The Strange Case of Dr. Competition and Mr. Climate

Assessing the compatibility of EU industrial decarbonization and competitiveness

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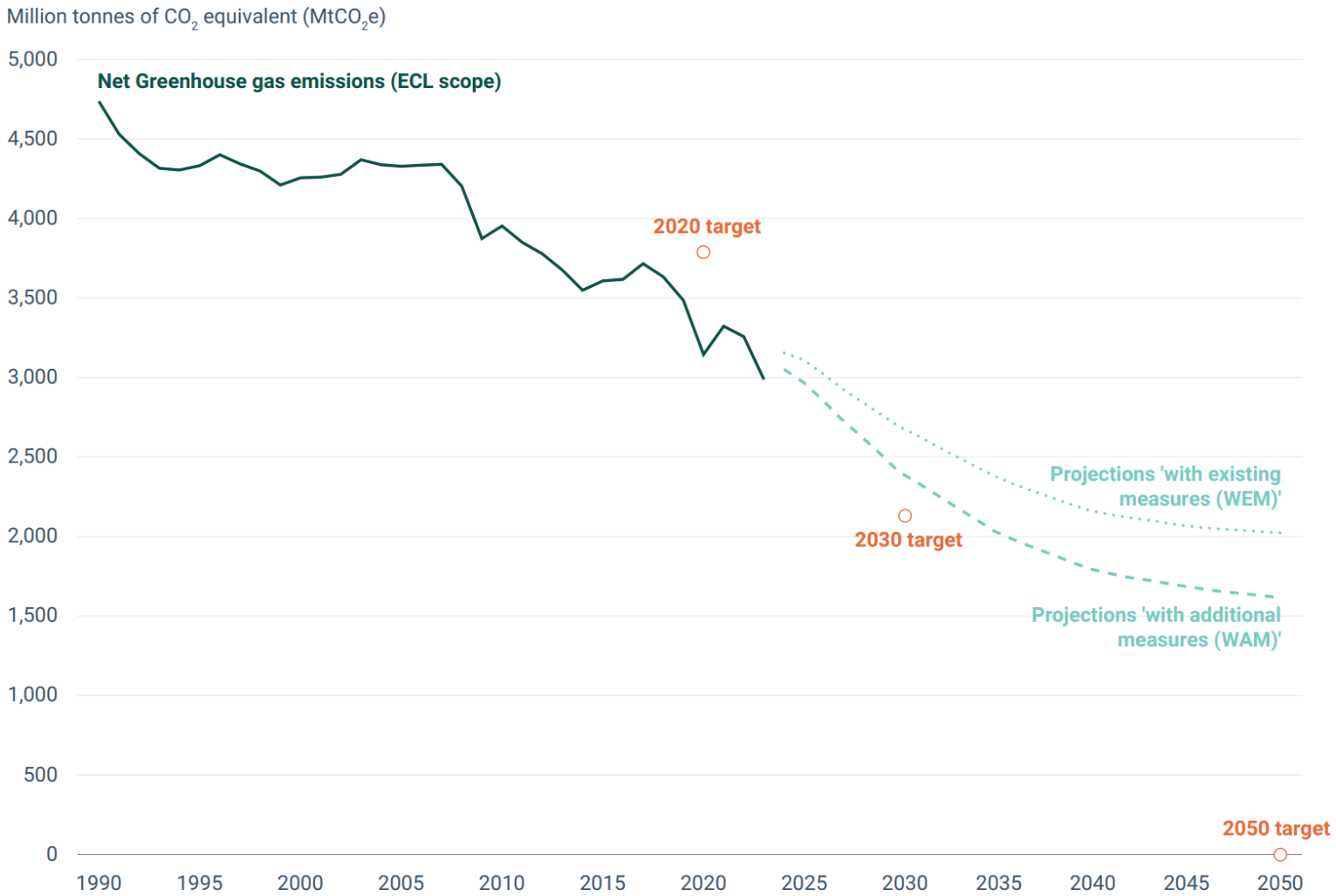
CEC Dauphine Université Paris | PSL
ADEME Agence de la transition écologique

