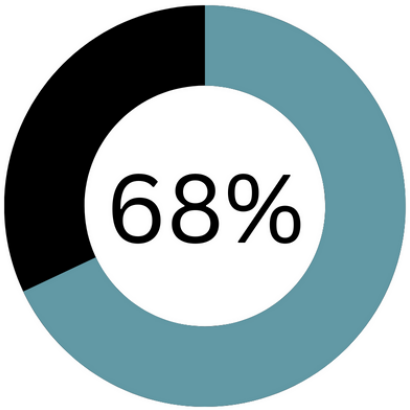
But risk of carbon leakage

If international partners do not share a comparable ambition to the EU, there is a risk of carbon leakage.

– European Commission, 2021

The EU ETS

Cornerstone of EU industrial decarbonization



EU Industrial emissions covered

(Excluding power sector)

Harmonized and efficient approach to address climate change within Single Market

Market-based instrument

$\simeq$ 2,000 industrial firms

3 types of GHGs (CO_2, N_2O and PFCs)

Energy-intensive sectors (cement, metal, chemicals, glass, ceramics, ...)

The EU ETS

Increasing stringency

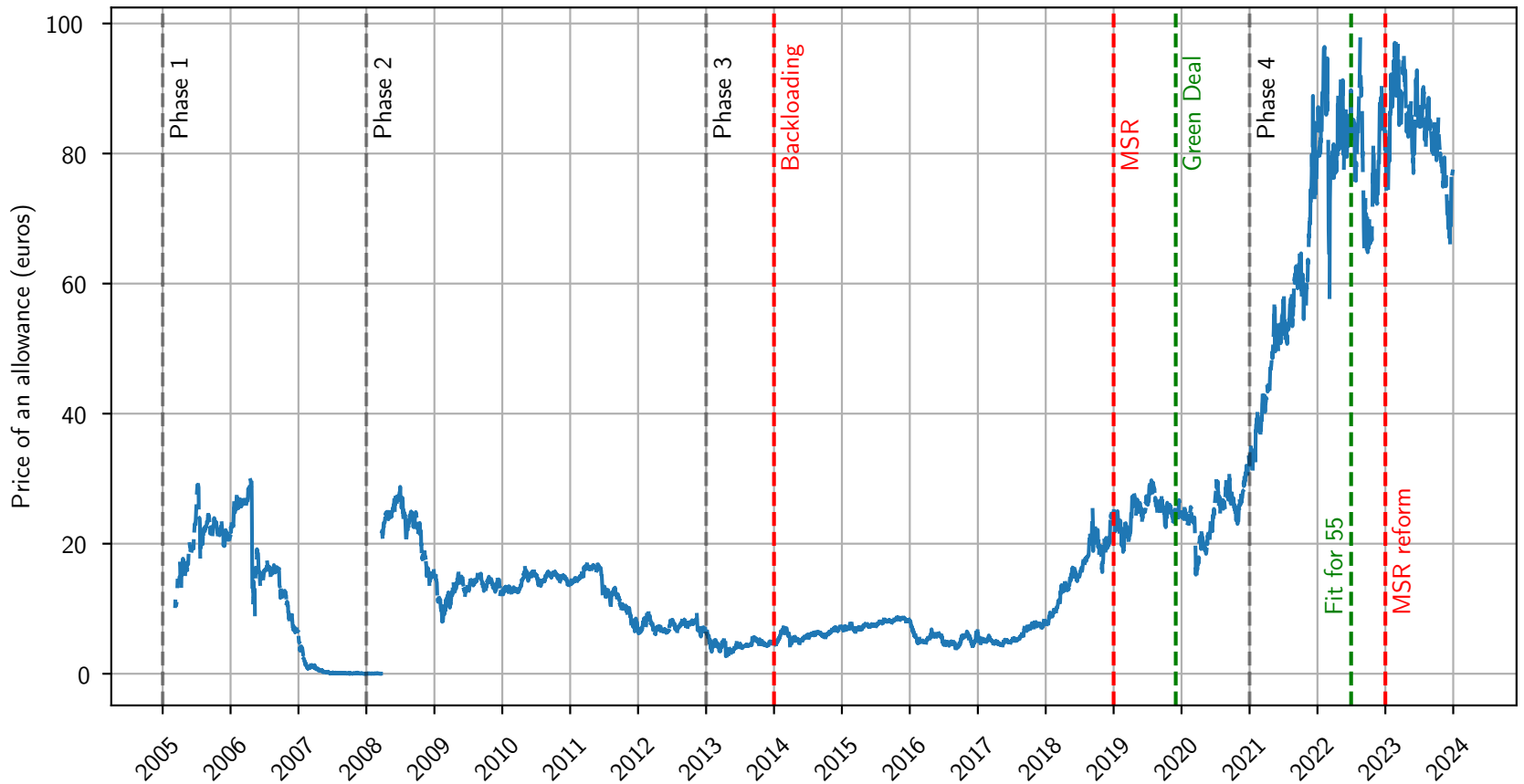


Figure: EUA price

Expectations based on literature

→ **Pollution haven hypothesis**

- » Firms in regulated countries will move to unregulated countries to avoid additional costs and competitiveness loss (Markusen, 1975; Markusen et al., 1993)
- » No negative impacts on economic performance or competitiveness so far (Joltreau & Sommerfeld, 2019; Trinks et al., 2020; Verde et al., 2019)

