

Growth in emission transfers via international trade from 1990 to 2008

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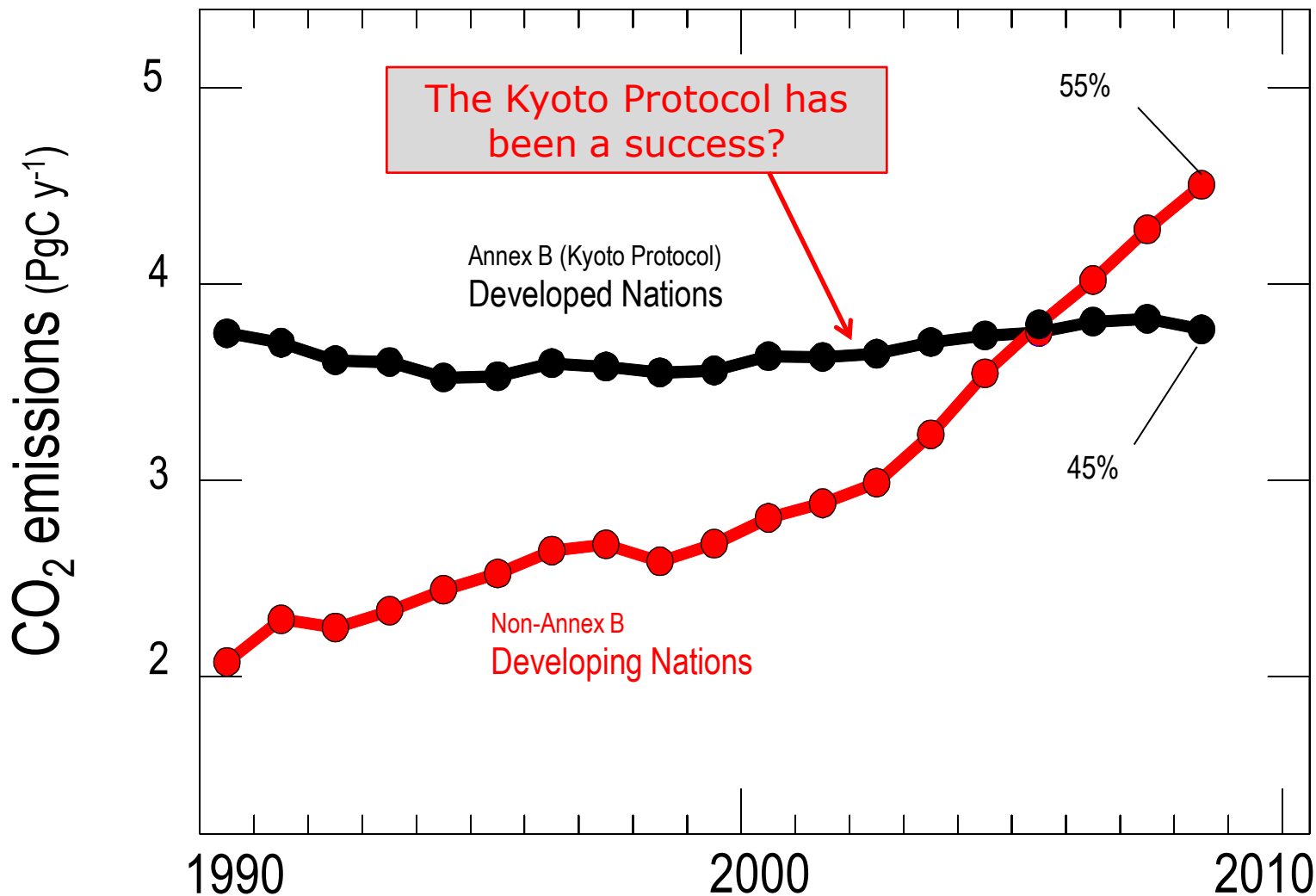
Center for International Climate and Environmental Research - Oslo (CICERO), Norway