Introducing Mr. Climate

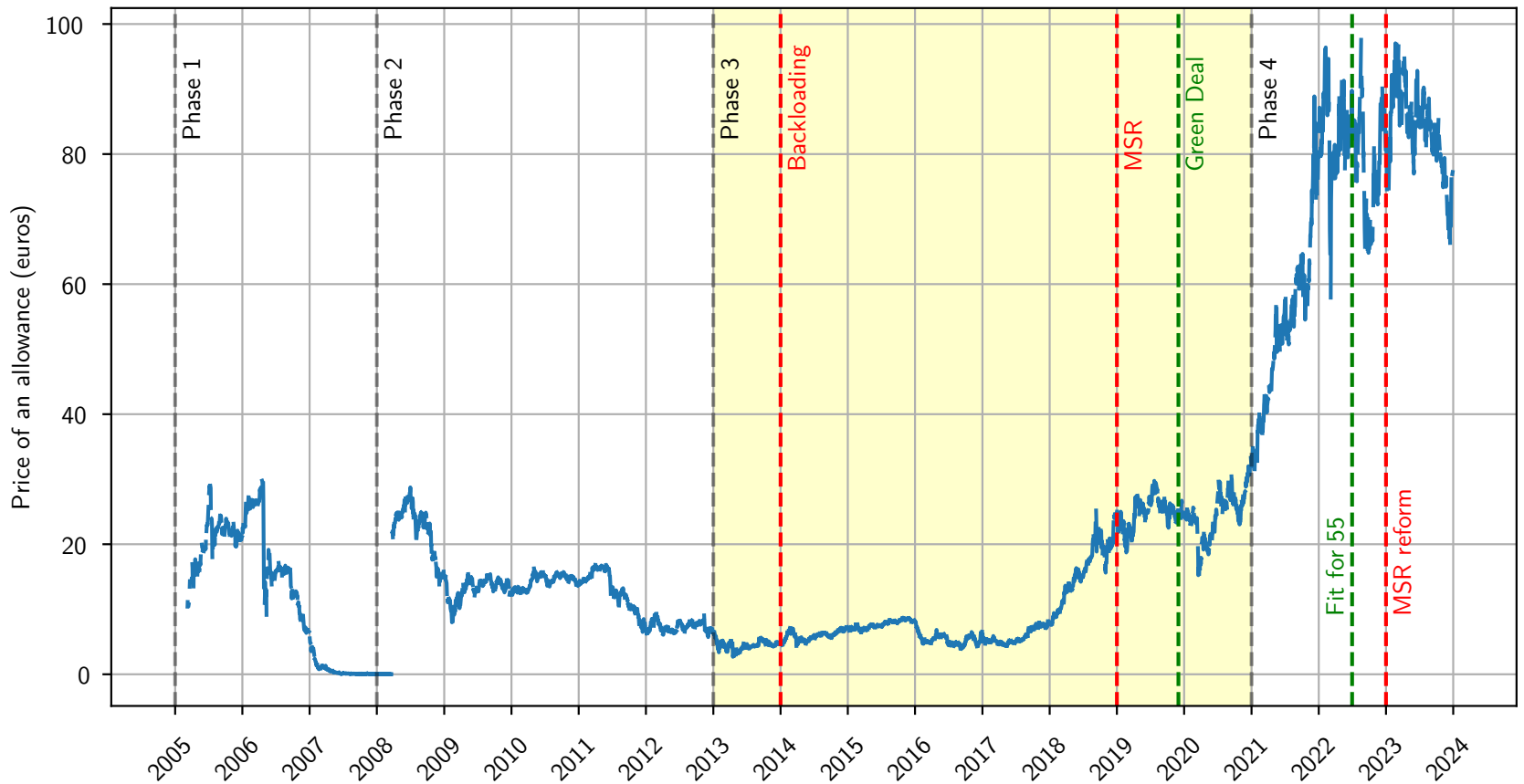
EU carbon emission trend



Source: European Environmental Agency (2025)

Introducing Mr. Climate

The EU Emissions Trading Scheme (EU ETS)



Source: International Carbon Action Partnership

Introducing Dr. Competition

The Competitiveness Compass

Photo credit: ENDS Europe

Heavy industry in the EU

> *"The pooling of coal and steel production should immediately provide for the setting up of common foundations for economic development as a first step in the federation of Europe"*

Schuman Declaration (1950)

Heavy industry in the EU

"The pooling of coal and steel production should immediately provide for the setting up of common foundations for economic development as a first step in the federation of Europe"

Schuman Declaration (1950)

7%
Employment

10%
Value added

20%
GHG emissions

Source: Eurostat SBS and EEA (2024)

The strange case of this thesis

Can EU industrial decarbonization and competitiveness go hand in hand?

The strange case of this thesis

Can EU industrial decarbonization and competitiveness go hand in hand?

Chapter 1
Literature review

Chapter 2
New ex ante measure of carbon leakage

Chapter 3
Ex post evaluation of impacts of decarbonization

Chapter 4
Ex post evaluation of efficiency and innovation

Chapter 1 – The case for carbon leakage and border adjustments: where do economists stand?

Environmental Economics and Policy Studies
https://doi.org/10.1007/s10018-023-00366-0

RESEARCH ARTICLE

The case for carbon leakage and border adjustments: where do economists stand?

Aliénor Cameron[1,2,3] · **Marc Baudry**[1,2]

Received: 10 November 2022 / Accepted: 17 March 2023

Co-authored with Marc Baudry
Published in *Environmental Economics and Policy Studies* (2023)

