



# Carbon border adjustments and the future of carbon markets

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**Views are mine & not necessarily those of any organization**

# Recent research on carbon markets

## Carbon border adjustment mechanism

- ❑ Mehling & Ritz (2023). [From theory to practice: Determining emissions in traded goods under a border carbon adjustment](#). *Oxford Review of Economic Policy*
- ❑ Mehling & Ritz (2023). [Addressing carbon leakage risk to support decarbonisation: Consultation response](#). Department of Energy Security & Net Zero and HM Treasury March 2023 Consultation, 22 June 2023
- ❑ Ritz (2022). [Carbon pricing and industrial competitiveness: Border adjustment or free allocation?](#) EPRG Working Paper 2211, May 2022
- ❑ Evans, Mehling, Ritz & Sammon (2021). [Border carbon adjustments and industrial competitiveness in a European Green Deal](#). *Climate Policy*

## Carbon pricing

- ❑ Neuhoff & Ritz (2020). [Carbon cost pass-through in energy-intensive industrial sectors](#). EPRG Working Paper 1935, Revise & resubmit at *The Energy Journal*
- ❑ Ritz (2022). [Global carbon price asymmetry](#). *Journal of Environmental Economics & Management*
- ❑ Perino, Ritz & van Benthem (2022). [Overlapping climate policies](#). NBER Working Paper 25643, July 2022. Revise & resubmit at *The Economic Journal*

# Plan for this talk

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## ① The role and future of carbon pricing

## ② EU Carbon Border Adjustment Mechanism

- Objectives
- Design
- Impacts
- Challenges

# Strategic context for carbon pricing

**Theory:** Carbon price alone sufficient for efficient decarbonization

**Reality:** Carbon pricing sits within wider economic context

- Additional market failures  
(innovation, finance, networks, market power, ...)
  - Political & social resistance to carbon pricing
- ⇒ *2<sup>nd</sup> best carbon prices not uniform across sectors or countries...*

**Practice:** Climate policy relies on multiple instruments

- Carbon pricing now ramping up in more jurisdictions
- Carbon pricing sits alongside lots of other policies

⇒ ***How to design carbon pricing that works...  
.... for consumers, industry & environment?***

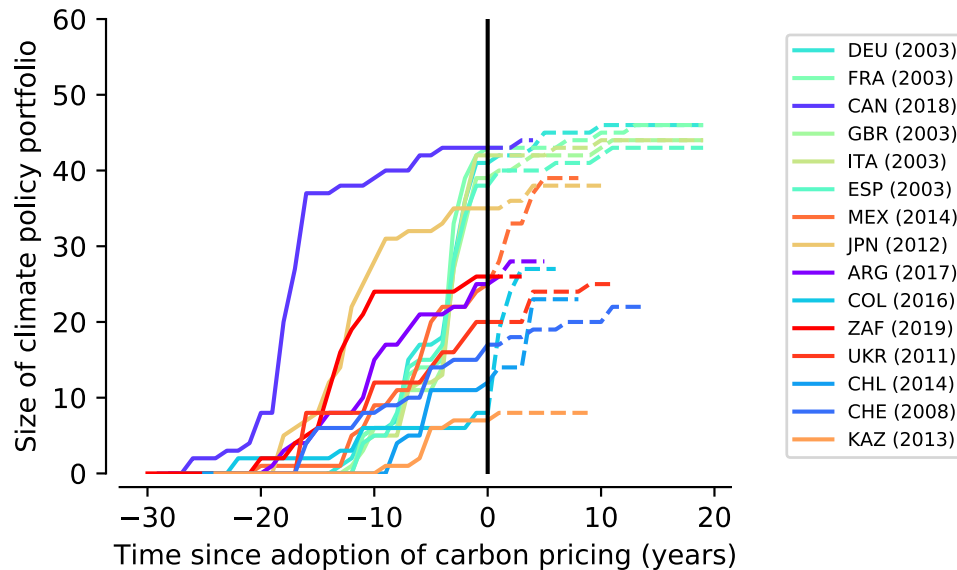
**Source:** Ritz (2022). Global carbon price asymmetry. *Journal of Environmental Economics & Management*  
Perino, Ritz & van Benthem (2022). Overlapping climate policies.

