Understanding overlapping climate policies

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Research paper

This talk is mostly based on a recent EPRG research paper:

"*Understanding overlapping policies: Internal carbon leakage and the punctured waterbed*", March 2019

With Grischa Perino (Hamburg) & Arthur van Benthem (Wharton)

EPRG Working Paper 1910 & NBER Working Paper 25643
https://www.eprg.group.cam.ac.uk/eprg-working-paper-1910/

EU climate policy: EU ETS + overlapping policies

2018 EU ETS reforms

- Market Stability Reserve (MSR) started in 2019
- MSR from 2023 will cancel fraction of "excess'" EUAs
  - From "plain vanilla" ETS to complex "hybrid" instrument

$\Rightarrow$ Long-run emissions cap now depends on market outcomes

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Overlapping climate policies

- Many additional policies by individual EU countries
- Often apply to individual sector also covered by EU ETS
  - Carbon price floor, renewables support, energy efficiency

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⇒ **Key question**: What is the climate benefit of such unilateral overlapping policies?

“Waterbed effect” inside the EU ETS

Old EU ETS (fixed cap)

- Say overlapping policy cuts EU emissions demand by 1 tCO_2
- Fixed cap: 1 tCO_2 more emissions elsewhere in EU ETS

$\Rightarrow$ Waterbed effect always 100%

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Missing link: By how much does overlapping policy actually reduce EU emissions demand?

— EU markets are interconnected… (e.g. electricity)

Plan for this talk

① **Conceptual framework**

② Internal carbon leakage
- Cost-raising policy
- Demand-reducing policy

③ Waterbed effect under new EU ETS MSR

④ Empirical estimates
- Europe
- North America

⑤ Conclusions

Conceptual framework: Waterbed & leakage

What is the equilibrium emissions impact of overlapping policy?

$$\Delta e_t^* = [1 - W_t] \times \underbrace{[1 - L_{it}] \times \overbrace{\Delta e_{it}}^{\substack{= \text{change in domestic} \\ \text{emissions demand} < 0}}}_{\substack{= \text{change in EU-wide} \\ \text{emissions demand} \lessgtr 0?}}$$

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3. **Plain vanilla carbon tax**
   — Zero waterbed $W_t=0$ because no emissions cap

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Overlapping policy imposes extra domestic carbon price

- National carbon price floor on power generation (GB, NL)

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Proposition 1

$$L_i^{\text{cost}} = \frac{\text{emissions intensity}_j}{\text{emissions intensity}_i} \left[\frac{\text{market share}_j}{\text{market share}_j + \frac{|\text{elasticity of demand}|}{\text{elasticity of } j\text{'s supply}}} \right] > 0$$

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1. Leakage positive & above 100% if *j*’s firms (imports) very dirty
2. Rationale for regional carbon price floor:
   Higher “domestic” market share so less internal leakage

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1. Leakage always negative: foreign firms also cut emissions
   - Domestic renewables displace fossil-fuel imports