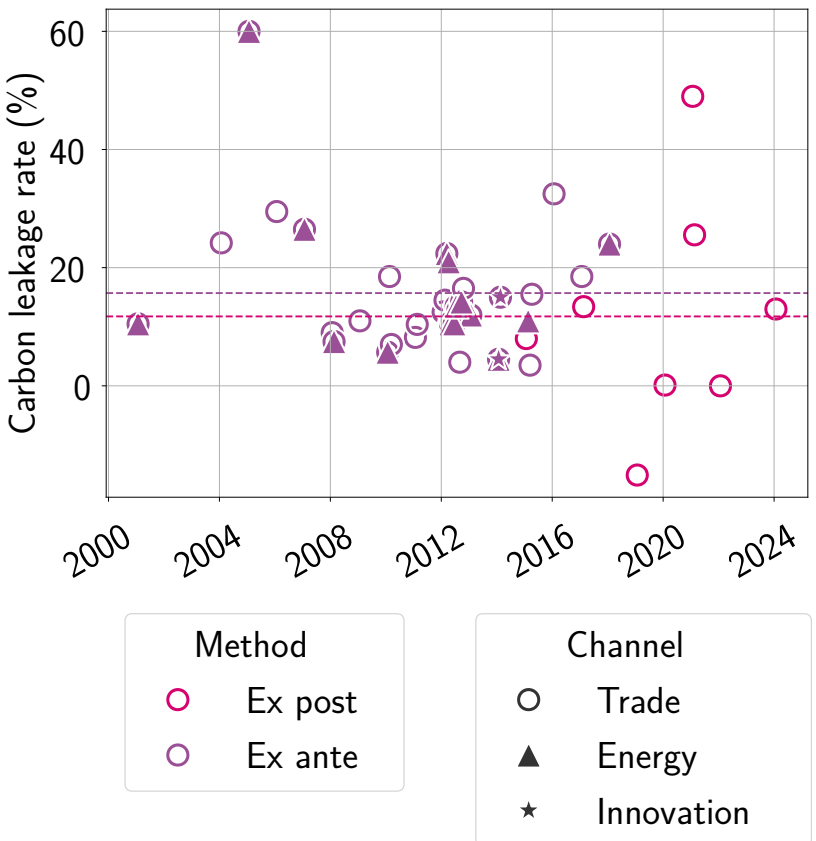
Summary and contributions

First systematic & structured literature review across **all channels of leakage** (competition, energy, innovation) **and methodologies** (theory, empirical, modeling)

Study of differences in results depending on methodology and channels

Identifies research gaps to address in rest of thesis

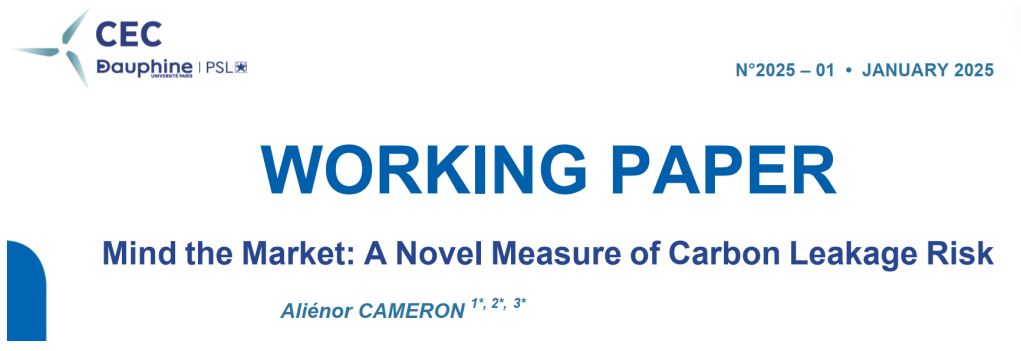
Main Results



Gaps in literature:

1. Differences between *ex ante* and *ex post* estimates?
2. Impacts of EU ETS after phase II?
3. Role of green innovation?

Chapter 2 – Mind the market: a novel measure of carbon leakage risk



Single-authored
Published as a Working Paper (CEC and EconomiX)