# Policy sequencing towards carbon pricing

## Proposals to price carbon often face political & social opposition

— More salient than other policies, “revenue recycling” with little traction

⇒ Using other (non-price) policy instruments can bring down public resistance & costs and pave the way for carbon pricing in future



## Climate policy portfolio

### Instrument:

- Policy Support
- ▼ Grants and subsidies
- Regulatory Instruments
- ⊕ Information and Education
- ◆ Procurement and investment
- ⊗ Research, Development and Deployment
- ▲ Voluntary Approaches
- ★ Carbon pricing

⇒ **On average, 5-18 years of other policies before carbon pricing adopted**

**Source:** Linsenmeier et al. (2022). Policy sequencing towards carbon pricing: Empirical evidence from G20 economies. IMF Working Paper 22/66

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① The role and future of carbon pricing

## ② **EU Carbon Border Adjustment Mechanism**

- Objectives
- Design
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# EU ETS: Journey from free allocation to CBAM

## Communication on Green Deal (December 2019)

“the Commission will propose a CBAM, for **selected sectors**, to reduce the risk of carbon leakage” ... “it would be an **alternative to the measures—such as the free allocation** of emissions allowances or compensation for the increase in electricity costs—that **address the risk of carbon leakage** in the EU ETS”

## CBAM Inception Impact Analysis (March 2020)

“Carbon leakage occurs when production is transferred from the EU to other countries with lower ambition for emission reduction, or when **EU products are replaced by more carbon-intensive imports**... a CBAM would ensure that the **price of imports reflects more accurately their carbon content.**”

# Is the CBAM “innovative climate policy”?

## Practice: Yes!

EU agreement on CBAM introduction  
in December 2022

*“This morning’s agreement is a decisive step towards the launch of the world’s first carbon border adjustment mechanism and I warmly congratulate the negotiators of the EU institutions on this historic achievement. The CBAM is at the heart of the EU’s efforts to reach our ambitious climate goals under the European Green Deal. It sends an important signal to producers all over the world: that the EU is serious about cutting emissions and that we expect the same level of commitment from industrial firms exporting into the EU, wherever they may be located.”*

*Paolo Gentiloni, Commissioner for Economy - 12/12/2022*

## Theory: No!

2<sup>nd</sup>-best corrective tariff  
(Markusen, *J of International  
Economics* 1975)

Journal of International Economics 5 (1975) 15–29. © North-Holland Publishing Company

### INTERNATIONAL EXTERNALITIES AND OPTIMAL TAX STRUCTURES

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Received July 1973, revised version received October 1974

This paper develops a model of two trading countries which are related by a bilateral production externality. Necessary conditions which must characterize an optimal tax structure from the point of view of one country are solved for and interpreted. Second, the model serves as a vehicle to extend the theory of corrective taxation in the case where only one policy instrument is available to deal with several distortions simultaneously. It is pointed out that the ranking of alternate second best tax structures typically depends upon which good is imported and which good is exported.

# Multiple policy considerations for CBAM

- ① Addressing **carbon leakage**
  - ② Ensuring “**polluter pays principle**”
  - ③ Showing **climate leadership**
  - ④ Safeguarding **industrial competitiveness**
  - ⑤ Raising **fiscal revenue**  
CBAM revenue + extra allowance auctions
  - ⑥ Incentivizing **trade partners** to price CO<sub>2</sub>
- ⇒ **CBAM: Almost “no brainer” in theory,  
messier in practice...**