Outline

- The policy context
- Empirical findings
- Carbon Leakage
- Implications

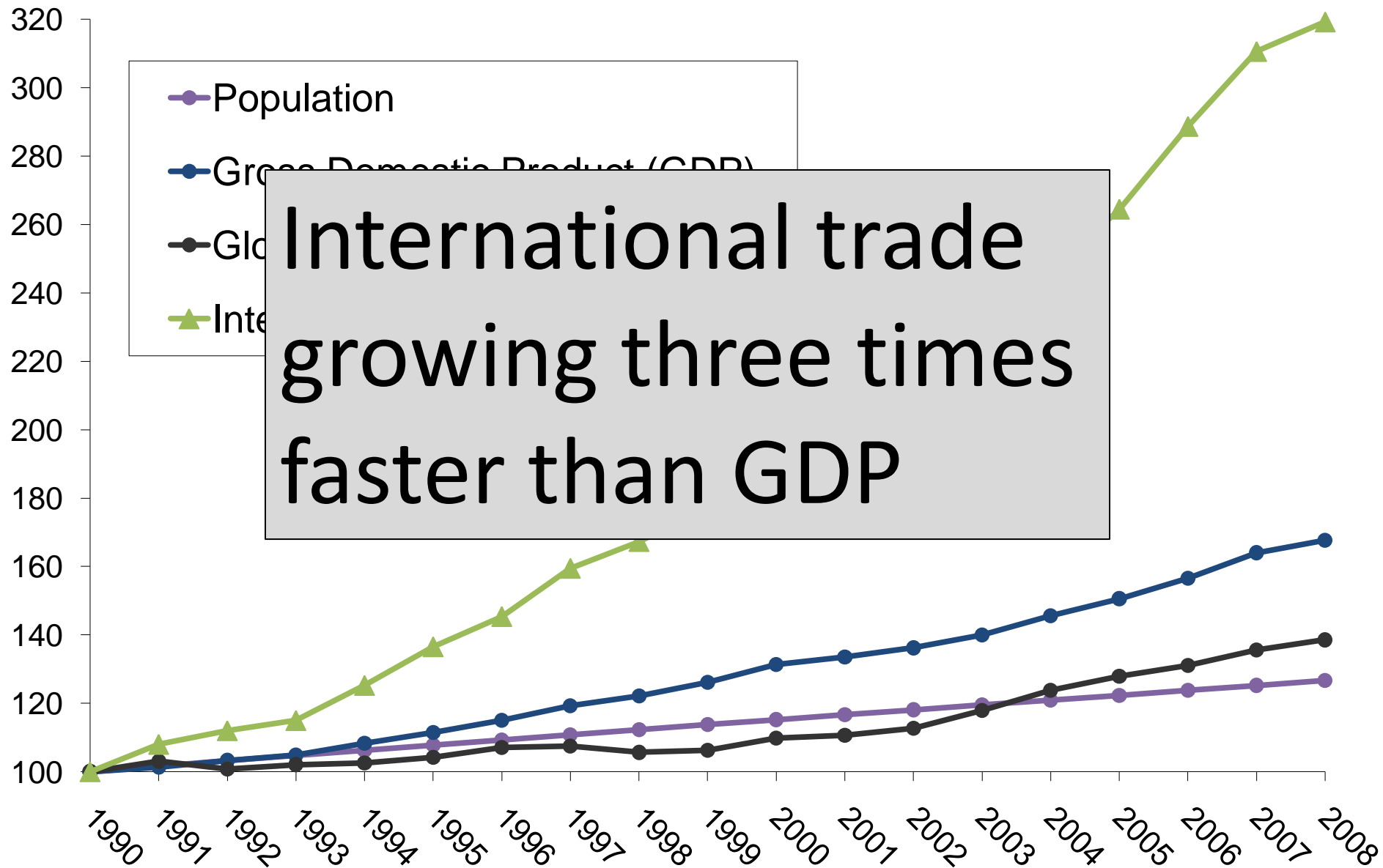
THE POLICY CONTEXT

CO₂ Fossil Fuel Emissions



Le Quéré et al. 2009, Nature Geoscience; CDIAC 2009

(One of the) elephants in the room

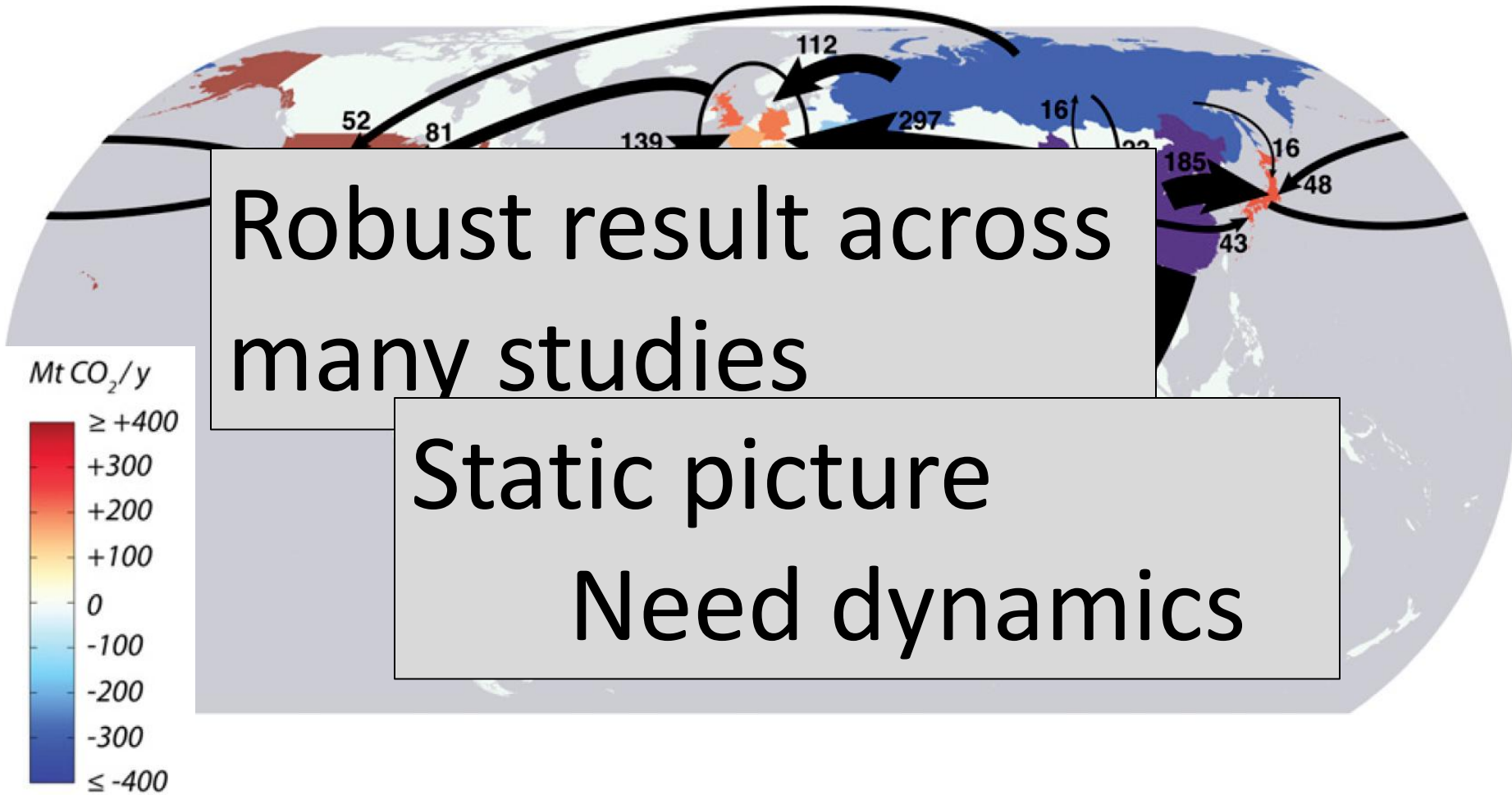


Research Questions

- What role does international trade play in shifting emissions between regions?
- Does this change over time and why?
- Does it matter?

EMISSION TRANSFERS OVER TIME

Virtual embodied CO₂ emissions (2004)



Robust result across many studies

Static picture

Need dynamics

Consumption-based accounting of CO₂ emissions

Steven J. Davis¹ and Ken Caldeira

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- World split into 113 countries and region each with 57 sectors
- Annex B (developed) versus non-Annex B (developing)
- 1990 to 2008
- Focus on net emission transfer (exports minus imports)