Summary and contributions

New *ex ante* measure of carbon leakage risk incorporating **market power**

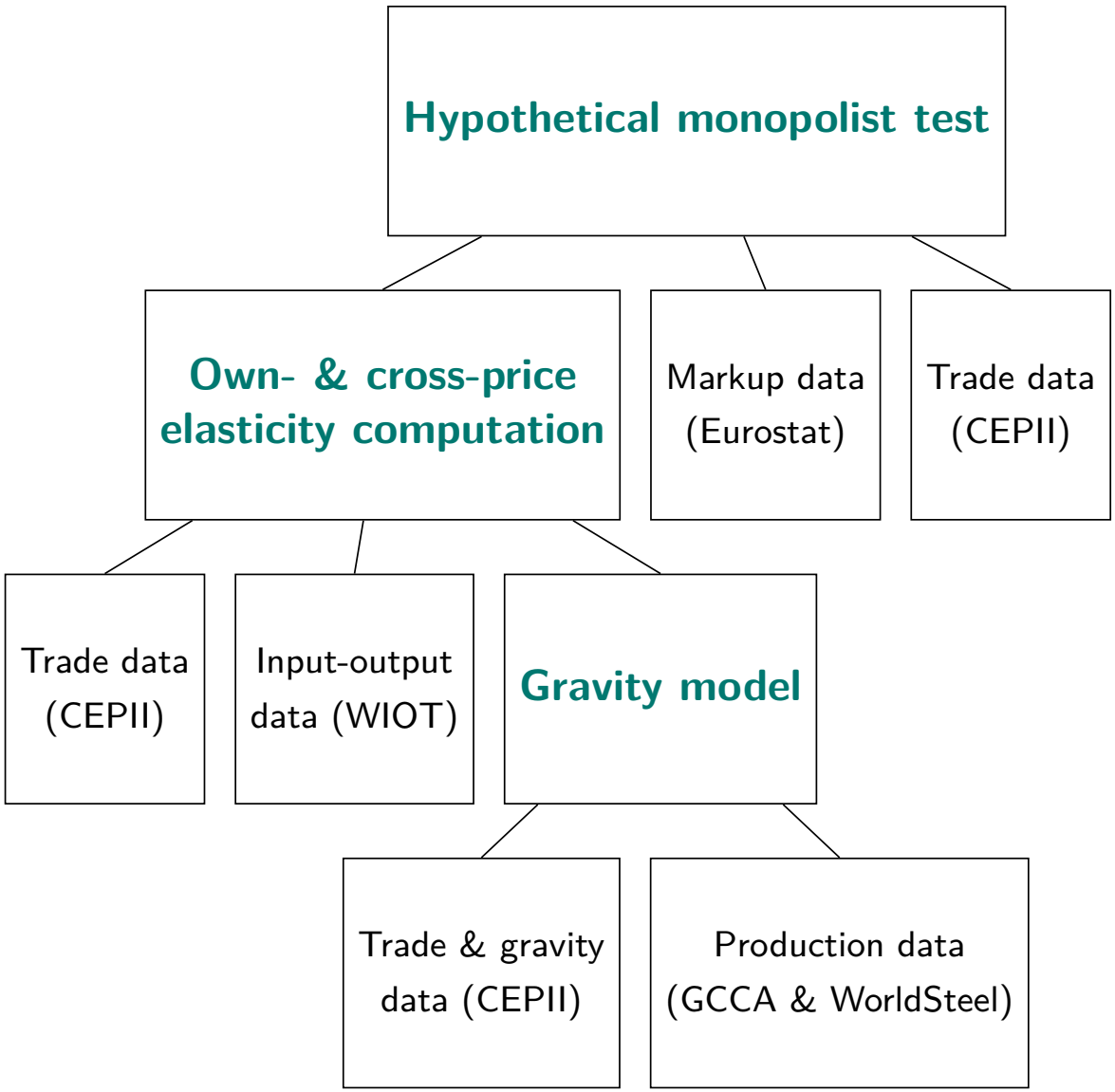
Addresses research gap 1: differences between *ex ante* and *ex post* values

European Commission indicator of carbon leakage risk has many limitations

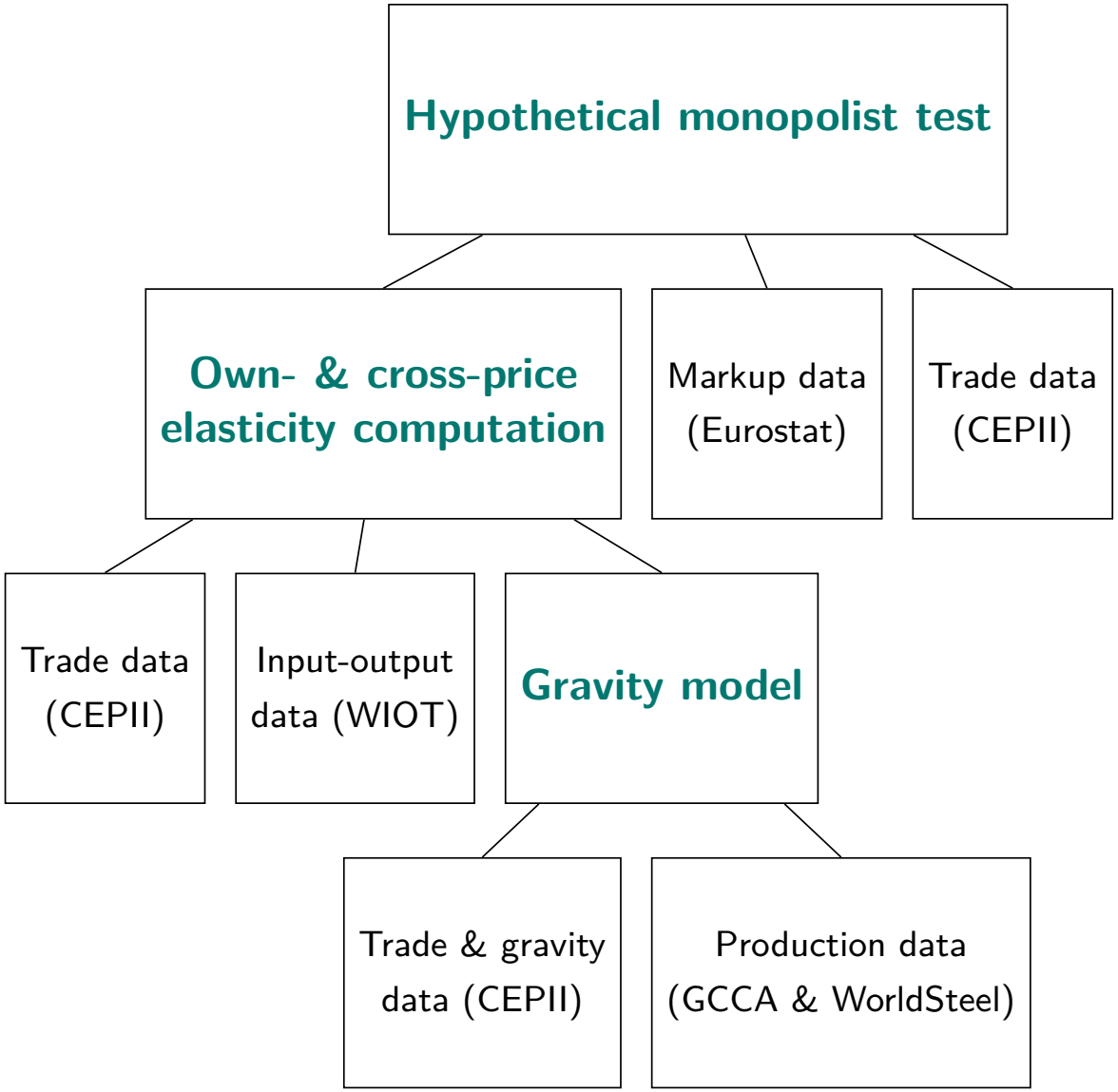
(aggregation bias, does not account for pass-through capacity, foreign output elasticities, non-price trade barriers, market power)

