Integrating consumption and international trade into energy and climate policy

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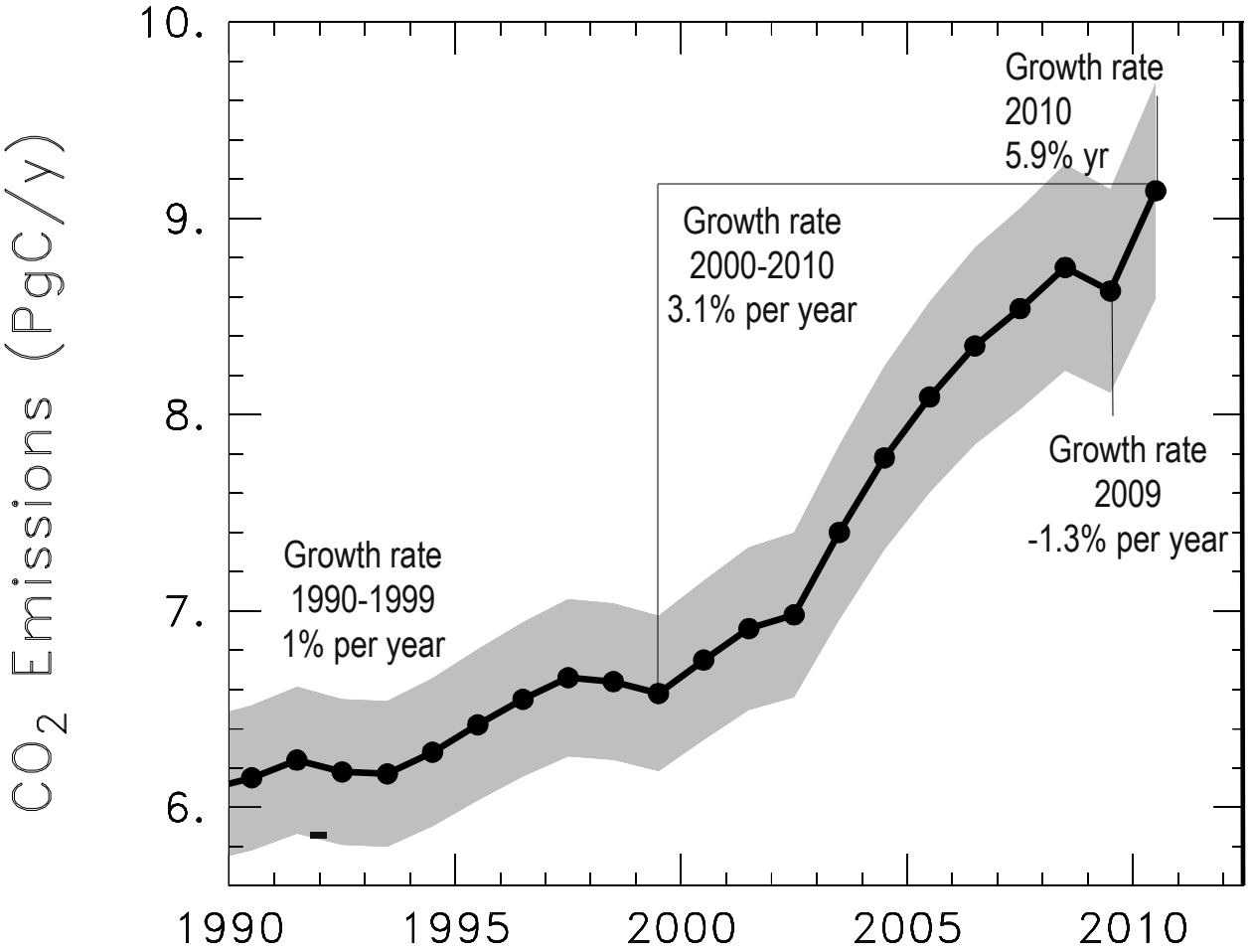
BACKGROUND AND FRAMING

