Does Pricing Carbon Mitigate Climate Change? Firm-Level Evidence from the European Union Emissions Trading Scheme

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Carbon Pricing

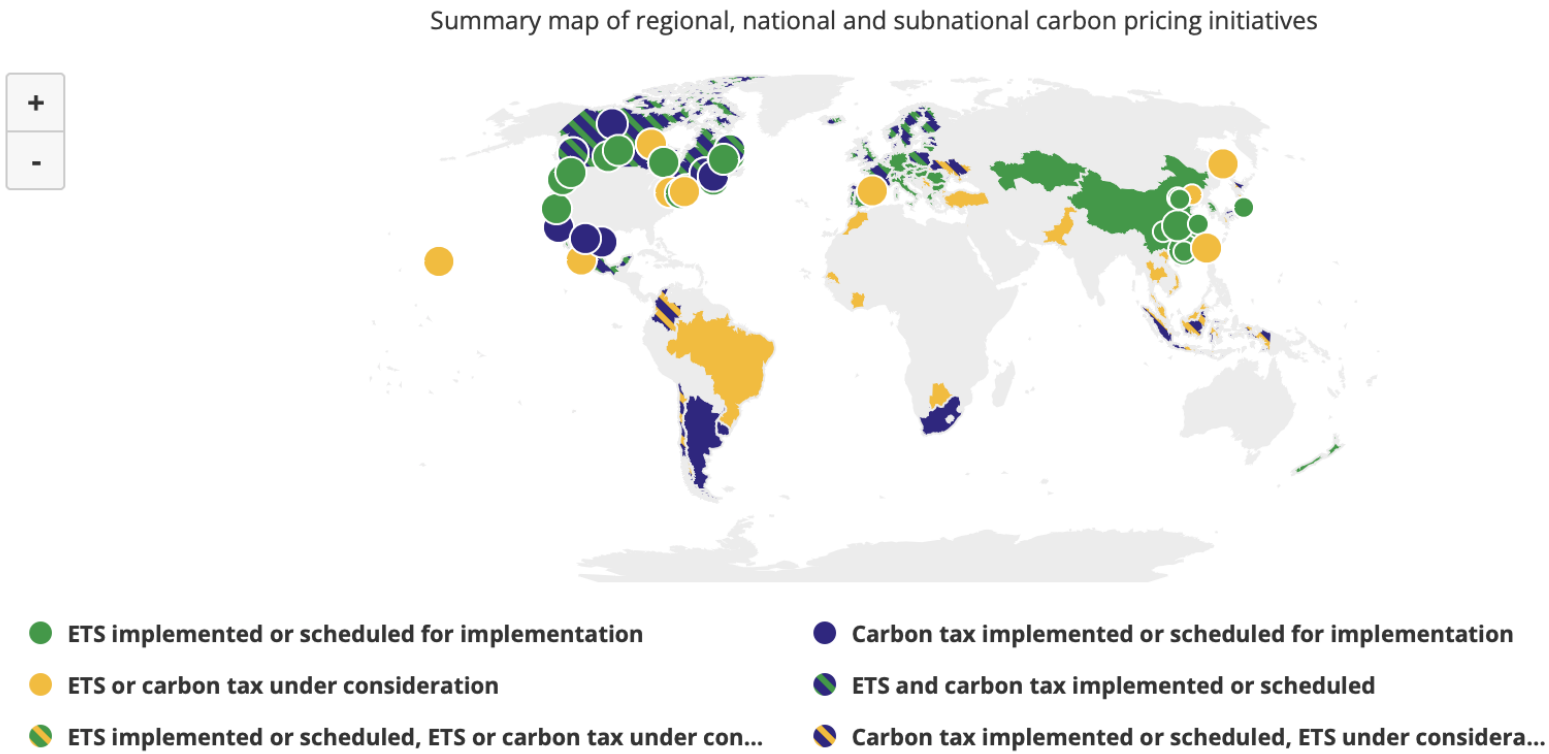

Figure: Carbon Pricing Dashboard, Source: World Bank

- 68 carbon pricing initiatives implemented (2022)
- Initiatives cover 12 $GtCO_2e$, representing 23% of global greenhouse gas emissions

Why is this important?

- Evaluate impact of the EU emissions trading scheme (ETS), a key climate change policy
  - Shift from command & control to market-based regulations (cap-and-trade)
  - Total emissions **cap** set by policy maker
  - **Trade** between firms will lead to least cost abatement

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  - Shift from command & control to market-based regulations (cap-and-trade)
  - Total emissions **cap** set by policy maker
  - **Trade** between firms will lead to least cost abatement
  - Yet, emission trading can lead to **leakage concerns**
  - Little evidence on CO_2 reductions and impact on regulated firms using detailed micro-level data

Paper overview

Research questions:

- How does the EU-ETS affect CO_2 emissions and firm-level outcomes?
- Does the EU-ETS lead to a global reduction in emissions?
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Data and empirical methodology:

- Combination of detailed administrative datasets: manufacturing survey, financial data, imports data, investment data, EU transaction log
- Focus on the time period around the introduction of the ETS and the first two trading phases (1996 - 2012)
- CO_2 emission data based on detailed fuel consumption
- Main econometric analysis: difference-in-differences (DiD) setting combined with matching DiD

Main findings

- ETS led to a 8-12% reduction in emissions in phase II (2008-2012), but not in phase I (2005-2007)
- Aggregate emissions fell by 4.7 million tons of CO2 (roughly one quarter of aggregate emission reduction during that period)
- ETS likely led to global emissions reductions:
  - No evidence on economic performance
  - No trade effects
  - No substitution to electricity
- **Main mechanism:** investment in clean production technologies

Contributions

- Rich data that allows authors to get into main mechanisms of CO_2 reductions
- Focus on environmental, as well as economic outcomes
- Provide evidence on the functioning of the EU ETS and show that market-based mechanisms are cost-effective way of reducing emissions

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Comments:

1. Confounders: economic crisis and carbon tax
2. Analysis of additional years
3. Policy: current ETS developments

1. Potential confounders

- Two potential confounders should be discussed more in detail

  1. Financial and economic crisis of 2008 and 2009
     - Main effect (trading phase II) conincided with financial and economic crisis and rebound
     - In case treated firms had different growth expectations, might have been more likely to invest in new (efficient) machinery

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1. Financial and economic crisis of 2008 and 2009
   - Main effect (trading phase II) conincided with financial and economic crisis and rebound
   - In case treated firms had different growth expectations, might have been more likely to invest in new (efficient) machinery
2. Planned implementation of carbon tax (fossil fuel tax)
   - The French government planned to levy a fossil fuel tax in 2009, which was planned to be effective January 2010
   - Bill was blocked by French Constitutional Council on 30 December 2009
   - Final implementation of carbon tax in 2014

2. Analysis of additional years

Figure: EU Carbon Permits (EUR), Source: Trading Economics

- Later trading phases might help to disentangle *announcement effect* from pure *price effect* of policy
- Endowment effects (and possible manipulation of CO_2 emissions prior to ETS implementation) should play a minor role in later trading phases

3. Policy discussion

- Paper focuses in great detail on impact of ETS on emission reduction, yet does not enter the discussion about the efficient implementation of the policy
- Finding no impact on competitiveness of treated firms and CO_2 leakage seem to suggest that "carbon-boarder adjustment" might not be necesary