Time scope	2007 - 2021
Units of observation	133 countries $\times$ 4 products

Methodology



Methodology



Case study:

- → Clinker & hydraulic cement
- → Flat & long steel products

Main Results

Case study

→ Products ordered by leakage risk:

1. Clinker
2. Hydraulic cement
3. Long steel products
4. Flat steel products

→ EU producers not very present on foreign markets

Main Results

Case study

→ Products ordered by leakage risk:

1. Clinker
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→ EU producers not very present on foreign markets

Methodology

→ Product-level disaggregation very important

→ Market power matters

→ Provides price thresholds for leakage risk

Chapter 3 – Carbon intensity and corporate performance: a micro-level study of EU ETS industrial firms

Co-authored with Maria Garrone

Published as a European Commission Conference Paper

Summary and contributions

Study of **impacts of firm-level decarbonization on economic & financial outcomes** in EU ETS Phase III

Addresses research gap 2: impacts of EU ETS **after Phase II**

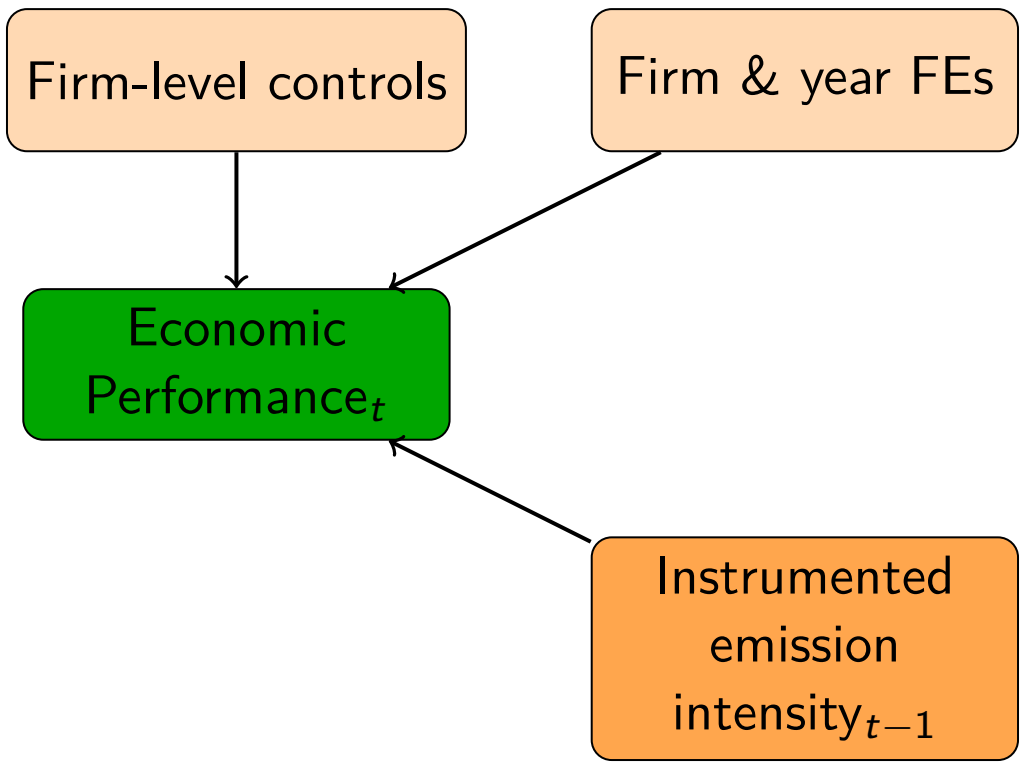
New updated & automated **matching** between two firm-level databases

New **production-based measure of emission intensity**

Time scope	2012-2019
Units of observation	1200 firms

Methodology

Two-way fixed-effects panel model with IV2SLS
(with Bartik instrument)