→ **Porter hypothesis** (Dechezleprêtre & Kruse, 2018; Porter & van der Linde, 1995)

- » Climate policies induce technological progress (weak version)
- » Maybe also induce productivity increases (strong version)
- » Some increases in patenting and R&D expenditure (Borghesi et al., 2015; Calel, 2020; Calel & Dechezleprêtre, 2014; Teixidó et al., 2019)

BUT evidence is mostly focused on first two phases of EU ETS

Research question

What is the impact of the EU ETS' third phase on firms' economic performance?

Contributions:

- → Construction of micro-level dataset connecting financial and emissions data at the firm level covering the entire third phase
- → New measure of emission intensity in volumes based on this data
- → Analysis of firms' climate and economic performance

Data construction

Merging two data sources:

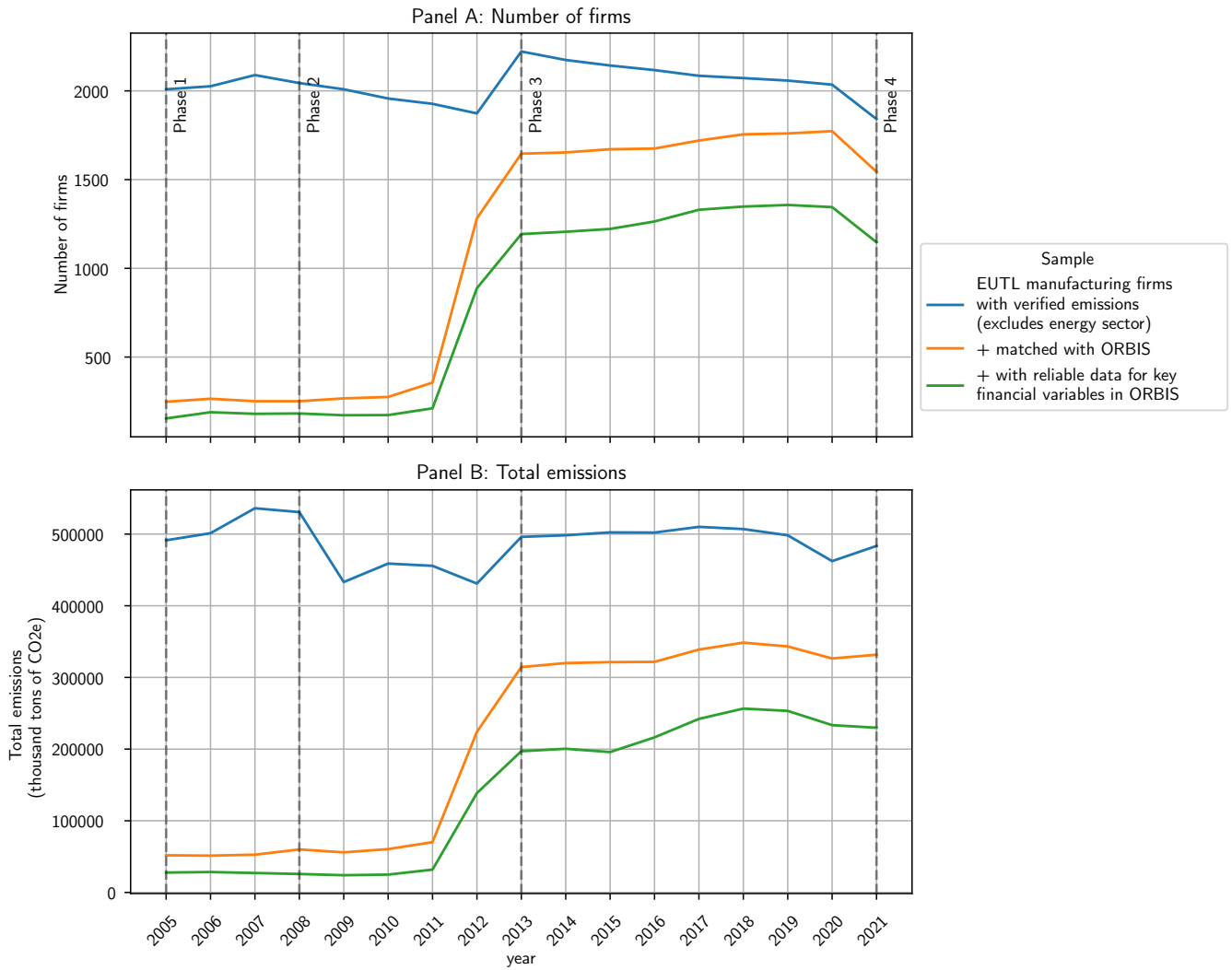
- → European Union Transaction Log (EUTL) → database reporting verified emissions for all installations regulated under the EU ETS
- → ORBIS → firm-level financial data

