# Border Carbon Adjustment Revisited

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# Background

- Caveats against unilateral climate policy

  - Cost-efficiency of abatement ("carbon leakage")

  - Competitiveness of emission-intensive and trade-exposed (EITE) industries

- Border carbon adjustment

  - Import tariffs and export rebates on embodied carbon

  - Destination-based emission pricing

    - Taxing the carbon footprint of imports

    - Leveling the playing field in international trade

# Q&A&R

- Questions
    1. Leakage reduction
    2. Global cost savings
    3. Burden shifting
    4. Impact on domestic EITE production

- Answers
    1. Substantial
    2. Modest
    3. Substantial
    4. Strongly positive

- Revisited:
    4. Strongly negative

# Study Design

- Data (GTAP8):

  - Multi-region, multi-sector input-output tables

  - Production, consumption, bilateral trade, CO2 emissions

- Computational framework

  - Multi-region input-output (MRIO) calculations

  - Computable general equilibrium (CGE) model

- Scenarios:

  - Unilateral $CO_2$ emission reduction by 20% either through a tax (*ref*) or through a tax plus BCA (*bca*)

  - Simulations for Switzerland (CHE) and for the European Union (EU)

  - BCA design: tariffs and rebates apply to the **full** region- and sector-specific carbon content of the traded good at the domestic $CO_2$ price

# Key Driver

- Composition of embodied carbon in EITE production

  - direct      combustion of (direct) fossil fuel inputs

  - domestic    embodied in domestically produced intermediate inputs

  - imported    embodied in imported intermediate inputs

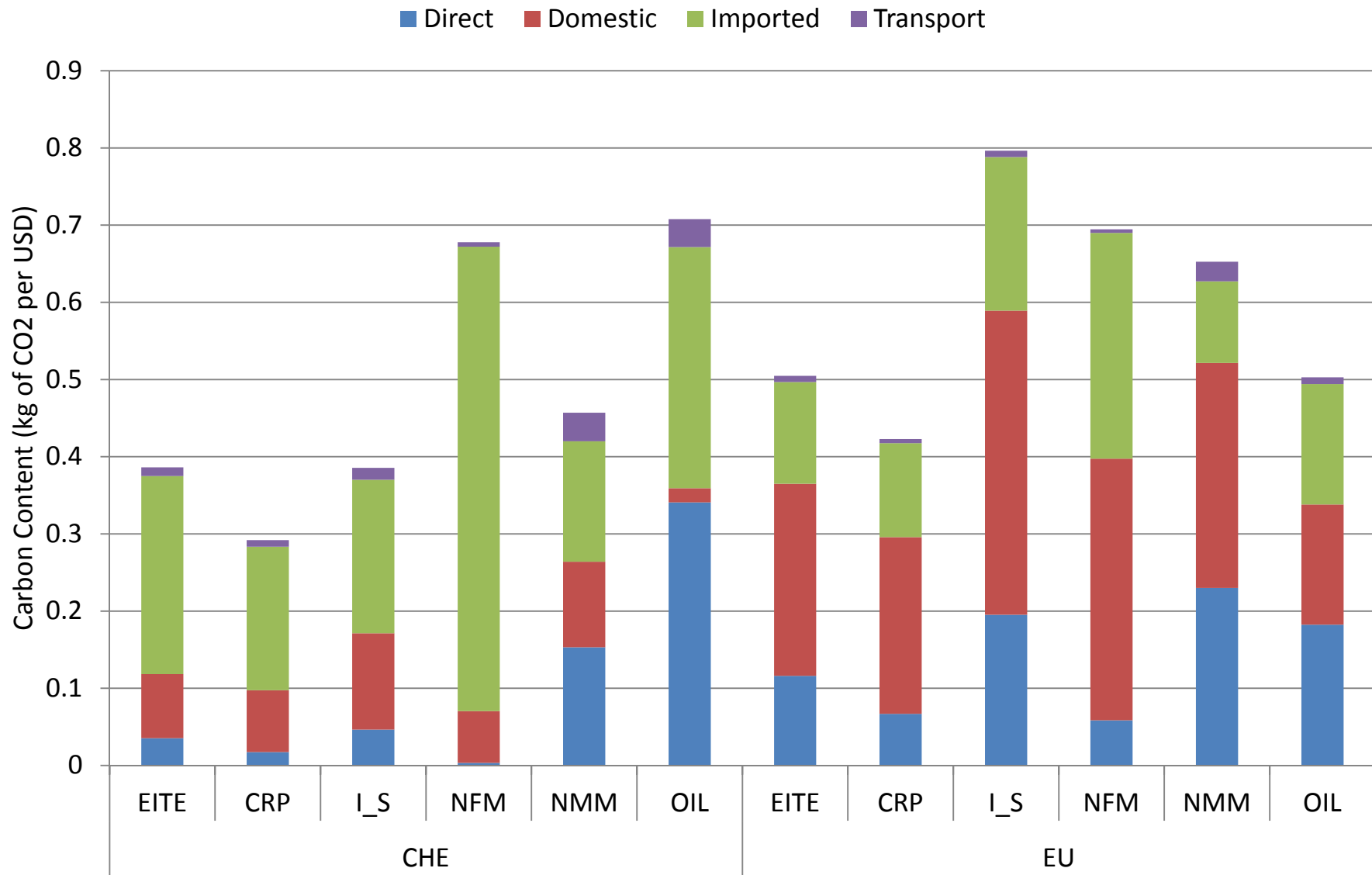  - transport    embodied in international transport service