Main Results

- → Reduced emission intensity = **stable or improved economic/financial performance**
- → Stronger effect when international competition is accounted for
- → No short-term losses of competitiveness as a result of decarbonization

Chapter 4 – Green on paper ? The effect of green patents on EU ETS firms

Co-authored with Sylvain Belrose and Marc Baudry
Published as a Working Paper (CEC)

Summary and contributions

Study of **efficiency & technological progress** in EU ETS firms, linked to green patenting

Addresses research gap 3: **role of green innovation**

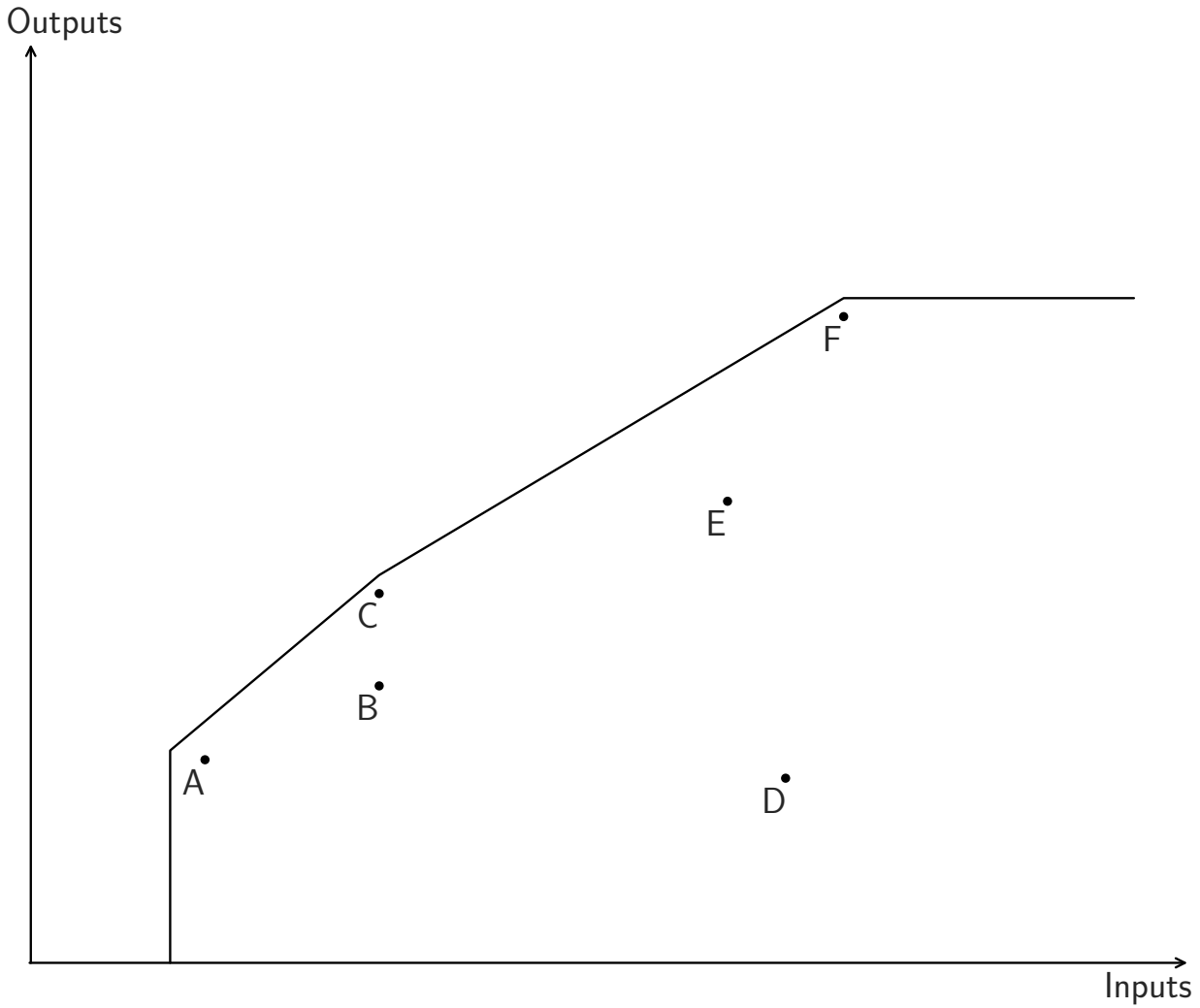
Switches to **dynamic approach**

Need to understand role of efficiency improvements vs innovation for decarbonization

Time scope	2012-2020
Units of observation	870 firms

Methodology

Step 1: Technological Frontier Analysis (Parametric Minimization Program)