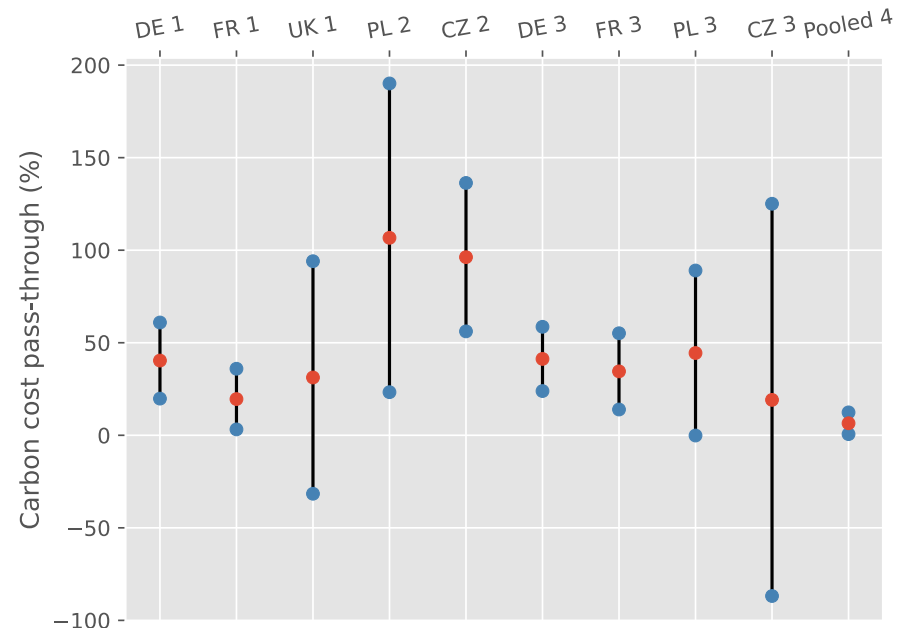
# Economics of carbon cost pass-through

**Theory:** Pigouvian logic based on pass-through of carbon costs

**Practice:** With sub-global policy, pass-through in EITE (“emissions-intensive, trade-exposed”) sectors limited by

- ① International trade
- ② Market power
- ③ Free allocation

⇒ ***EITE sectors:***  
*CO<sub>2</sub> pass-through typically ≤ 50%*



⇒ ***Higher carbon cost pass-through as rationale for CBAM***

**Source:** Neuhoff & Ritz (2020). Carbon cost pass-through in energy-intensive industrial sectors

# EU CBAM: Key design elements

## Timeline

- Transitional phase from 1<sup>st</sup> October 2023
- Financial obligations from 1<sup>st</sup> January 2026

## Scope

- Start: Cement, iron and steel, aluminium, fertilisers, electricity, hydrogen
- 2030: All EU ETS sectors to be included in CBAM

## Free allocation (EITE sectors)

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034
CBAM	2.5%	5%	10%	22.5%	48.5%	61%	73.5%	86%	100%
Free allocation	97.5%	95%	90%	77.5%	51.5%	39%	26.5%	14%	0%