Building on work from other researchers:

- → European Union Transaction Log scraped and structured by Abrell (2022)
- → Initial matching between EUTL and ORBIS from Letout (2021) → JRC project financed by DG GROW, based on 2019 account holder list
- → Improved and updated matching procedure (current work with DG GROW)

Database coverage

≈ 75% manufacturing firms covered for phase 3



New measure of emission intensity

Volume-based

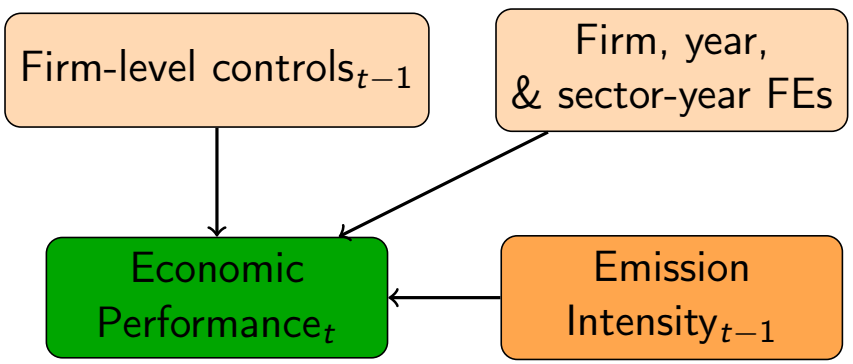
$$\underbrace{FA_{inst,t}}_{\text{In data}} = V_{inst,t-1} \times \underbrace{B_{product} \times CSCF_t \times TCF_{sect,t}}_{\text{In regulation}}$$

So we can recover production volumes as follows:

$$V_{inst,t-1} = FA_{inst,t} \times \frac{1}{B_{product} \times CSCF_t \times TCF_{sect,t}}$$

Limitation: free allocations are determined at the SUB-installation level, and we do not have data at this level of granularity.
To mitigate a potential bias, we use Monte Carlo simulations based on different product benchmarks.

General approach



Specification follows Trinks et al. (2020).

→ **Economic Performance**:
- » ROA
- » $\frac{\text{Turnover}}{\text{Costs}}$
- » Profit margin
- » EBITDA margin
- » Labor productivity
- » Markup (TL)

→ **Firm-level controls**:
- » Turnover
- » Current ratio ($= \frac{\text{Assets}}{\text{Liabilities}}$)
- » Opened installations