Global Carbon Emissions from Fossil-Fuels, Cement, and Flaring

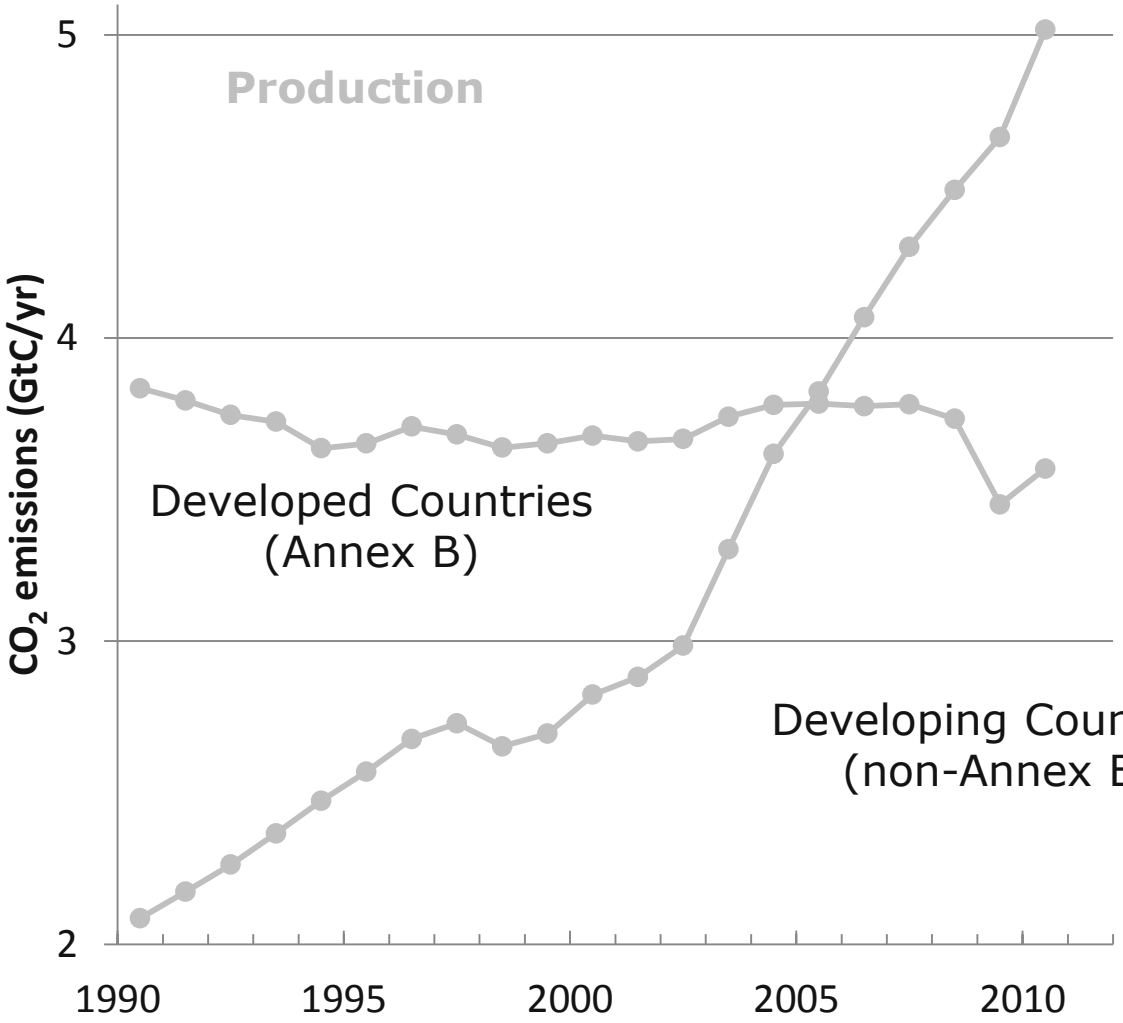


2010:
Emissions: 9.1 PgC
Growth rate: 5.9%
1990 levels: +49%

2000-2010
Growth rate: 3.1%

Rapid growth in CO_2 emissions after the 2008–2009 global financial crisis

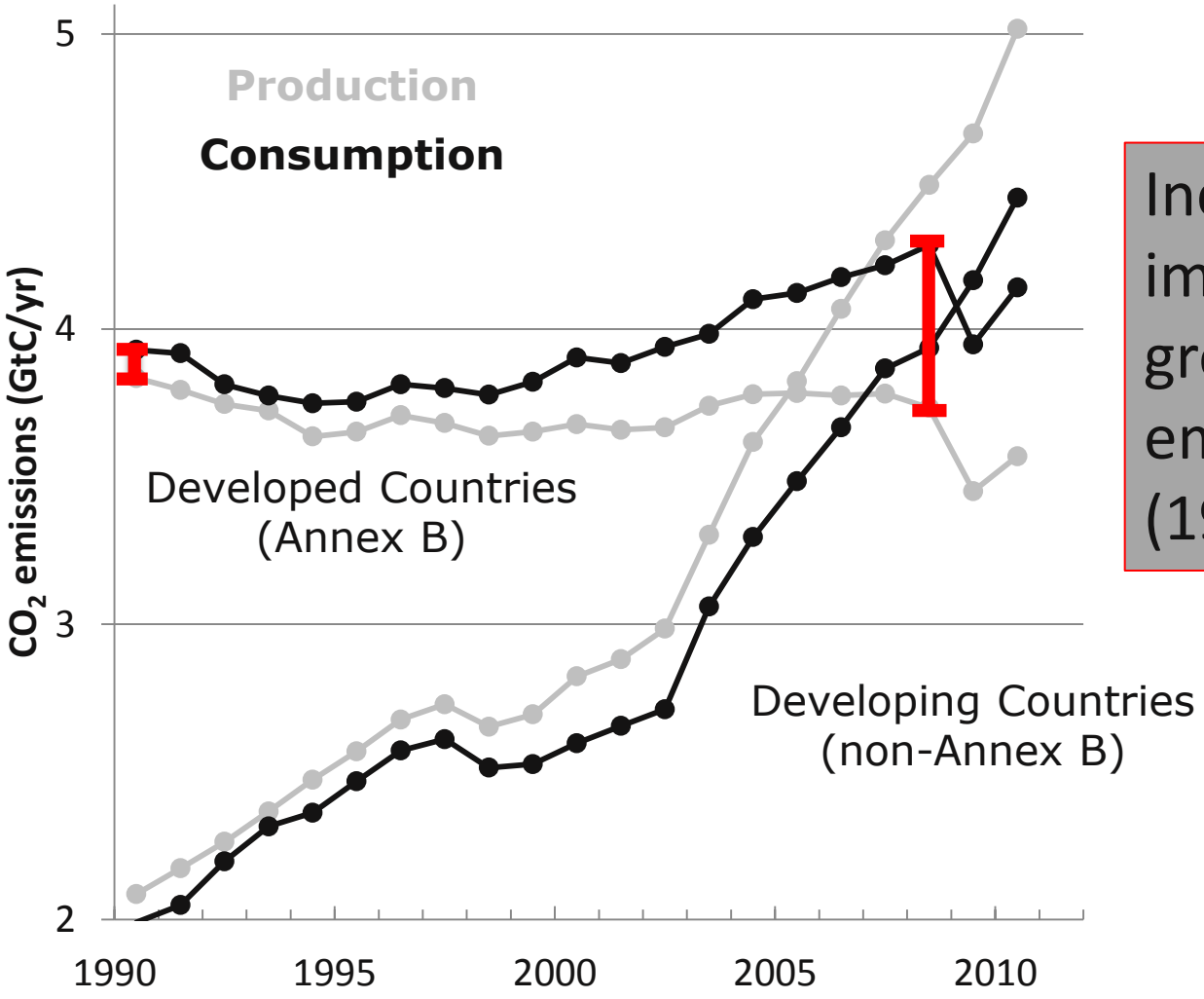
The Kyoto Protocol View



These regions are connected via international trade and financial flows

Rapid growth in CO_2 emissions after the 2008–2009 global financial crisis

The Kyoto Protocol View



Increase in net import ***five*** times greater than emission reductions (1990-2008)

Growth in emission transfers via international trade from 1990 to 2008

Glen P. Peters[a,1], Jan C. Minx[b,c], Christopher L. Weber[d,e], and Ottmar Edenhofer[c,f]