Consumption-based CO₂ Emissions

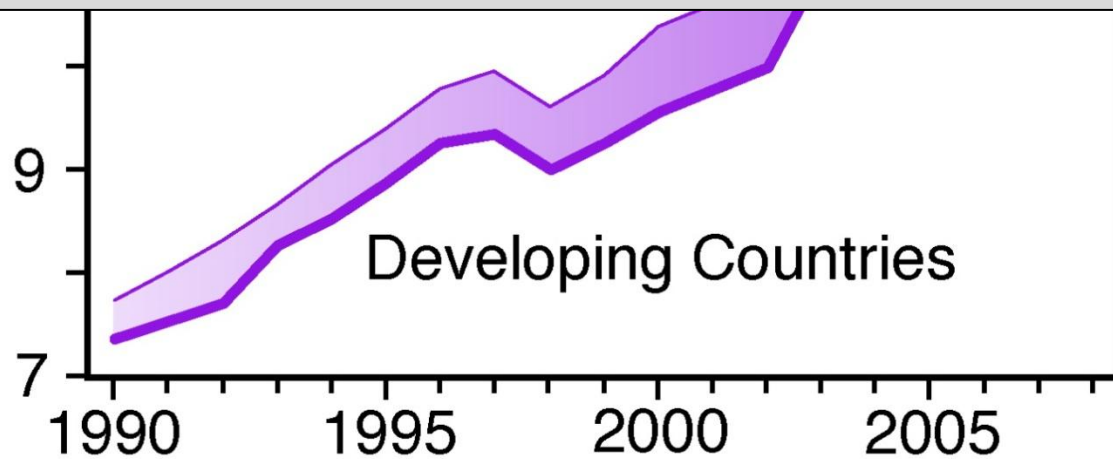


Globally:

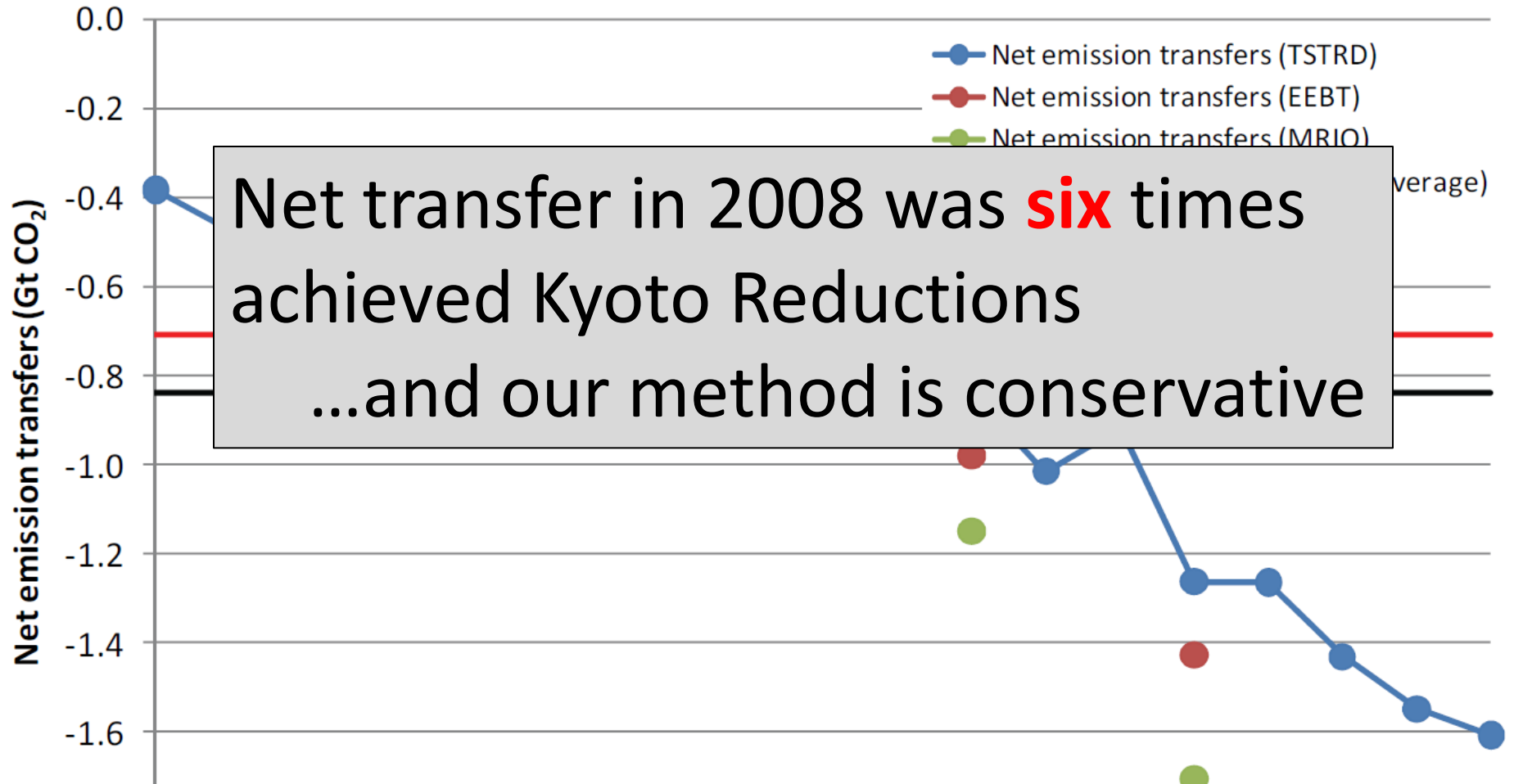
Emissions from the production of traded goods and services

