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Virtually (un)sustainable: An empirical analysis of wealth in trade

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THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE



Earlier version

- Published in 2012
Inclusive Wealth Report
- Atkinson, Agarwala, and
Munoz (2012)



Outline

- Research question
- Background & motivation
- My contribution
- Data
- Model
- Results

Resource
Depletion

Virtual
Carbon

Trade

Carbon
Emissions

Measure
Impacts
Sustainability

Various
Liabilities

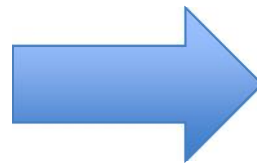
Multi-Regional Input Output Analysis (MRIO)

Leontief (1936, 1941)

Miller & Blair (2009)

Sustainability: A review

- Definition: Meeting needs of present & future generations (Brundtland 1987)
- Think in terms of consumption (non-declining)
- Consumption depends on...



£

Ingredients → Comprehensive Wealth

Ingredients

- Produced capital
- Human capital
- Natural capital

Elements of nature that generate value to people:

- ecosystems & species
- freshwater
- land
- minerals
- air and oceans
- natural processes and functions.

Genuine Savings =

- = Gross national saving
- Consumption of fixed capital
- + Education expenditure
- Energy depletion
- Mineral depletion
- Net forest depletion
- Fisheries depletion
- CO₂ damages

Trade in Natural Resources (2008)

- 24% of global merchandise exports in 2008
- Increased >600% (\$613b to \$3.7t) since 1998
 - > GDP of all but 4 countries
 - = combined GDP of 131 smallest economies

Source: WTO (2010)

Natural Resources as a share of merchandise exports

Middle East	74%
Africa	73%
Commonwealth	70%
South & Central Americas	47%

- 21 countries, NR >80% of exports
- 9 countries, NR >50% of GDP

Trends in virtual carbon

	1990	2008
Virtual Carbon	20% Global CO ₂ (4.3Gt)	26% Global CO ₂ (7.8Gt)

Intermediate demand

Region r

Agriculture

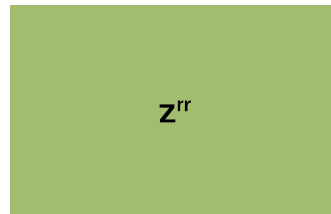
Region r (I)

Industry

(I)

Services

(III)



z^{rr}

Multi-Region Input-Output Model

Data

- Global Trade Analysis Project v8 2007 data
 - 57 sectors in 129 countries & regions
 - Fisheries, forests, oil, gas, coal, mineral extraction, CO₂ (fuel combustion)
- Social Cost of Carbon = \$50/tC
- World Bank (2013) for savings, net physical capital, education expenditure for 2007
- Munich Re NatCatSERVICE

Why use Input-Output

- National & international climate policies
 - Taxes
 - Cap & Trade Schemes
 - Agreements & treaties (Kyoto, etc).
- Traces impacts along the entire production chain
- Examine resource depletion & CO₂ embodied in trade

Sources: (Miller & Blair 2009; Lenzen et al 2007; Wiedmann et al 2007; Wiedmann 2009)

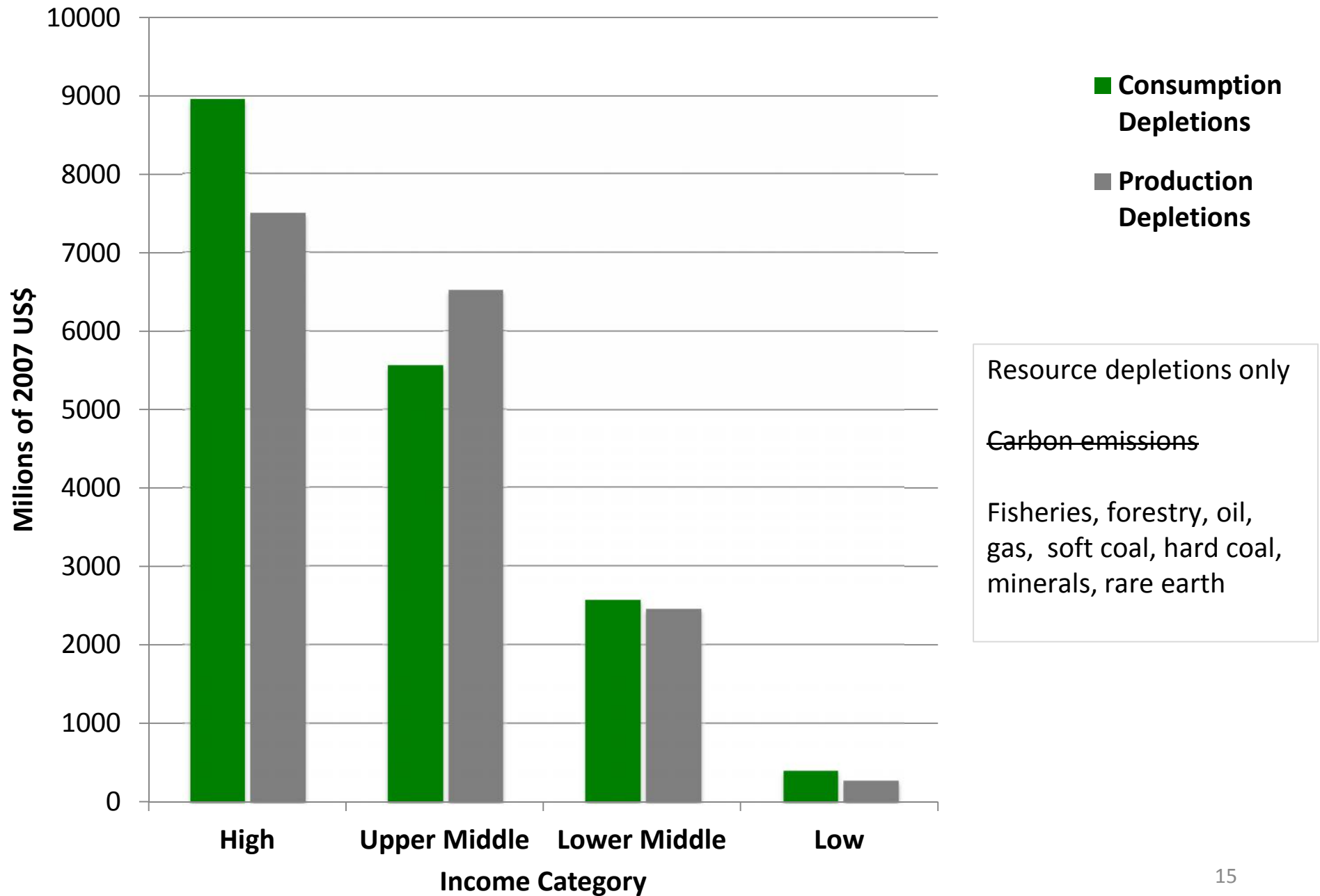
Understand how we might **account** for emissions and determine national **responsibilities**