Rapid growth in CO_2 emissions after the 2008–2009 global financial crisis

esearch - Oslo NATURE CLIMATE CHANGE | VOL 2 | JANUARY 2012

Broad research question

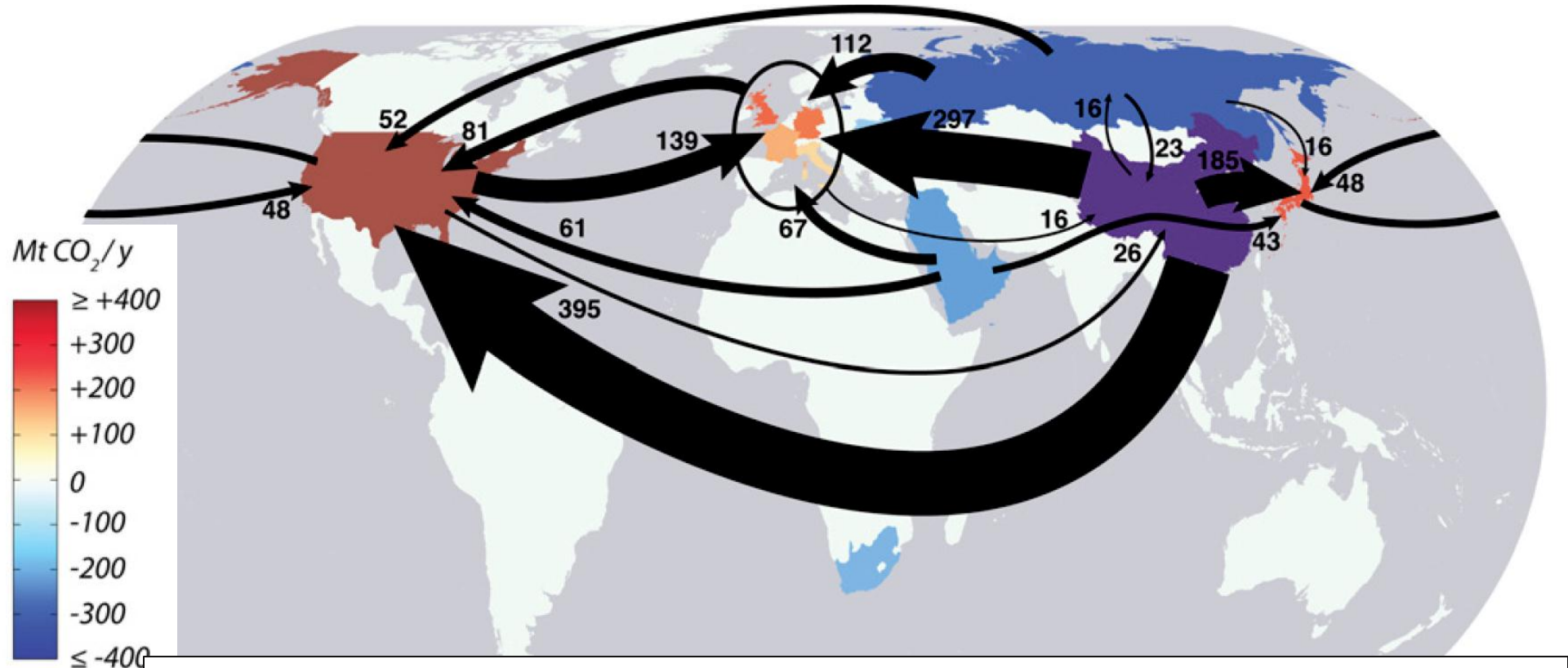
- In a world of **fragmented** climate policies can different methods of emissions accounting lead to more effective policy?

- Current system (EU-ETS)
  Production cap
  – free allocation to exporters
  + border tax for importers
  = Consumption cap

PREVIOUS RESULTS

Consumption-based accounting of CO_2 emissions

Steven J. Davis[1] and Ken Caldeira



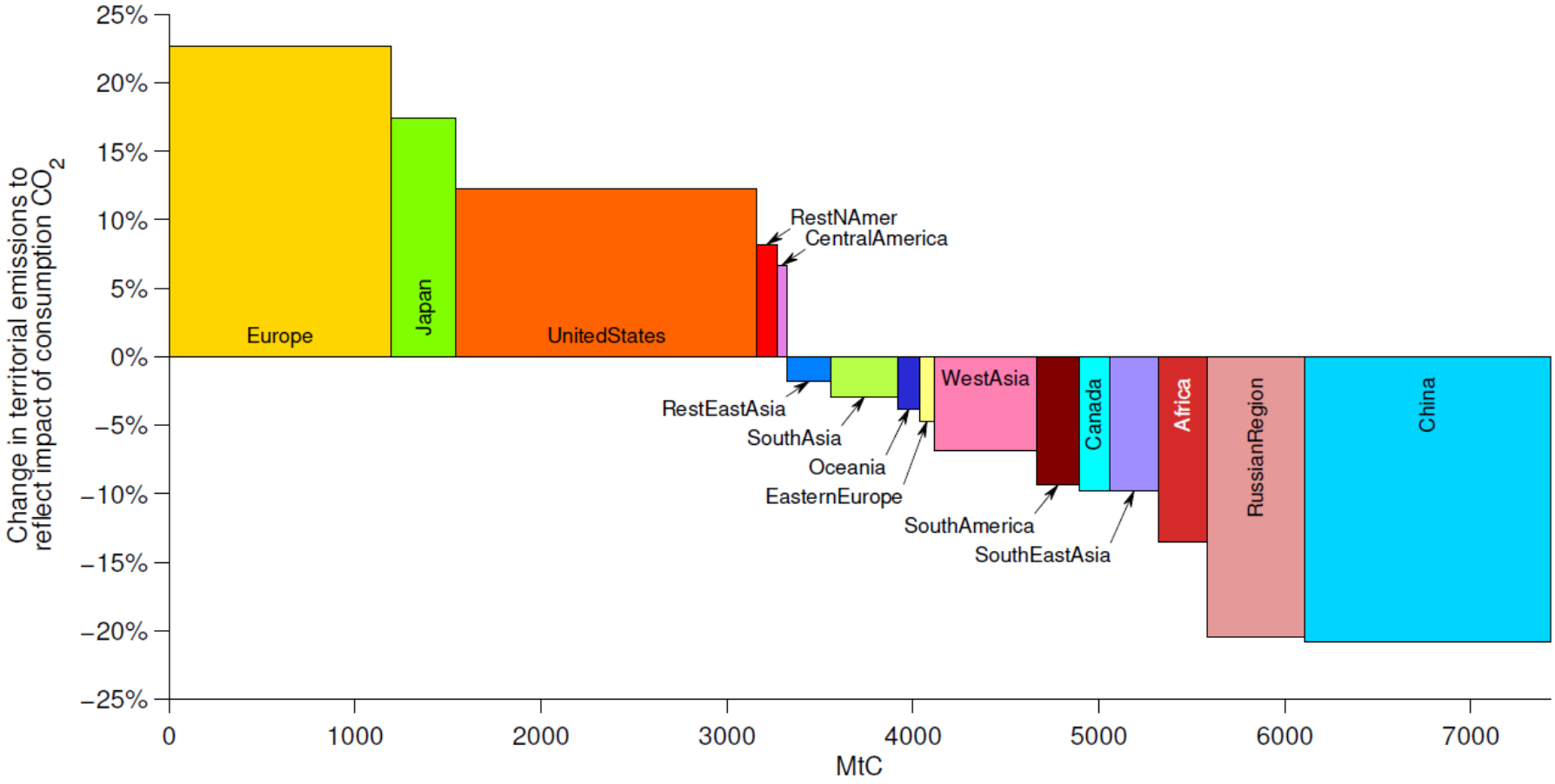
Key Findings (2004):