1990: 4.3 Gt CO₂ (20% of global emissions)

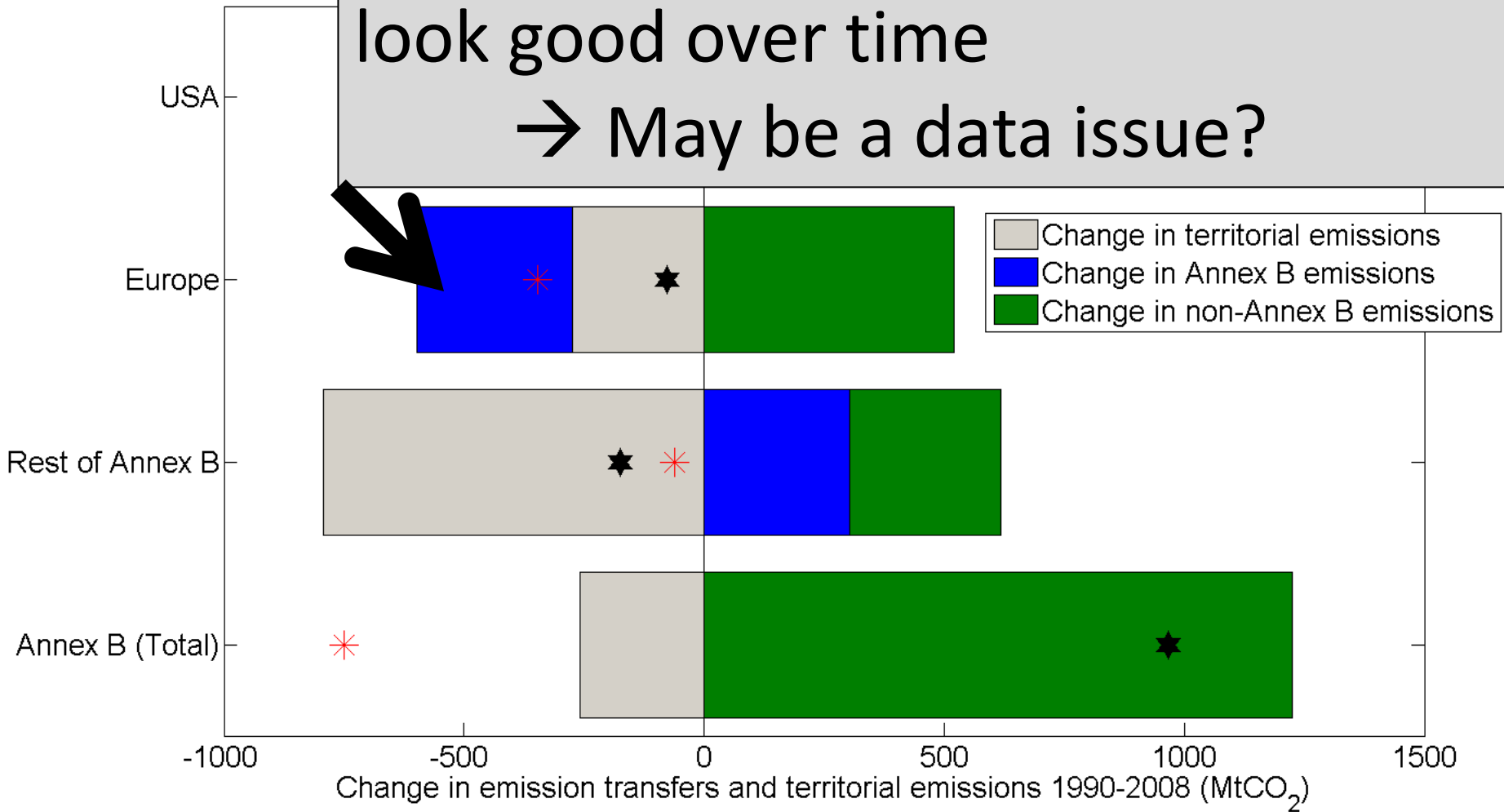
2008: 7.8 Gt CO₂ (26%)