**Accounting
Perspective**

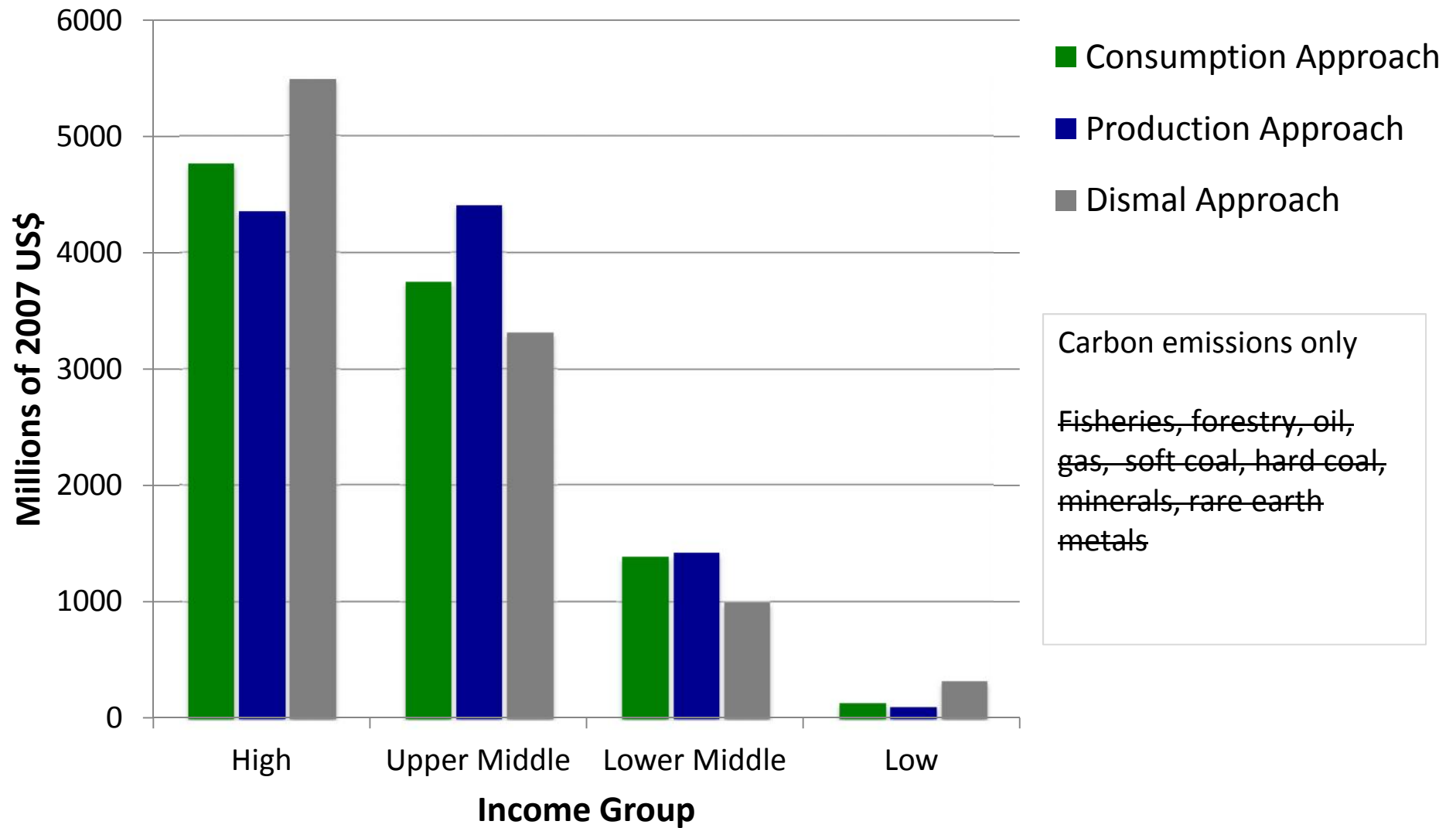
Source of Damages

**Responsibility
assigned to country**

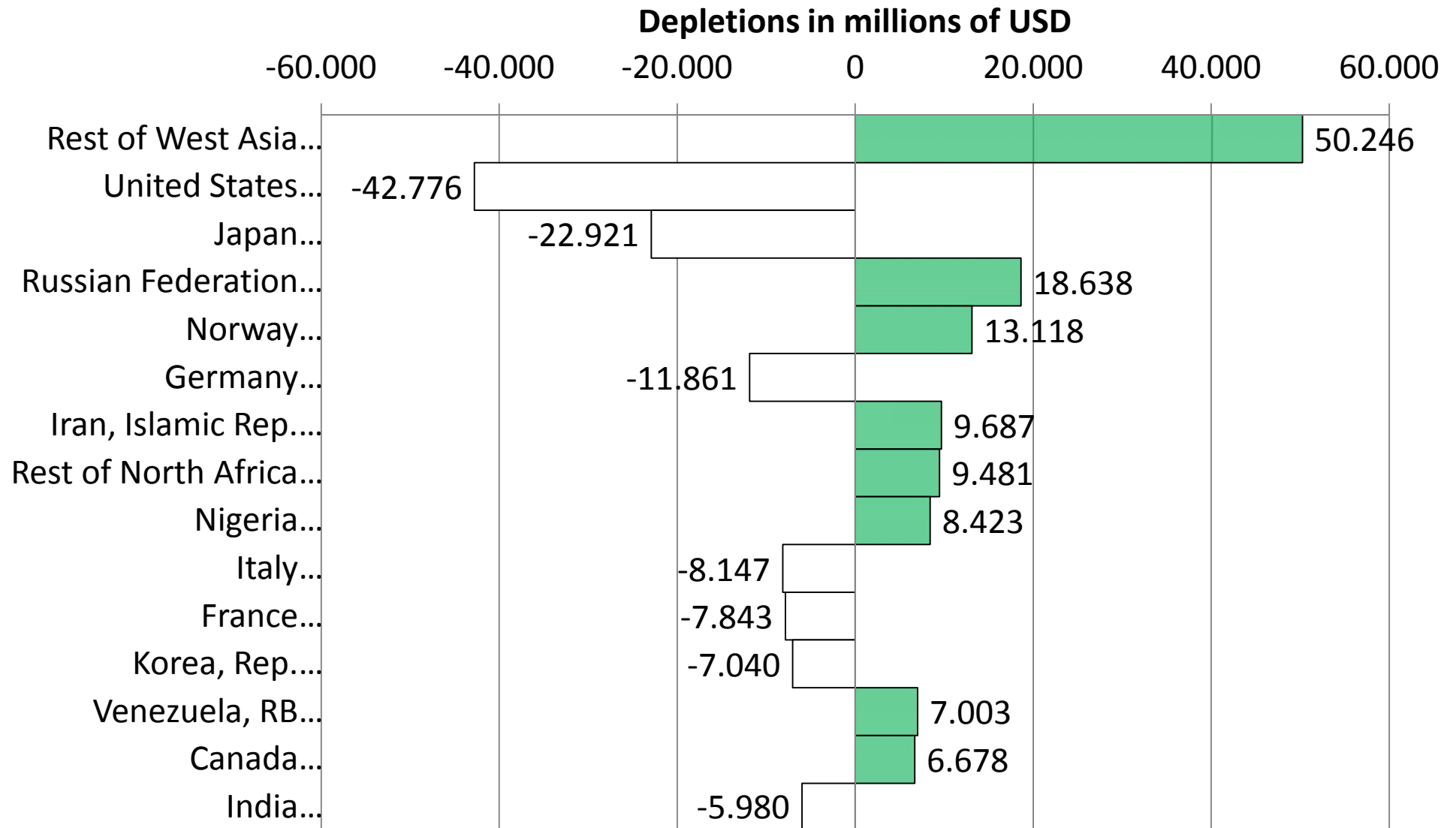
Production vs. Consumption Based Resource Depletions



Consumption, Production & Dismal CO₂ Emissions



Resource Depletion Production – Consumption



Take home points

Accounting perspectives matter

Substantial implications for policy design

Focusing on domestic production masks broader global trends

Thank you.

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References & slides upon request