- 6.2 $GtCO_2$ (23%) embodied in trade
- Annex B Consumption 1.6 $GtCO_2$ higher than Production (12%)
- OECD Consumption 2.1 $GtCO_2$ higher than Production (16%)

A synthesis of carbon in international trade

G. P. Peters[1], S. J. Davis[2,3], and R. Andrew[1]

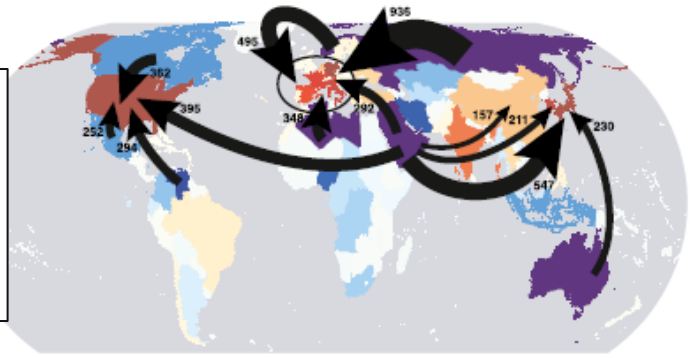
Biogeosciences



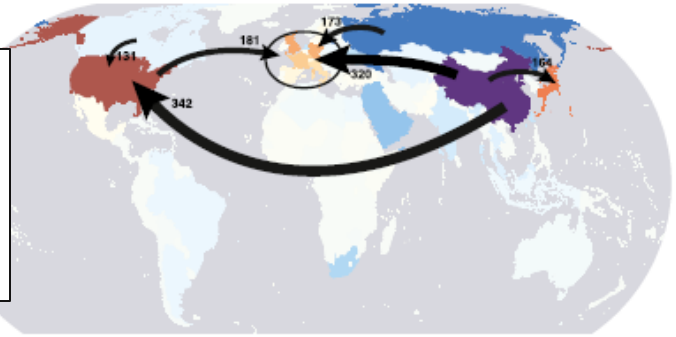
The supply chain of CO_2 emissions

Steven J. Davis[a,1], Glen P. Peters[b], and Ken Caldeira[a]