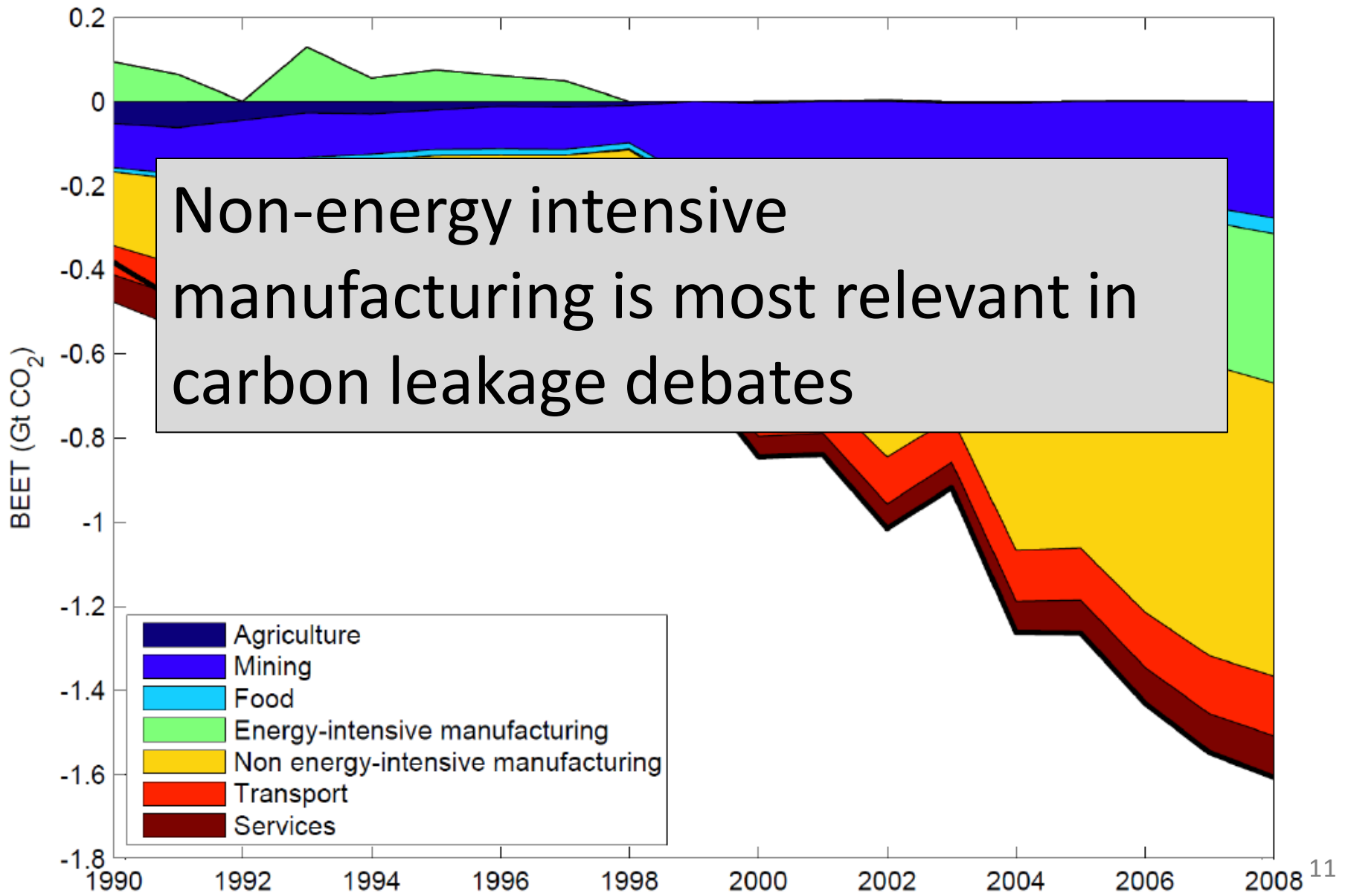
Changes offset Kyoto reductions



The former Soviet makes Europe look good over time
 → Maybe a data issue?