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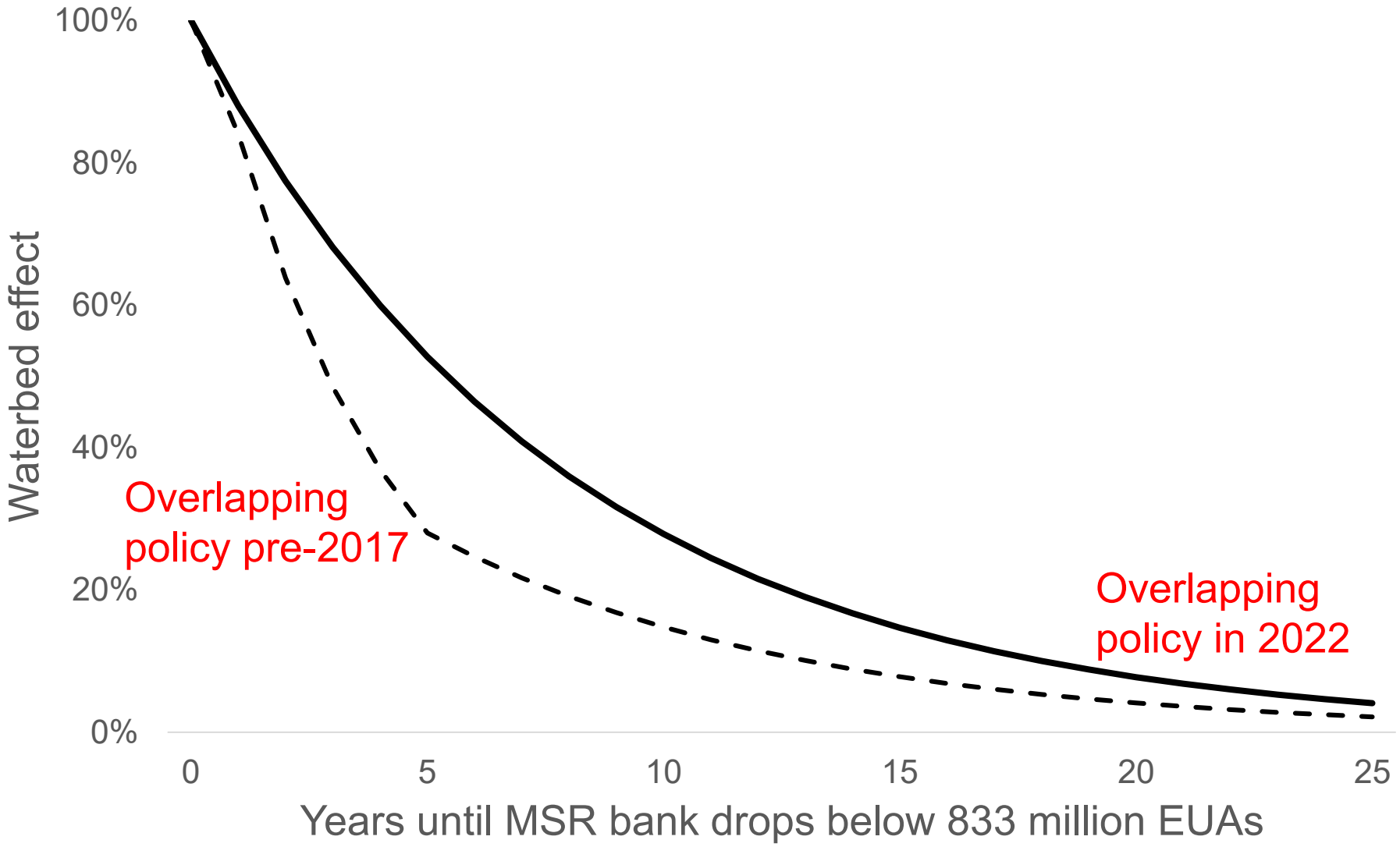