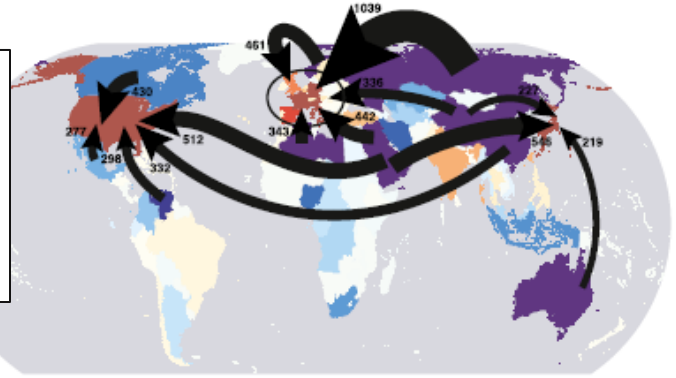
Extraction to Production



Production to Consumption



Extraction to Consumption

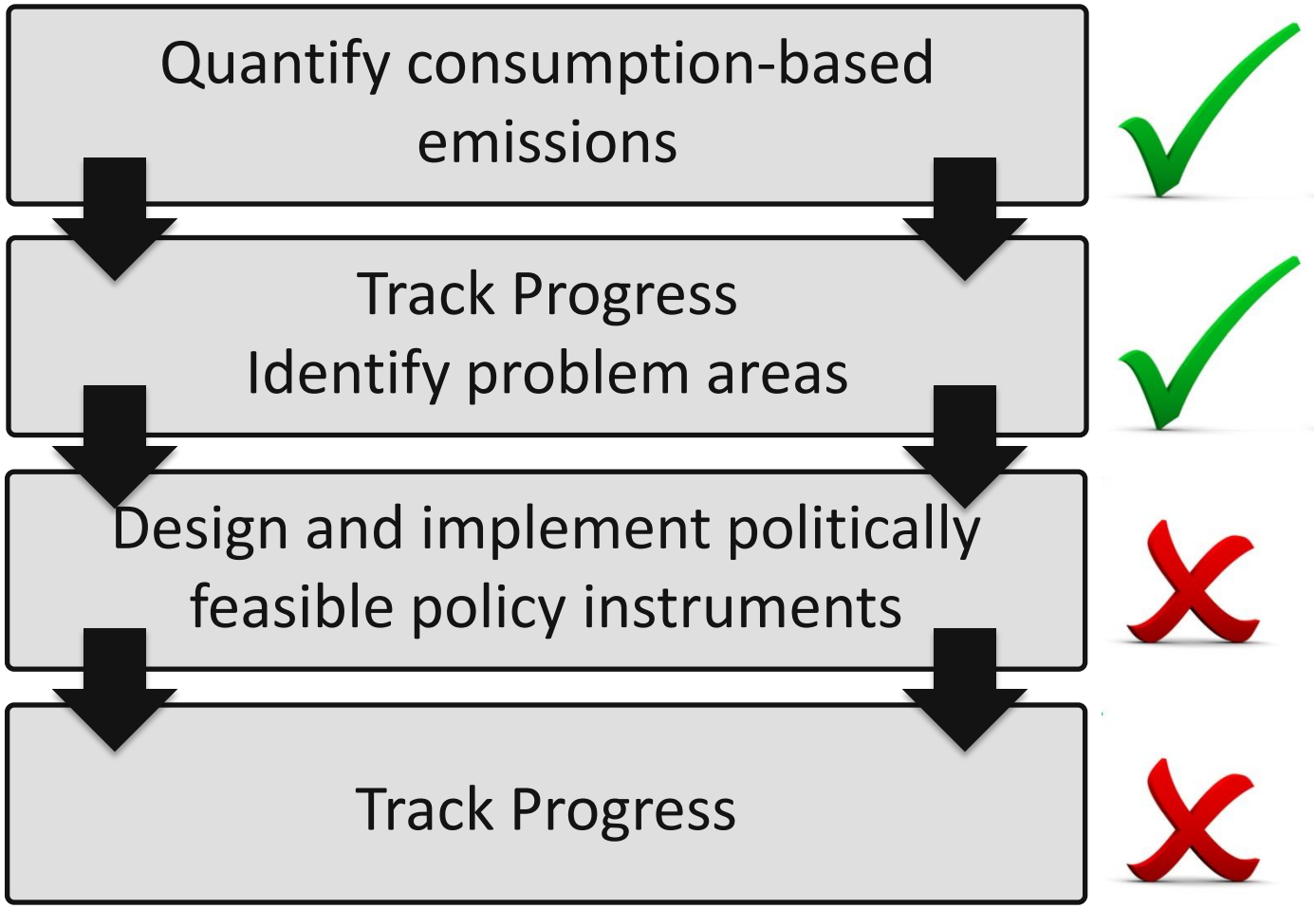


Key Findings (2004):

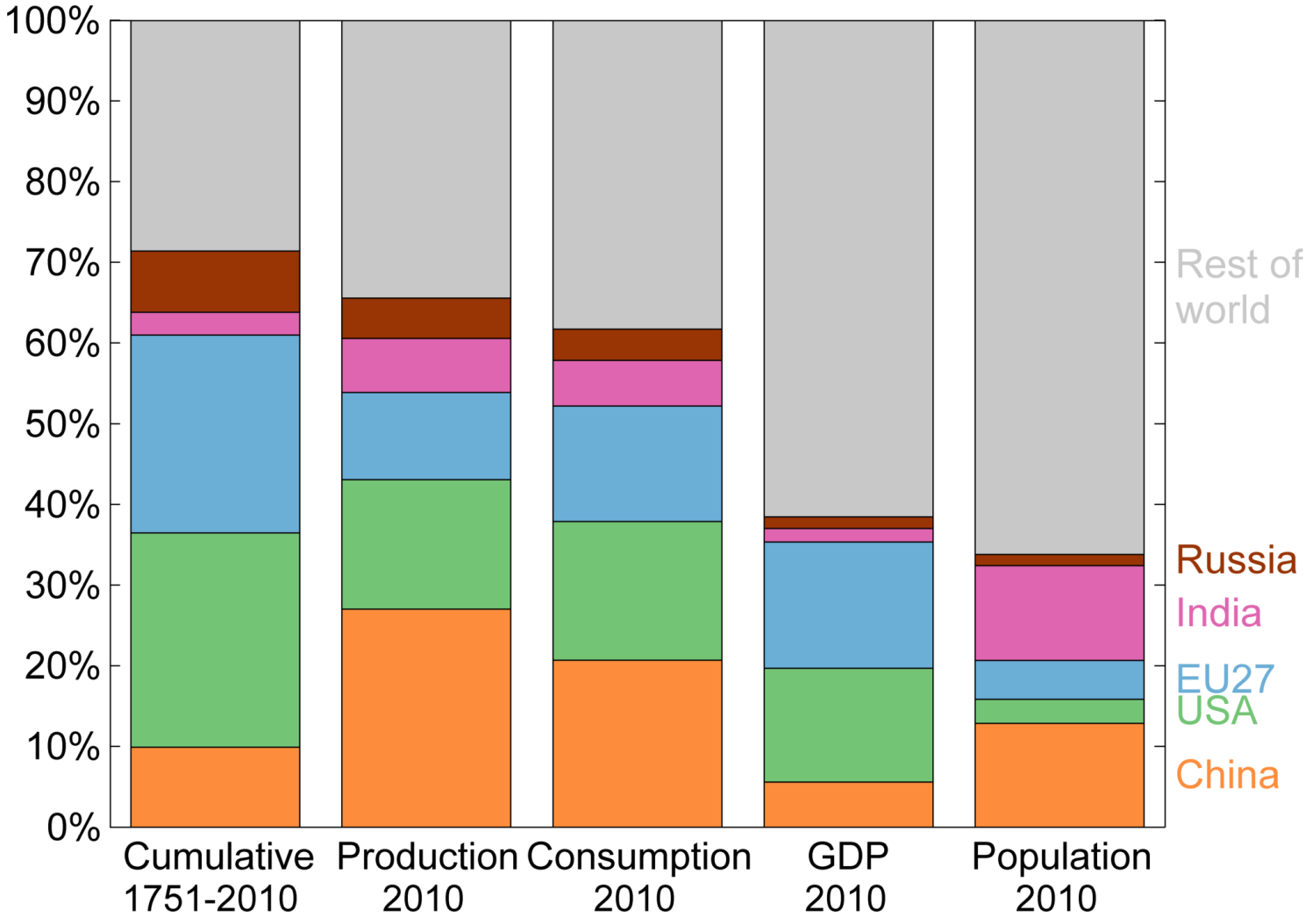
- 10.2 $GtCO_2$ (37%) embodied in extraction
- 6.4 $GtCO_2$ (23%) embodied in production