Addressing endogeneity

Potential endogeneity between firms' Economic and Emission Performance

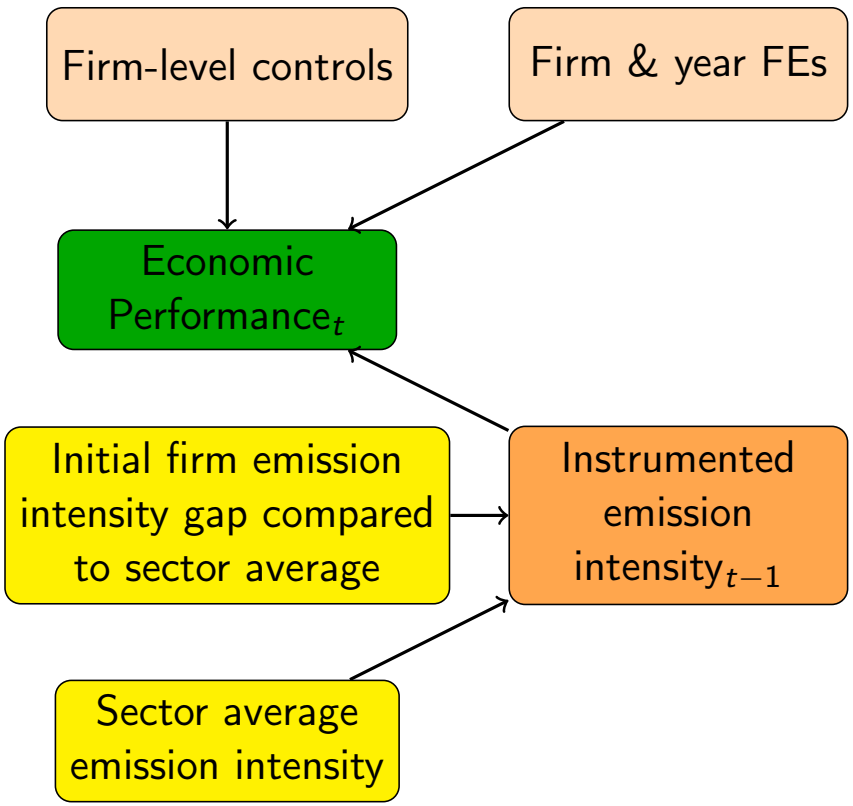
→ Firms with more overall efficiency will likely perform better in both measures (simultaneity bias)

Possible solutions:

→ Diff-in-diff → Not possible because no control group

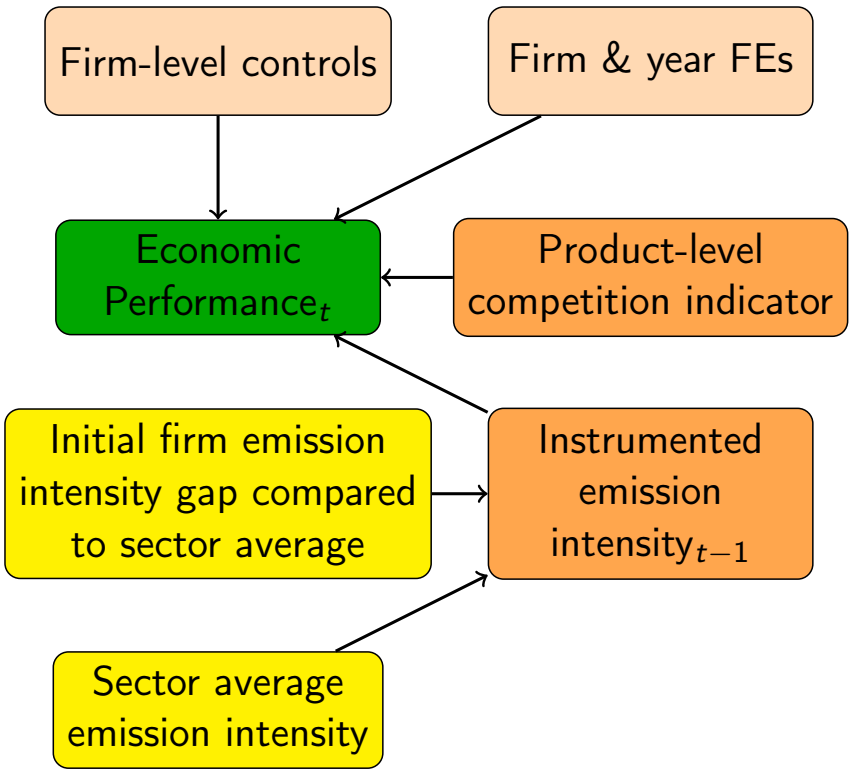
→ IV strategy → Bartik instrument applicable