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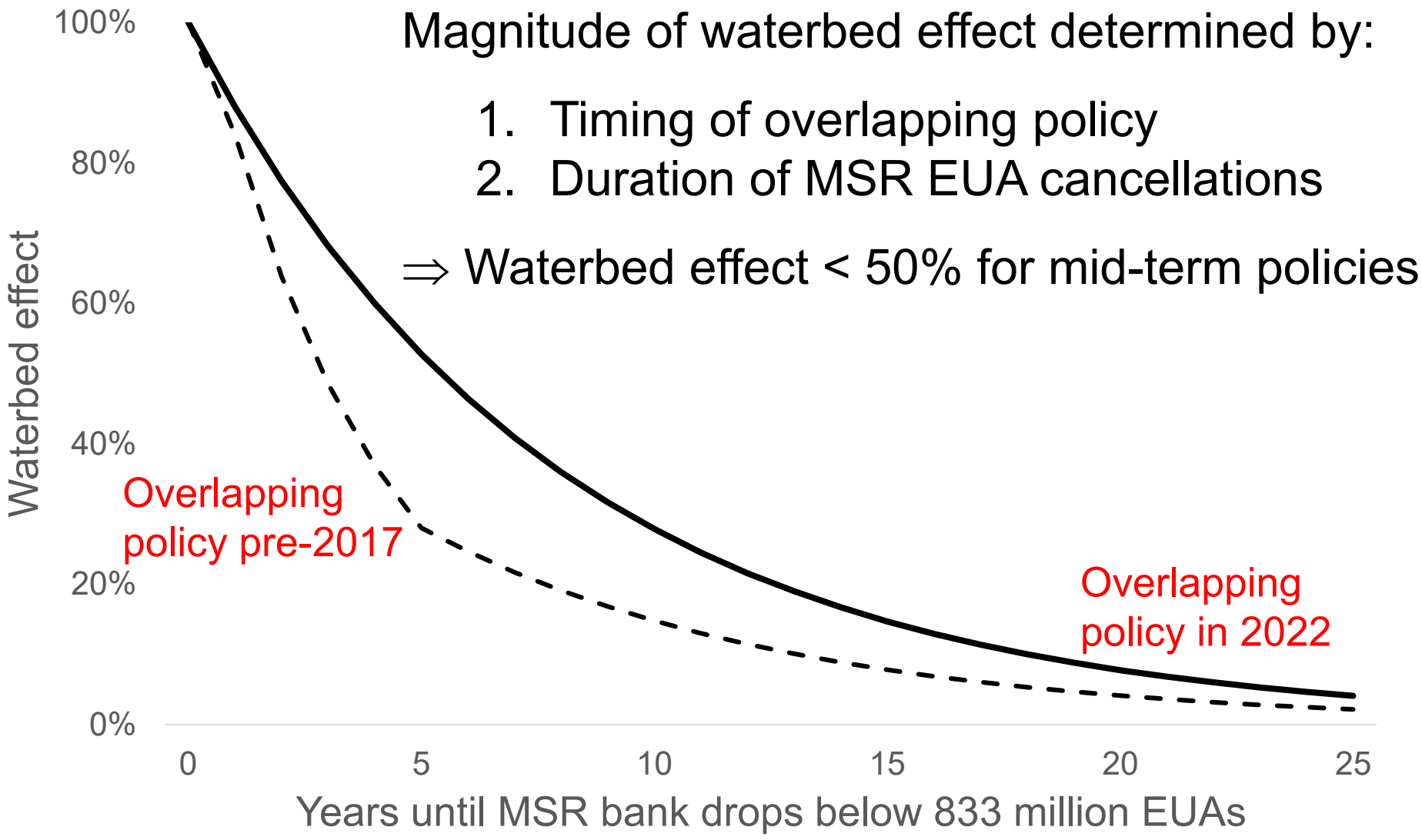