FUTURE RESEARCH

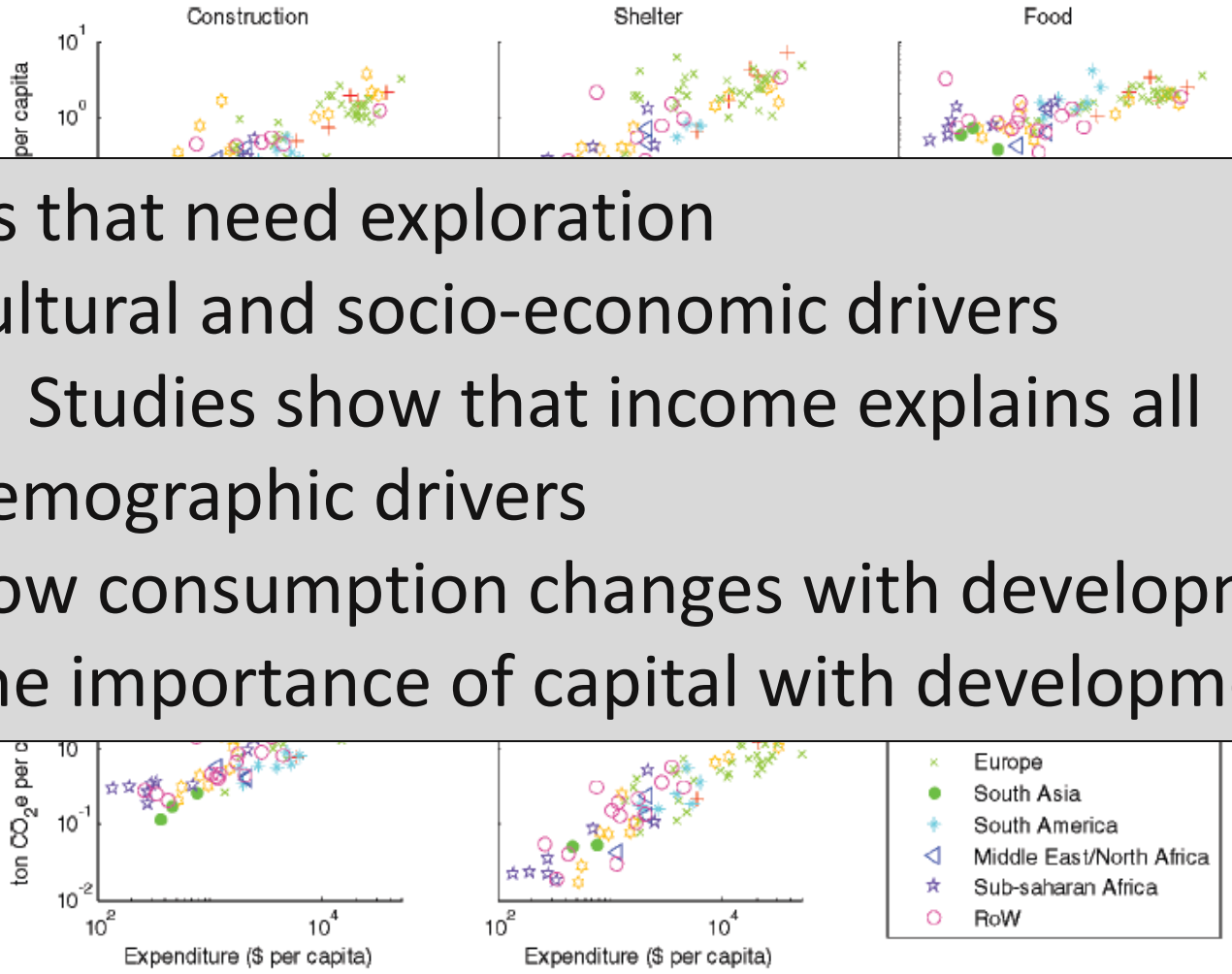
Consumption-based approaches are ***complementary*** to production-based approaches



“Fairness” and “Equity”



Drivers of consumption



Areas that need exploration

- Cultural and socio-economic drivers
  - Studies show that income explains all
- Demographic drivers
- How consumption changes with development
- The importance of capital with development