Sector Detail



CARBON LEAKAGE

Managing carbon leakage

Carbon Management (2010) 1(1), 35–37

- Strong carbon leakage (IPCC/Economics):
increase in emissions in non-Annex B countries as a result of *mitigation policies in Annex B*
 - Mitigation -> increased costs -> energy-intensive industry moves to non-Annex B due to lower costs
 - Modelling studies only, assumption dependent, static
 - No real evidence for strong CL at today's carbon prices

Managing carbon leakage

Carbon Management (2010) 1(1), 35–37

- Weak carbon leakage (*carbon migration*)
Increased production in non-Annex B to meet increased consumption in Annex B
 - Due to pre-existing economic conditions and policies
 - Represents an increasing global separation between consumption and production
 - Our results:
 - Weak CL is significantly larger than strong CL
 - Weak CL more than offsets Annex B emission reductions

IMPLICATIONS

Implications (1)

- With *fragmented* climate policies
 1. Move towards harmonized climate policies
 - Deeper and broader
 2. Report **both** territorial- *and* consumption-based emissions
 - Monitor, Report, Verify
 - Track progress towards policy goals

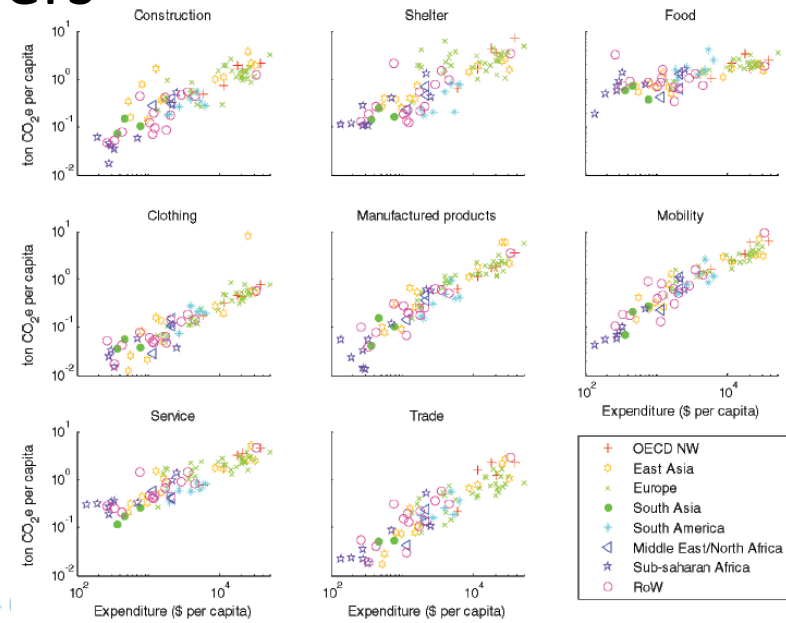
- These are the “easy” things

Implications (2)

- Inventories are more than a number...
- Use information in consumption-based inventories
 - Understand emission drivers
 - Provide information to consumers
 - Analyse global supply chains
 - Help to design efficient policy

Carbon Footprint of Nations: A Global, Trade-Linked Analysis

Environ. Sci. Technol. 2009, 43, 6414–6420



Competitiveness concerns

Production



Why do it the difficult way?
Go straight to consumption

Consumption



Implications (3)

- Current policy
 - Subsidize exports (remove them)
 - Border tax on imports (include them)
 - Inefficient way to get to:
 - Consumption = Production – Exports + Imports
- Better policy?
 - Base carbon pricing on current VAT systems
 - Exclude exports, include imports
 - Competitiveness neutral

Implications (4)

- Encourage “greening” trade flows?
 - Trade is not the problem, but production methods and consumption patterns
- Trade is the link between production and consumption
 - Analyse consumption patterns
 - Analyse production methods
- Is it bad to import an electric car from China?

Conclusions

- Changes in international trade have, unintentionally, offset Kyoto reductions
- Report and monitor consumption-based (trade-adjusted) inventories
- Incorporate aspects of consumption into policy to address
 - Competitiveness concerns
 - Carbon leakage

Thank you

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