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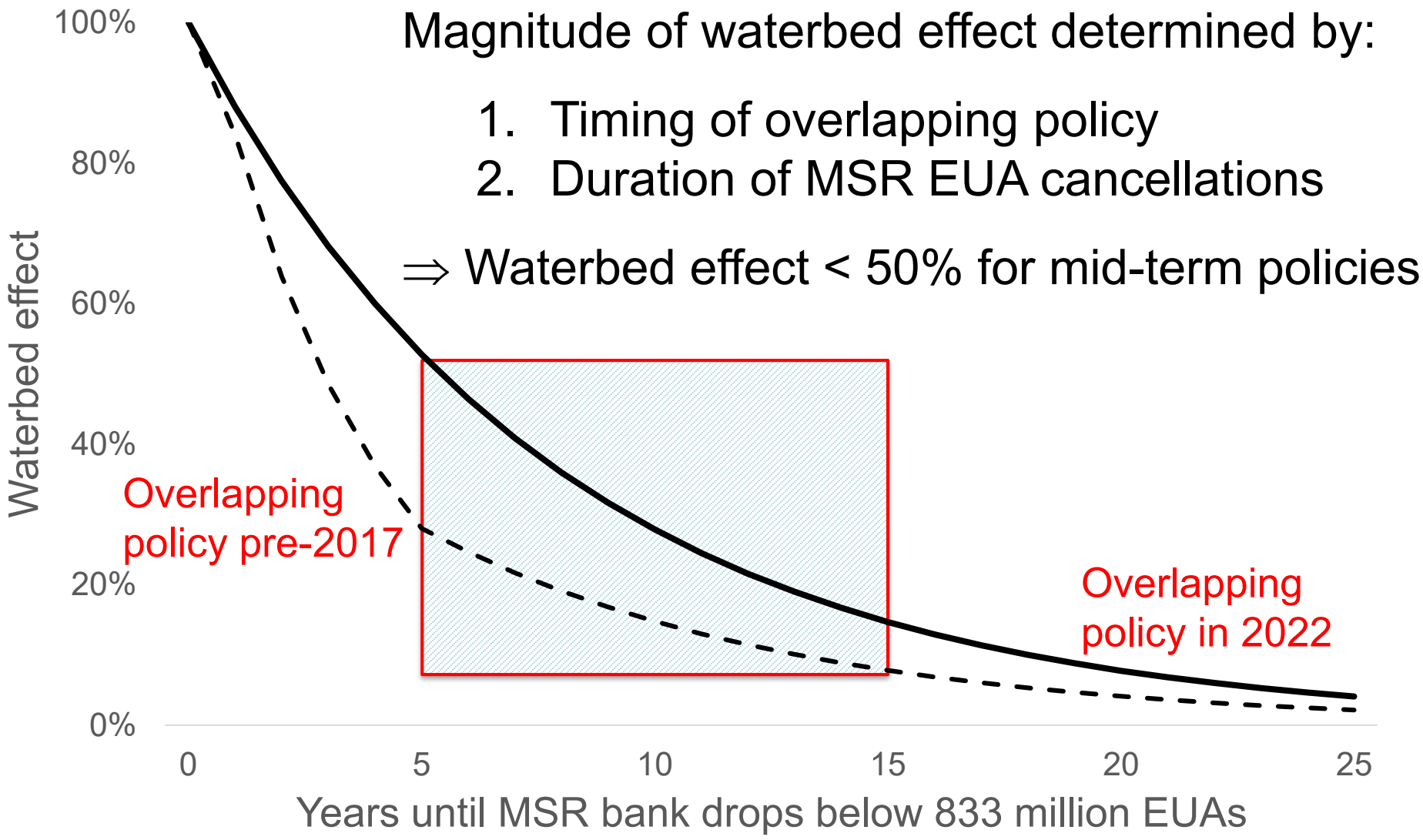