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

EDGAR G. HERTWICH*,† AND GLEN P. PETERS†,‡

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

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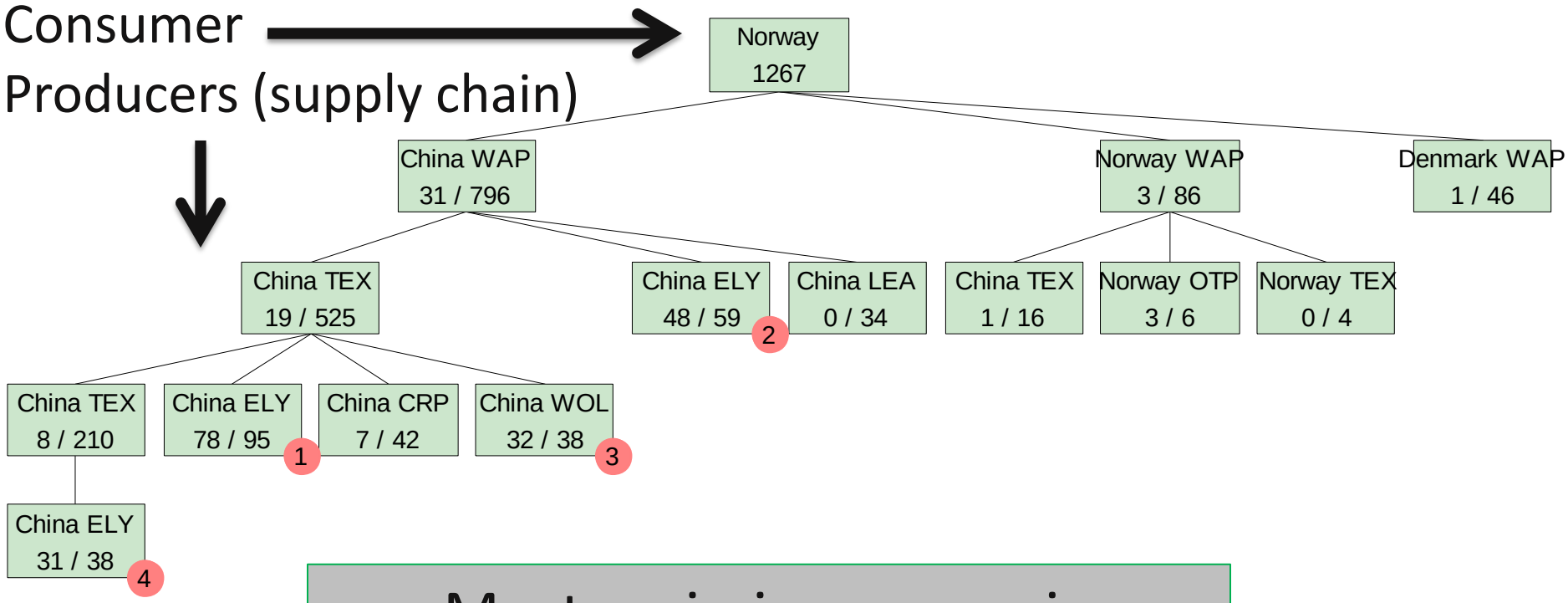
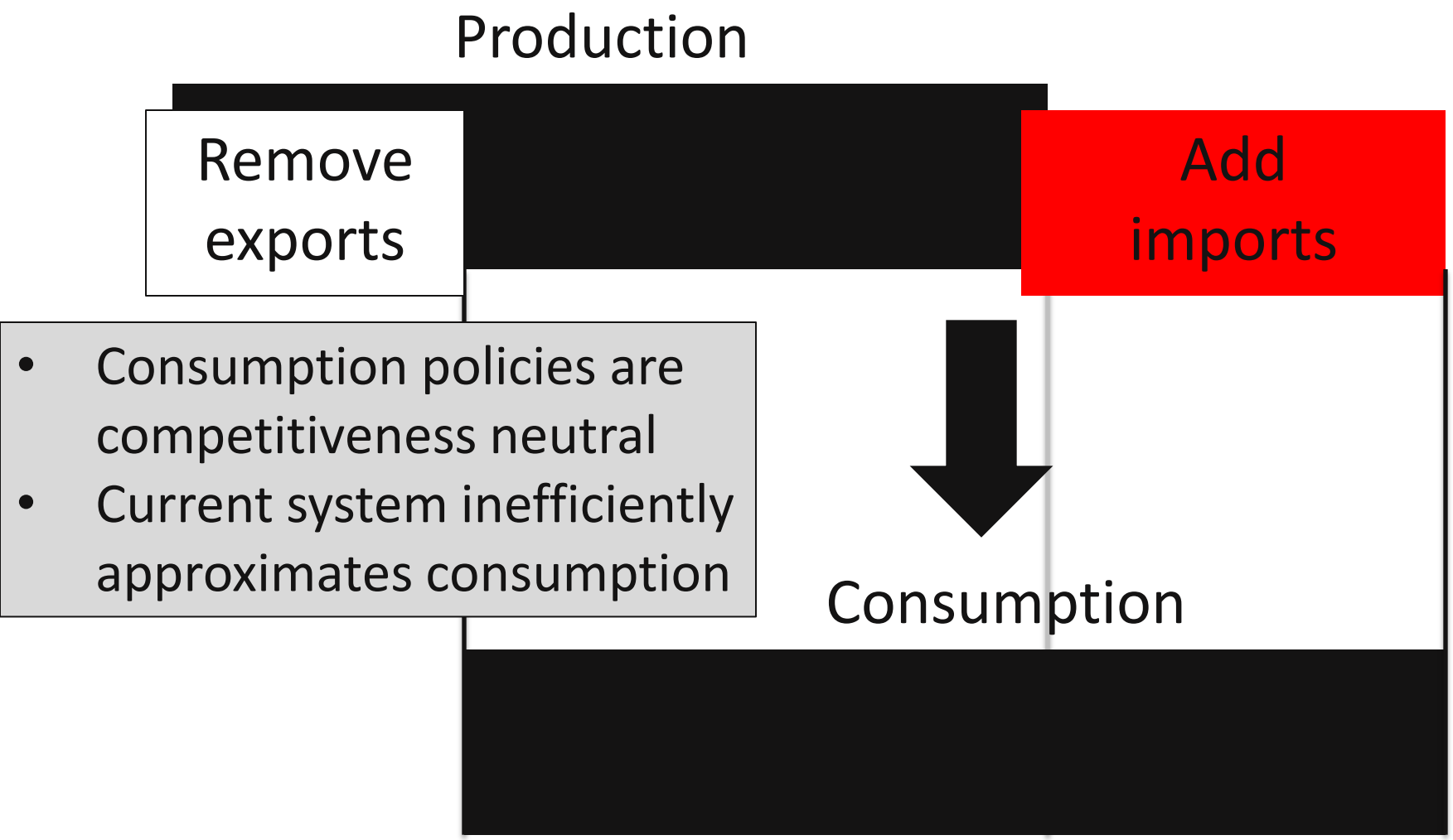
“Hot Spots”

Supply chain of clothing consumed in Norway



Most emissions occur in electricity production in China

Carbon Leakage (1)



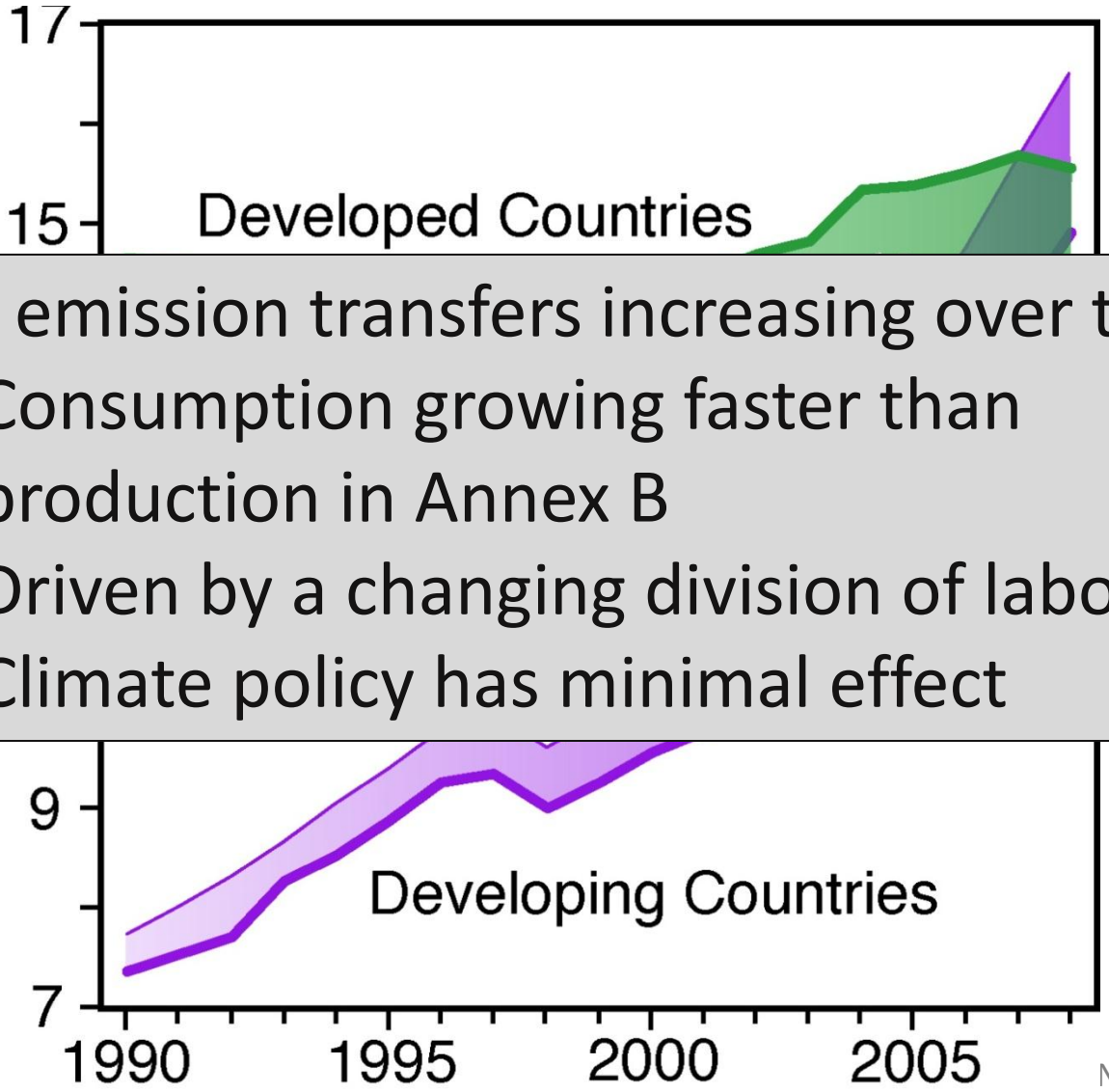
Carbon Leakage (2)