Methodology

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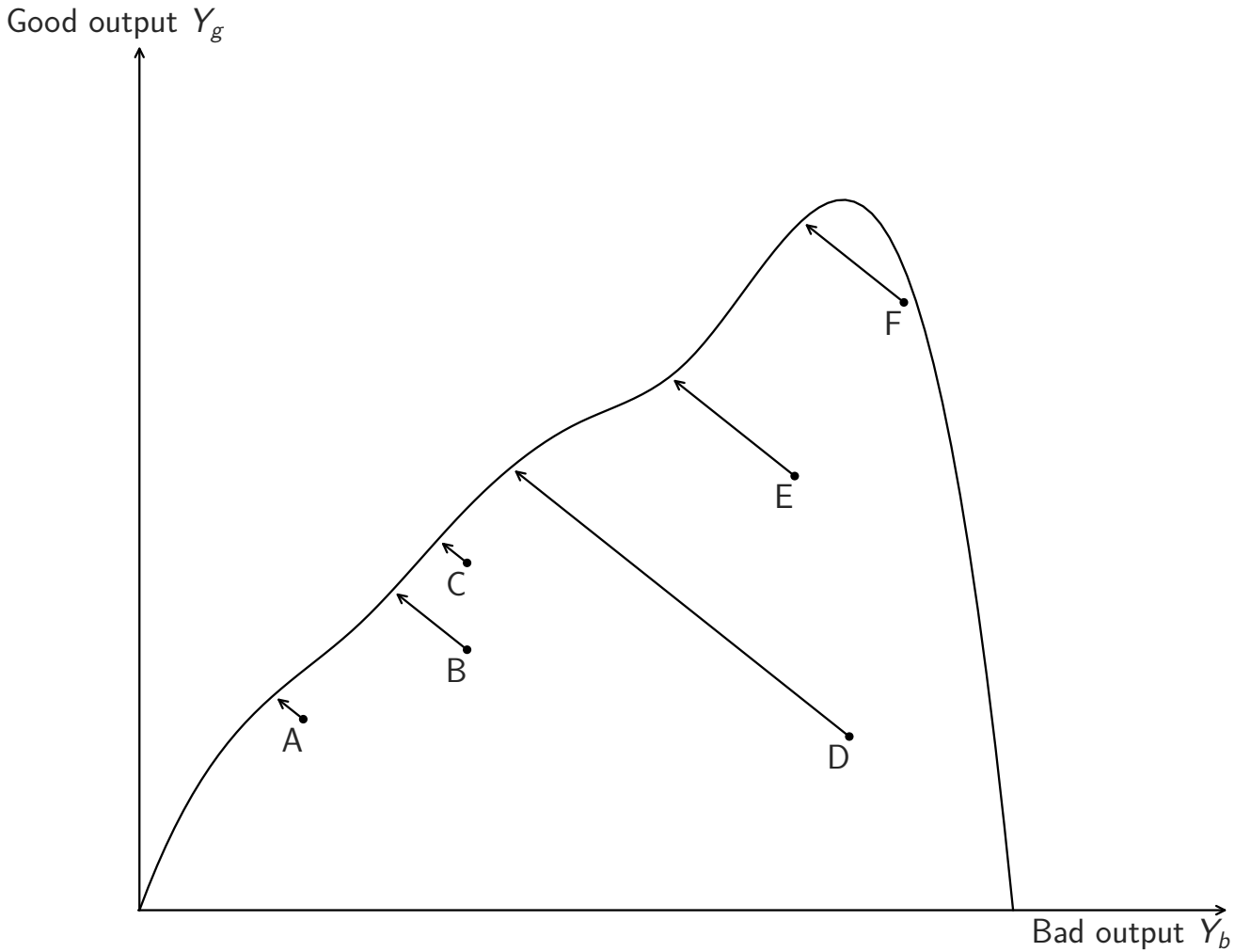
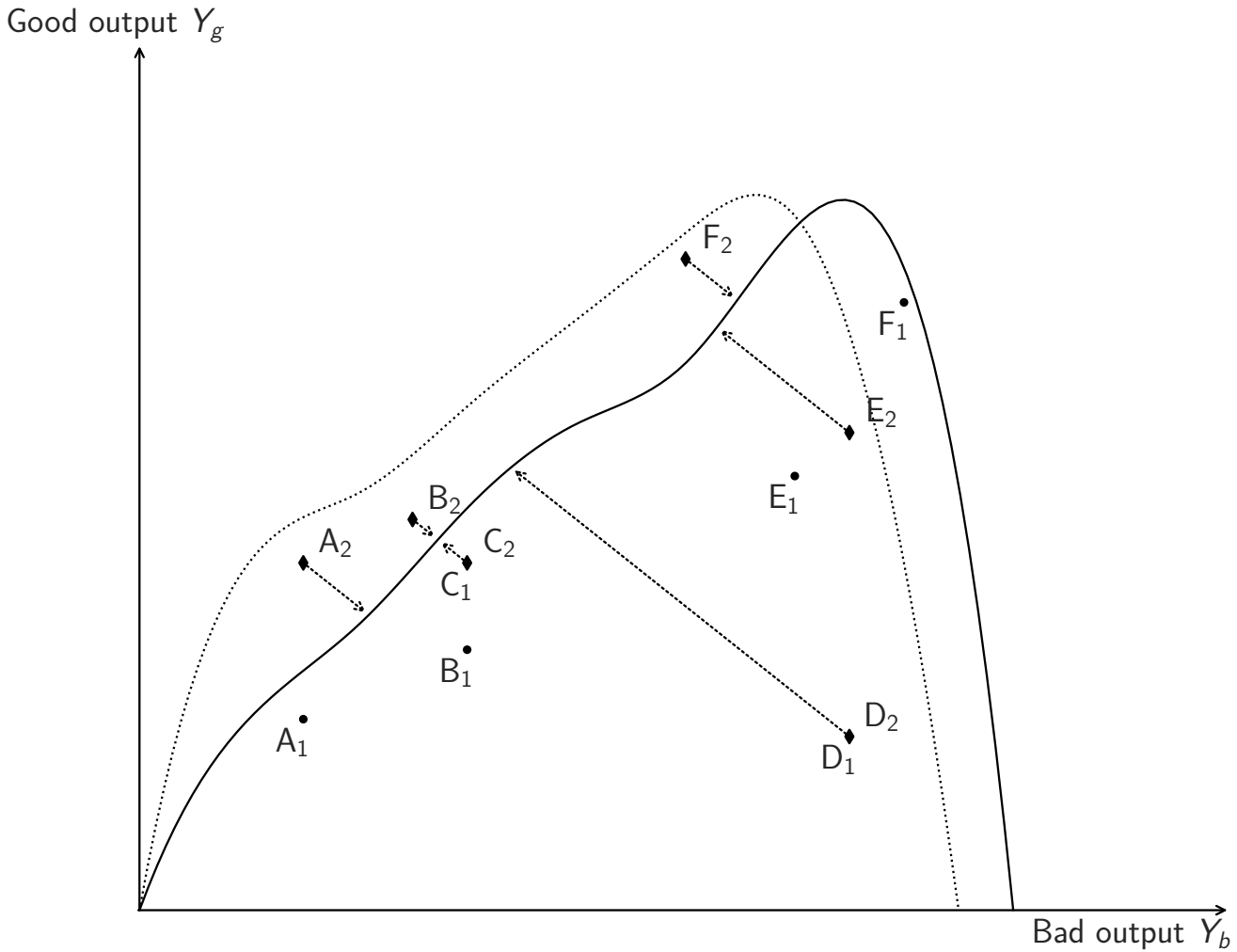