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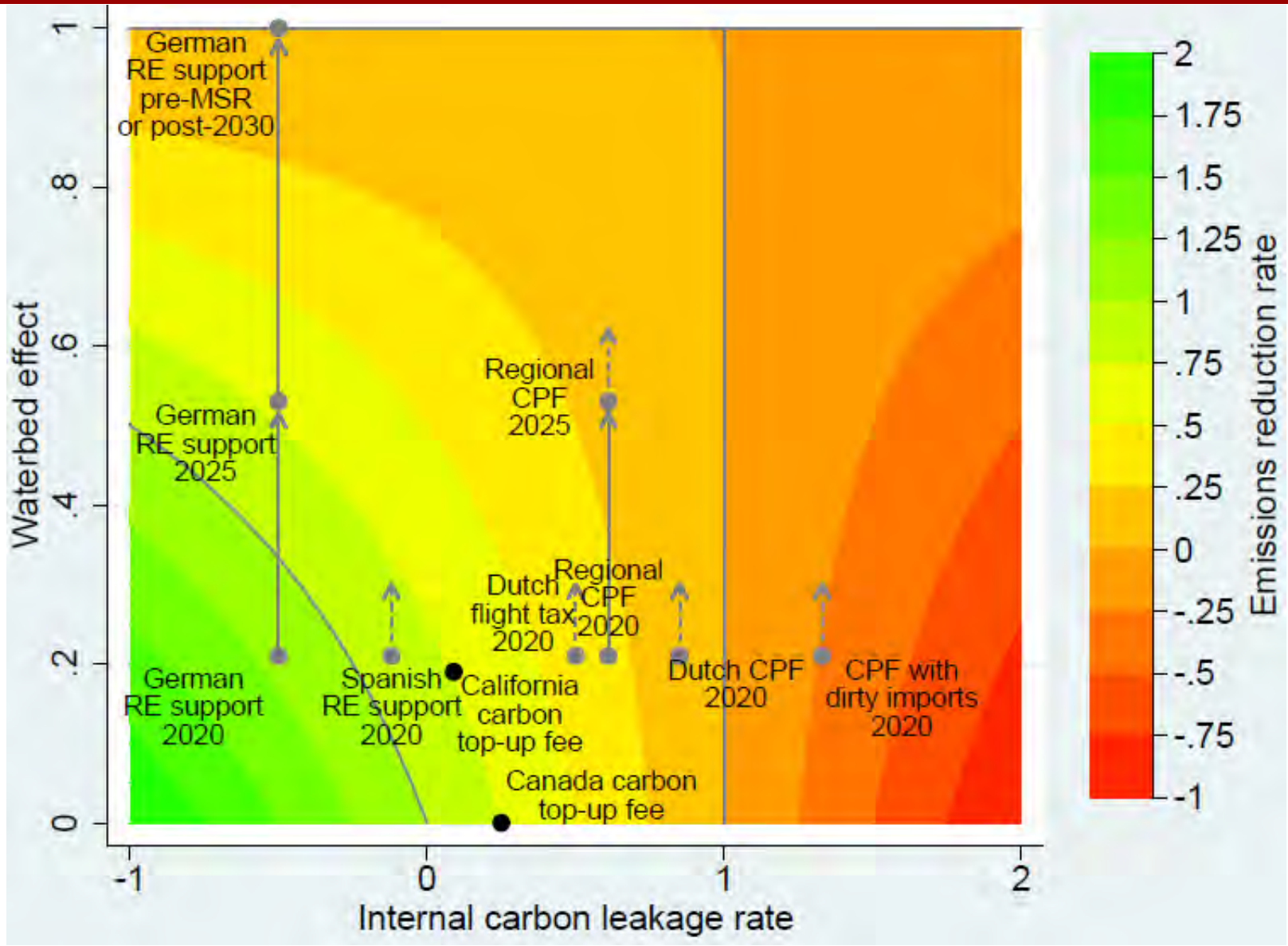