- *Strong*: Climate policies cause emissions to increase in other regions
- *Weak*: Increased consumption is met by production in other regions

- Potential policy mechanisms
  - Use of subsidies ***and*** BTAs
  - Base carbon pricing on current VAT systems?
  - Consumption emission limitations directly

Growth in emission transfers via international trade from 1990 to 2008

Glen P. Peters[a,1], Jan C. Minx[b,c], Christopher L. Weber[d,e], and Ottmar Edenhofer[c,f]



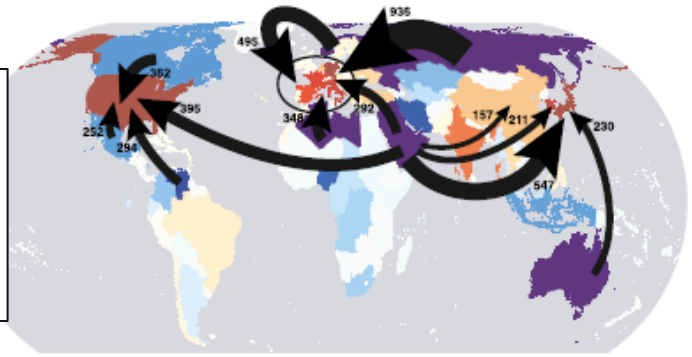
Net emission transfers increasing over time

- Consumption growing faster than production in Annex B
- Driven by a changing division of labour
- Climate policy has minimal effect

Broadening coverage through accounting

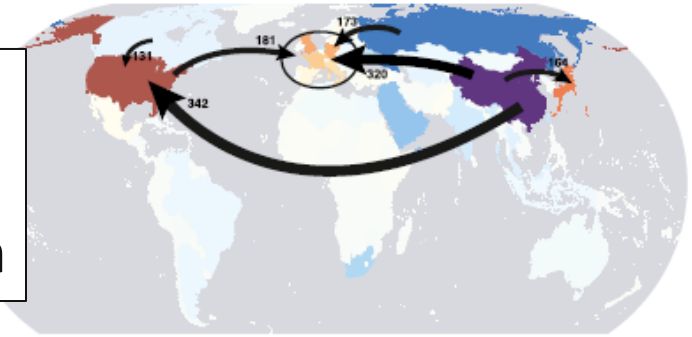
Robbie M. Andrew, Glen P. Peters, Steven J. Davis

Extraction to Production



Extraction base
- Only needs low participation
- Tax revenue to extractors

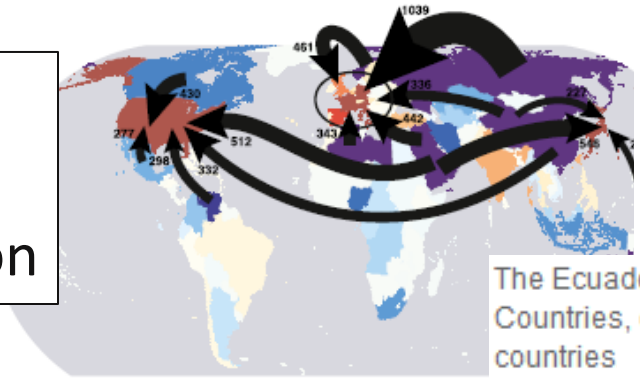
Production to Consumption



Territorial base
- Leakage Prone

Consumption base
- Expands coverage (if net importers)

Extraction to Consumption



Oil nations asked to consider carbon tax on exports

theguardian

Proposal could break deadlock at climate talks over raising finances for poorer countries to adapt to global warming

The Ecuador-led initiative, submitted to the Organisation of Petroleum Exporting Countries, could see a 3-5% tax levied on every barrel of oil exported to rich countries

CICERO

Global Agreements

- Alternative policy designs lacking research
  - Use of subsidies ***and*** BTAs
    - BTAs may "force" a global agreement
    - A lot of literature says this is *necessary*
  - Base carbon pricing on current VAT systems?
  - Consumption emission limitations directly
  - Supply-side/extraction-based policies

Measuring Effectiveness

$$E = \frac{AP - NR}{CO - NR}$$

AP: Actual Performance
CO: Collective Optimum
NR: No Regime Counterfactual (BAU)

- How can this framework be applied to emission pathways (scenarios)?

The Oslo-Potsdam Solution to Measuring Regime Effectiveness: Critique, Response, and the Road Ahead

*Jon Hovi, Detlef F. Sprinz, and Arild Underdal**

Power

Potential Contributions of Political Science to Environmental Economics

Environ Resource Econ (2011) 48:391–411

Jon Hovi · Arild Underdal · Hugh Ward

- "Power" can depend on *direct* and *indirect* relationships between parties
- Similar methods are used for the flows of goods and services between countries
  - $x = (I - A)^{-1}$
  - A describes direct and indirect "transfers"
- Can look at how different types of "power" are transferred between parties

Future Directions

- Robust data, methods, comparisons to prepare for potential policy applications
- Develop and cost policy instruments
- Political feasible pathways

- We have the numbers
  - …we are missing economics, politics, etc
  - …we are interested in ideas

Thank you

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