## Carbon intensity

- Actual intensity vs default country intensity vs worst-in-class EU intensity

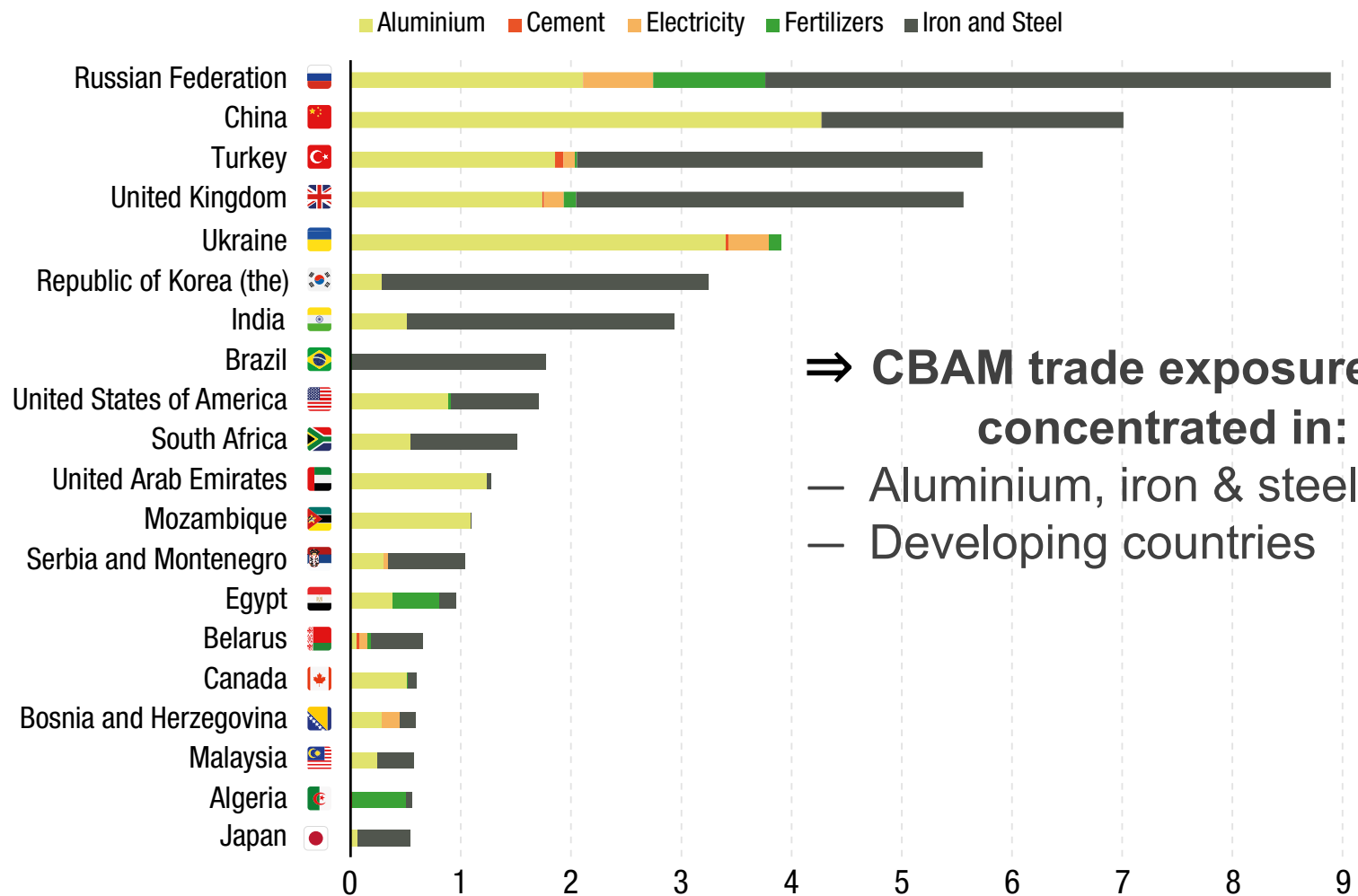
## Carbon price

- CBAM certificates at weekly average EUA auction price
- Discount for non-EU carbon pricing incurred

⇒ **CBAM looking increasingly ambitious (and blueprint for non-EU)**

# EU CBAM trade exposure in industrial sectors

Value of exports to EU in selected key CBAM sectors (2019 data)



⇒ **CBAM trade exposure concentrated in:**

- Aluminium, iron & steel
- Developing countries

Source: UNCTAD (2021), A European Union Carbon Border Adjustment Mechanism: Implications for developing countries

# Basic economic impacts of move to a CBAM

## Policy instruments

- ① CBAM tilts competition in favour of domestic producers
- ② Loss of free allocation does the reverse...