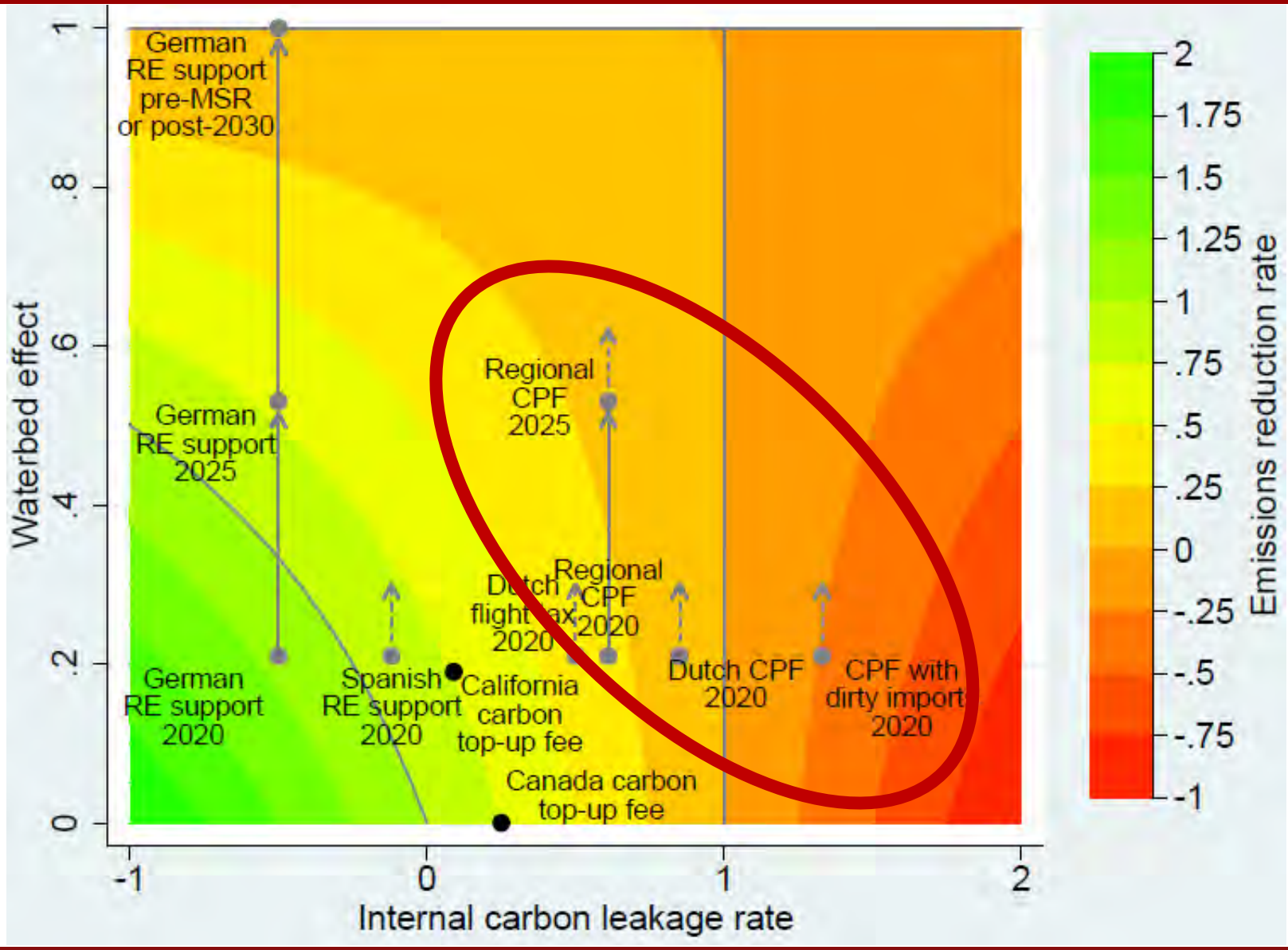