Methodology

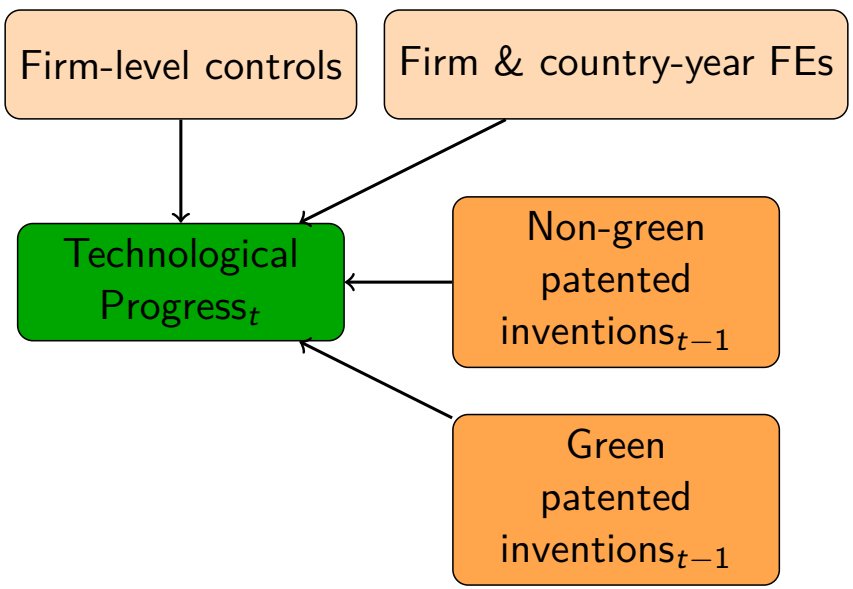
Step 1: Technological Frontier Analysis (Parametric Minimization Program)



Methodology

Step 2: Econometric Analysis

Fixed effects panel model



Main Results

- → **Heterogeneity in efficiency dispersion** between sectors
- → If all firms become 100% efficient with current technology, cuts in emissions are low
- → Green patenting = lower firm-level technological progress
- → Points to **brown technology lock-in**

General conclusion

The strange case of this Thesis

Can EU industrial decarbonization and competitiveness go hand in hand?

→ Systematic review of **all** literature on carbon leakage and border adjustments (all channels and methodologies)

→ Two static analyses of factors influencing carbon leakage risks during **Phase III of EU ETS**

→ One **dynamic analysis** of green innovation and technological progress in EU ETS firms

→ **Open-source matching** of firm-level databases + associated algorithm & methodology

Policy recommendations

Can EU industrial decarbonization and competitiveness go hand in hand?

Policy recommendations

Can EU industrial decarbonization and competitiveness go hand in hand?

Chapter 1
Unlock benefits of innovation channel

Chapter 2
Account for market power in carbon leakage evaluations

Chapter 3
Develop better data and ex post evaluations

Chapter 4
Monitor and address laggard-leader dynamics & tech lock-in

Thank you for your attention!