IV strategy



Following Fontagné et al. (2023), we use a Bartik instrument

Competition setting

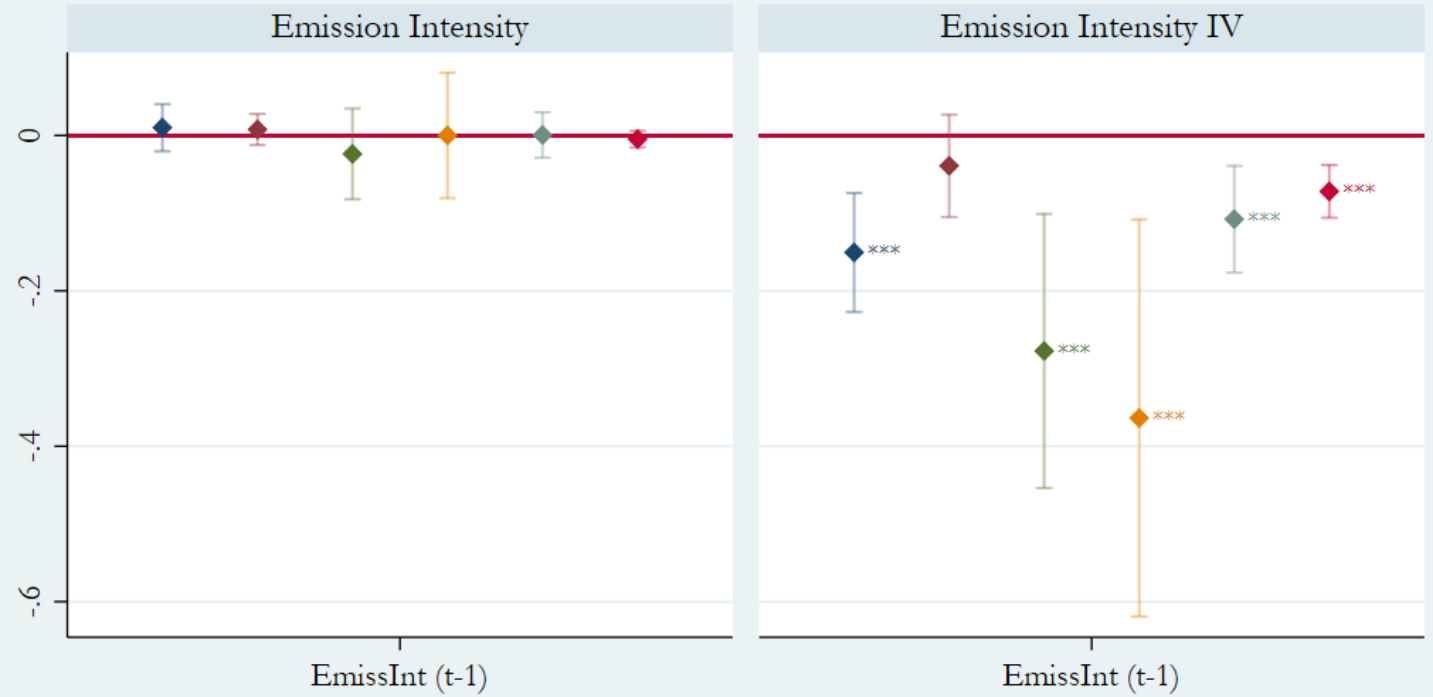


Two indicators of **Competition setting**:

→ Import Intensity ▷

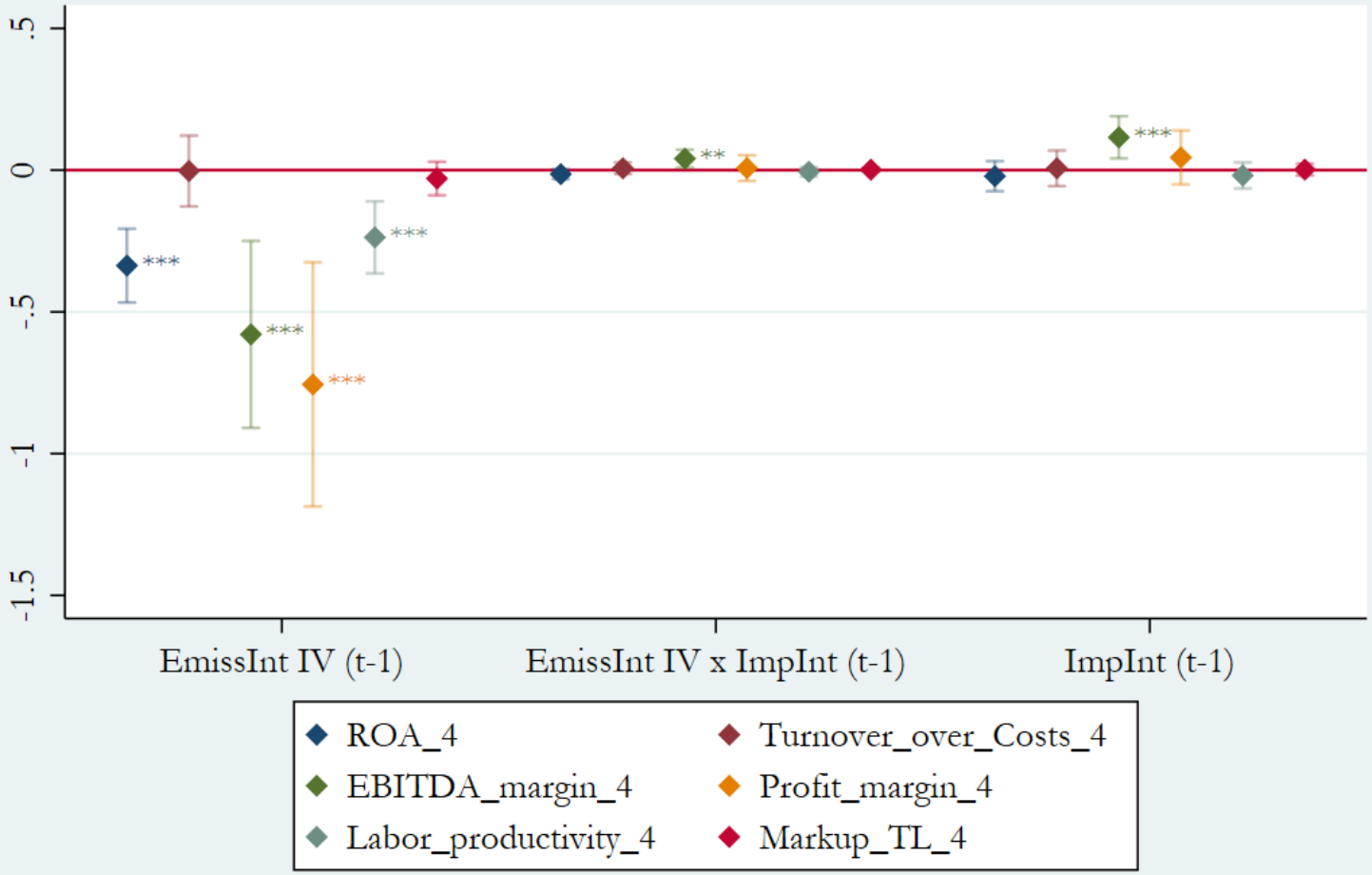
→ Product Specialization ▷

Emission Intensity



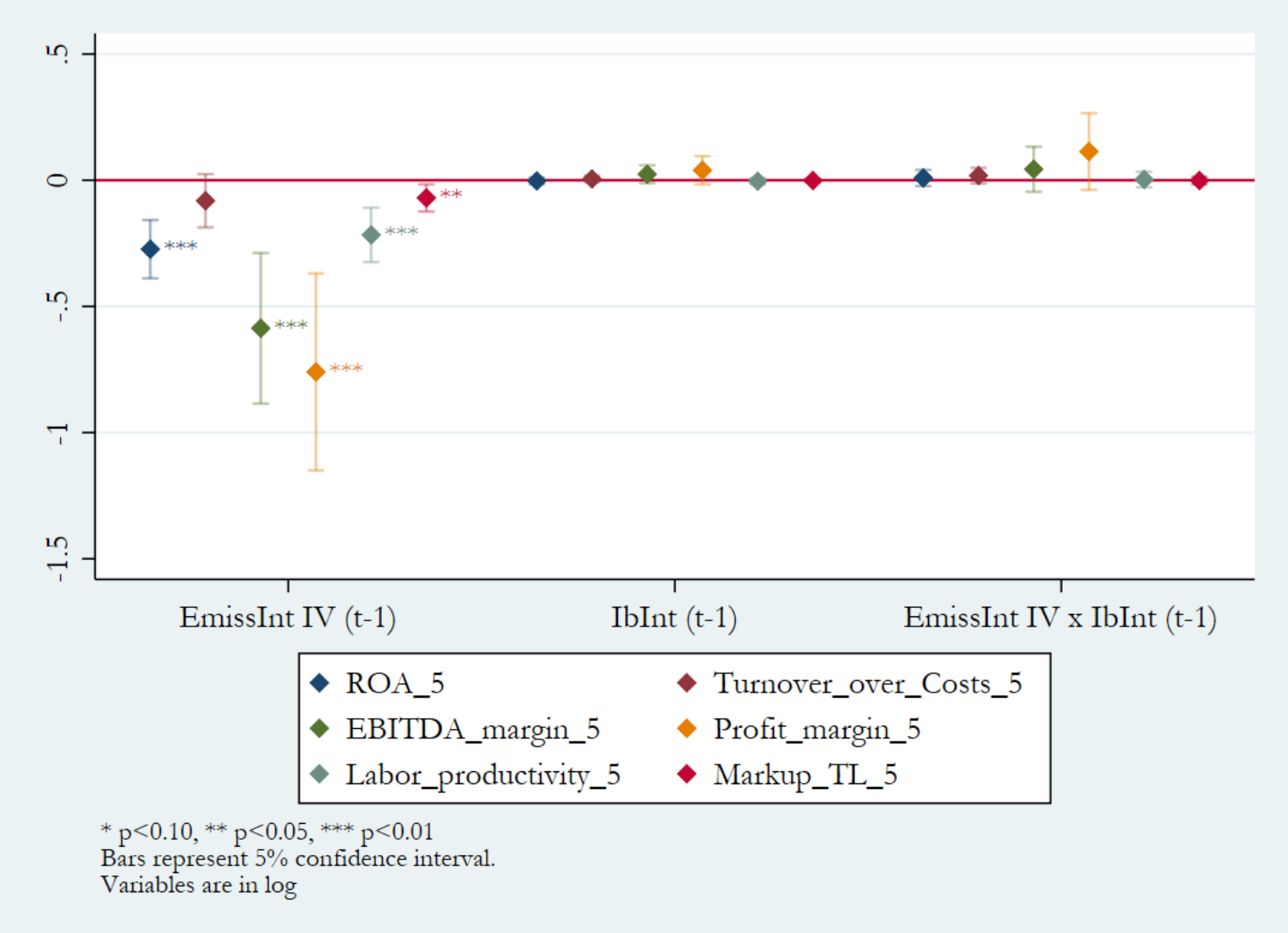
* p<0.10, ** p<0.05, *** p<0.01
Bars represent 5% confidence interval.
Variables are in log

Emission Intensity IV x Import Intensity



* p<0.10, ** p<0.05, *** p<0.01
Bars represent 5% confidence interval.
Variables are in log

Emission Intensity IV x Intra-branch Trade Intensity



* p<0.10, ** p<0.05, *** p<0.01
Bars represent 5% confidence interval.
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Discussion and policy conclusions

- → In line with previous evidence, results show little or negative effect of Emission Performance on Economic Performance
- → Even in its third phase, EU ETS does not seem to have had negative effect on participating industrial firms
- → Potential explanation: firms have adapted to rising carbon costs rather than relocated
- → Further analysis needed on underlying mechanisms of these results

Next steps

→ Explore channels of effects, especially innovation

→ Merging dataset with patent and/or R&D investment data

Thank you for your attention!

Questions/comments?

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Import Intensity

$$\text{Import intensity} = \frac{\text{Imports}}{\text{Domestic Production} + \text{Imports}}$$

Interpretation:

→ Size of imports compared to size of domestic market

▷ Back

Intra-industry Trade Intensity

$$\text{Intra-industry Trade Intensity} = \frac{(\text{Exports}+\text{Imports})-|\text{Exports}-\text{Imports}|}{\text{Exports}+\text{Imports}}$$

Interpretation:

- → Indicator varies between 0 and 1
- → 0 = All trade flows are inter-industry so no product differenciation
- → 1 = All trade flows are intra-industry so full differenciation of products

▷ Back