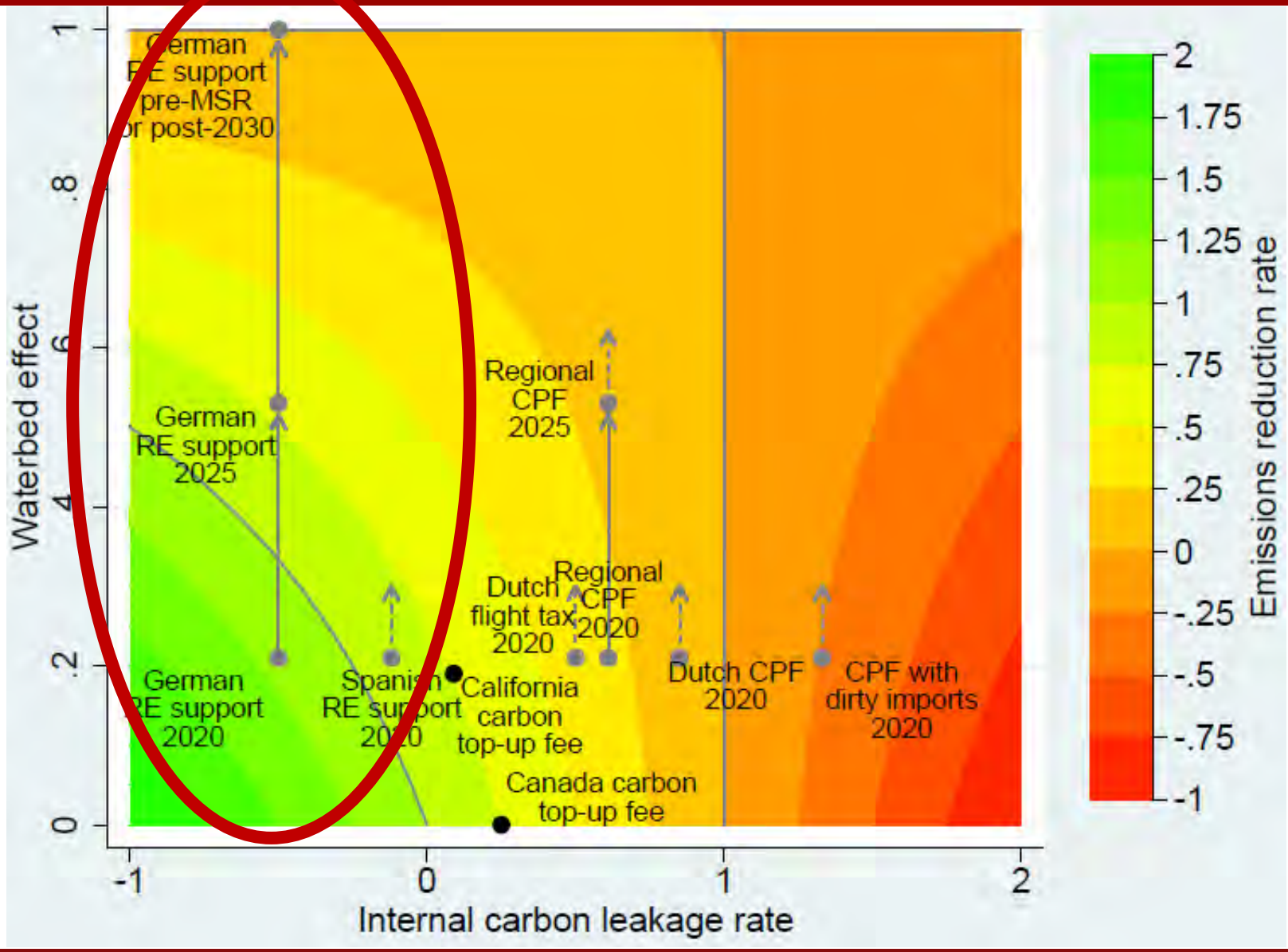
Empirical estimates of waterbed & leakage