## Competitive conditions

- ❑ Marginal cost of foreign producers  $\uparrow$  (new CBAM)
- ❑ Marginal cost of domestic producers  $\uparrow$  (lost free allocation)  
 $\Rightarrow$  Competitiveness of domestic producers *might* improve

## Market outcomes

- ❑ Carbon cost pass-through: Domestic product prices  $\uparrow\uparrow$
- ❑ Carbon leakage to rest of world *might* turn negative

**$\Rightarrow$  Insofar as free allocation is weak policy, CBAM is likely better...**

# Does a CBAM improve competitiveness? (1 of 2)

- Proxy “competitiveness” by EITE production volume, margins or profits

**Question:** Is competitiveness higher with policy switch to BCA?

**Answer:** Under output-based free allocation, competitiveness remains stable if CBAM replaces free allocation at the rate:

$$\frac{\Delta \text{free allocation}}{\Delta \text{border adjustment}} = -\text{rate of carbon leakage}$$

**Implications:**

Recap: Current EU CBAM policy has  $\frac{\Delta \text{free allocation}}{\Delta \text{border adjustment}} = -1$

**⇒ Sectors with “high” carbon leakage benefit from switch to CBAM**

**Source:** Ritz (2022). Carbon pricing and industrial competitiveness: Border adjustment or free allocation?

# Does a CBAM improve competitiveness? (2 of 2)

## Intuition?

Carbon leakage is near-zero if foreign producers have:

- ① Small market share, or
- ② Highly-differentiated product, or
- ③ Near-zero carbon intensity

Exactly situations in which CBAM has little “bite”...

... so poor substitute for free allocation

Sector with “low” leakage prefers keeping free allocation to CBAM

**⇒ Carbon leakage = “sufficient statistic” for competitiveness**

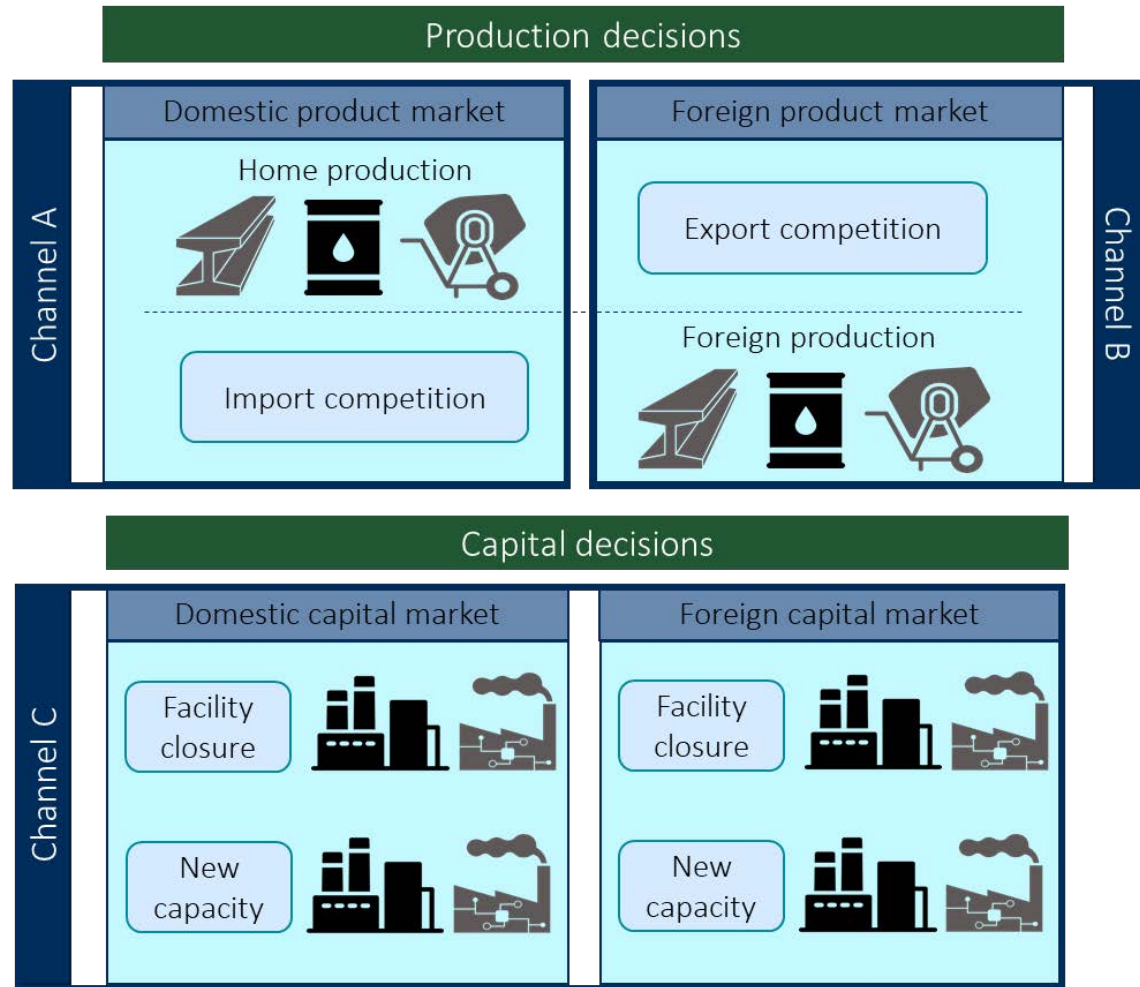
**Source:** Ritz (2022). Carbon pricing and industrial competitiveness: Border adjustment or free allocation?