Industries producing with a large share of imported embodied emissions will suffer under BCA

# MRIO I – CO2 and Production Statistics

| CO2 | | |
|---|---|---|
| | **CHE** | **EU** |
| Production (Mt $CO_2$) | 43.5 | 4140.9 |
| Consumption (Mt $CO_2$) | 86.6 | 4951.4 |
| Exports (Mt $CO_2$) | 59.9 | 736.2 |
| Imports (Mt $CO_2$) | 103 | 1546.7 |
| BEET* (%) | -99.0 | -19.6 |
| | | |
| EITE industries | | |
| | **CHE** | **EU** |
| % of total output | 13.8 | 12.2 |
| % of total value added | 8.6 | 8.8 |
| % of total exports | 36.6 | 25.7 |
| % of total imports | 37.6 | 25.8 |

* BEET: balance of emissions embodied in trade (100*net exports/production)

# MRIO II – CO2 Content

Carbon Content (kg of CO2 per USD)

Legend: Direct, Domestic, Imported, Transport

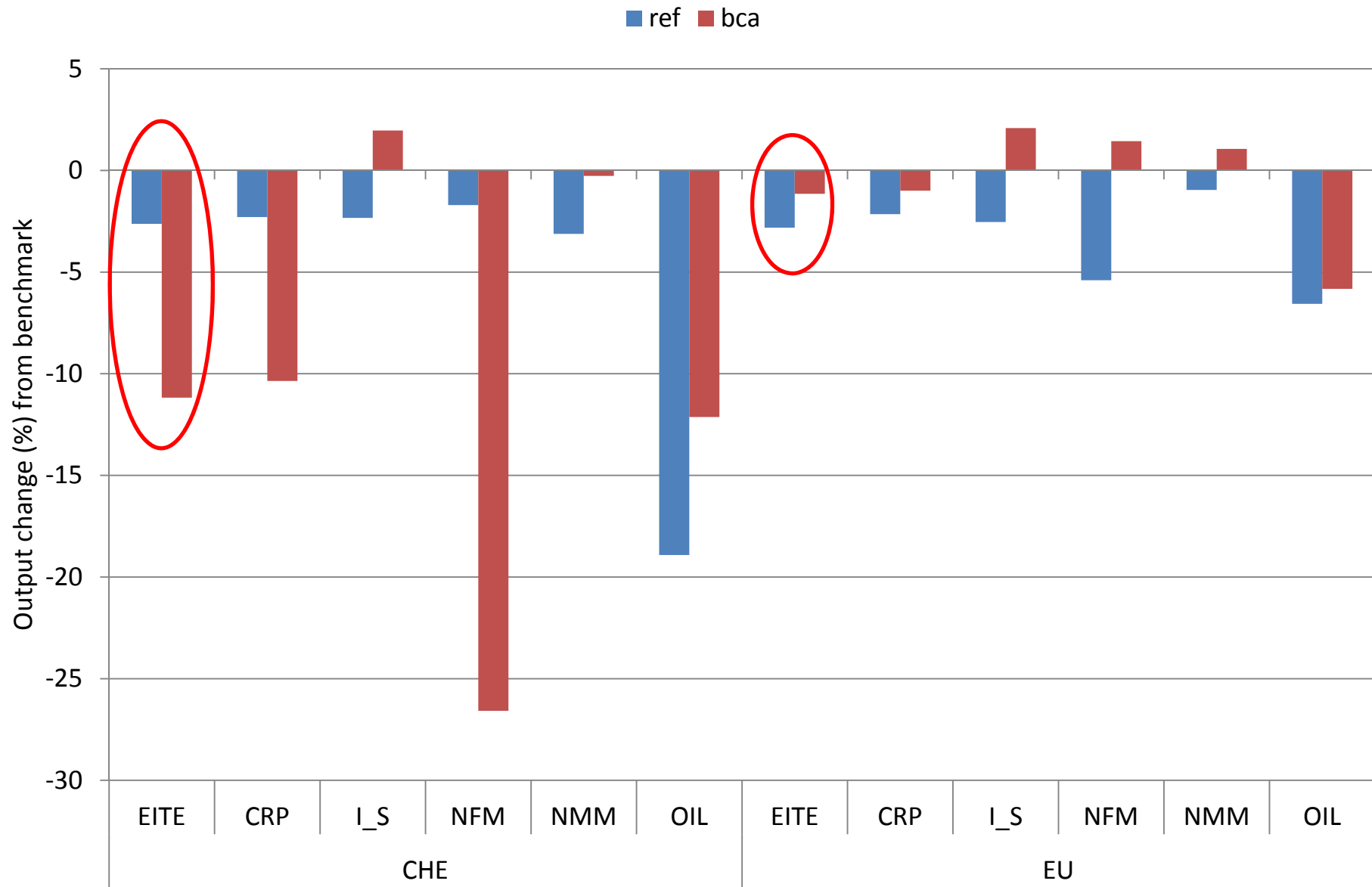CHE: EITE, CRP, I_S, NFM, NMM, OIL
EU: EITE, CRP, I_S, NFM, NMM, OIL

- CRP – chemical and rubber; I_S – iron and steel, NFM – non-ferrous metals; NMM – non-metallic minerals; OIL – refined oil products

# CGE I – Macro Indicators

| | CHE | | EU | |
|---|---|---|---|---|
| | *ref* | *bca* | *ref* | *bca* |
| CO$_2$ price (in USD per ton) | 146.41 | 88.02 | 63.57 | 57.27 |
| Leakage rate (in %) | 30.57 | -10.62 | 15.87 | 2.55 |
| Welfare abating region | -0.33 | 0.23 | -0.49 | -0.09 |
| Welfare BRIC | 0.00 | -0.03 | -0.07 | -0.57 |
| Global welfare | -0.0049 | -0.0048 | -0.23 | -0.20 |

# CGE II – EITE Output



• CRP – chemical and rubber; I_S – iron and steel, NFM – non-ferrous metals; NMM – non-metallic minerals; OIL – refined oil products

# Conclusion

Things never turn out the way you expect.



BCA may rather hurt than benefit EITE industries with large share of imported embodied carbon.