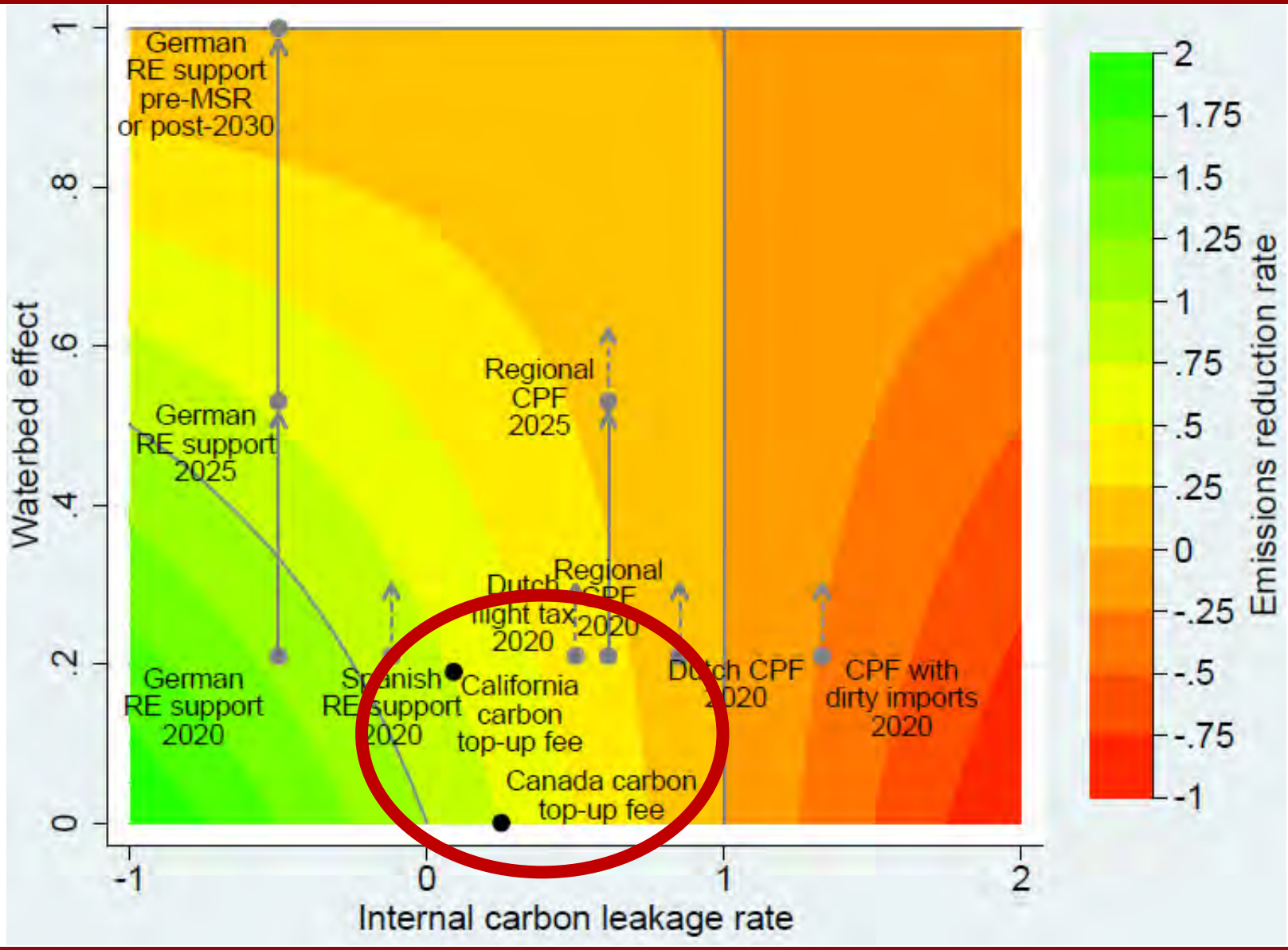
EU: National & regional carbon price floors



EU: Renewables support mechanisms



North America: Carbon top-up fees



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① **EU ETS new MSR raises stakes for overlapping policies:**
well-designed policy has climate benefit, others backfire

② **Devil is in the details**:
- *Timing* (affects waterbed)
- *Instrument* (affects leakage)
- *Location* (country/sector affects leakage)

③ **Reformed EU ETS with MSR now very complex:**
about as complex as regulating a local pollutant...
- [*EU carbon price floor = simpler & better!*]

④ **Need more empirical evidence on internal carbon leakage**
within EU & for other jurisdictions using carbon pricing