# Challenge 1: Export competitiveness

- ❑ Current EU ETS free allocation supports *all* channels A–C
- ❑ Import-only CBAM *cannot* support export channel B

⇒ Free allocation gives more holistic support

⇒ **Case for continued free allocation for exports alongside CBAM?**



**Source:** Evans, Mehling, Ritz & Sammon (2021). Border carbon adjustments and industrial competitiveness in a European Green Deal. *Climate Policy*

# Challenge 2: “Resource shuffling”

**Concern for California’s border adjustment on electricity imports from Western Interconnection (transaction-based CO<sub>2</sub> intensities)**

**California Air Resources Board:** “Any plan, scheme, or artifice to receive credit based on emissions reductions that have not occurred, involving the delivery of electricity to the California grid”

- ❑ **Example:** Imports of coal-fired power replaced by gas due to CBA but coal-fired power instead redirected to another US state...
- ❑ Resource shuffling is a particular form of carbon leakage:
  - ❑ **Thought experiment:** If carbon intensities identical everywhere, no reshuffling but could still have carbon leakage
- ❑ California regulation ‘prohibits’ reshuffling—hard to enforce...

⇒ ***CBAM based on default carbon intensity avoids reshuffling...  
... but also loses abatement incentive***

**Source:** Mehling & Ritz (2023). From theory to practice: Determining emissions in traded goods under a border carbon adjustment. *Oxford Review of Economic Policy*

# EU CBAM: International reactions are “mixed”



## Addressing carbon leakage risk to support decarbonisation

A consultation on strategic goals, policy options and implementation considerations

Closing date: 22 June 2023

FROM POLITICO PRO

## EU's looming carbon tax nudged Turkey toward Paris climate accord, envoy says

Ankara's COP26 negotiator says the planned levy was a 'very big threat' and was 'one of the reasons' for the decision.

Opinion **Global Economy**

### Unilateral action on climate change can have unintended consequences

Uncoordinated moves at a national level pose dangers for other countries, particularly poor ones

RAGHURAM RAJAN [+ Add to myFT](#)



- ① **Introduce your own CBAM**
- ② **Introduce your own carbon price**
- ③ **Block CBAM/climate club idea**

# Conclusions on CBAM

- ① CBAM close to “no brainer” in theory (since 1975!) but surprisingly messy in practice (so thank you to EU!)
- ② Free allocation of carbon permits is increasingly costly from fiscal perspective—and unclear how well it has worked...
- ③ Switch to CBAM helps especially highly trade-exposed sectors with strong carbon-heavy international competition
- ④ Any sector that supports free allocation over CBAM *reveals* that its leakage problem is likely not very severe to begin with...
- ⑤ CBAM policy push requires believing that:  

fiscal benefits + “climate club” dynamic + competitiveness impacts	>	trade tensions + reshuffling incentives
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