Economic Globalization and Carbon Emissions. Facts and Myths

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“It is easier to imagine the end of the world, than to imagine the end of capitalism.”

Likewise, it is easier to imagine the end of the world than to imagine capitalism without globalization

Why is this relevant?

- When we talk about economic globalization today, then we talk about capitalism as a system defined by the thirst for unlimited accumulation of capital as means to maximize profits as well as a system defined by steady commodification, externally as well as internally, driven by decentralized market transactions and perpetuated by money.

- In other words, today’s globalization is driven by all those traditional capitalist features

- When we are looking into the relations between globalization and carbon emissions we actually look into the ways capitalism is operating

- and I assume that capitalism is compatible with variety of energy sources

Economic "globalization" refers to the increasing integration of economies around the world, particularly through the movement of goods, services, labor and capital across borders controlled by nation-states.
Globalization does not mean the end of space and time. Space actually is relevant, and so is time, as capitalist developments move unequal in time and space

Network Aspect

- Globalization is the sum of processes of creating networks of connections among actors at multi-continental distances, mediated through a variety of flows including people, information and ideas, capital, goods and services. Globalization is conceptualized as a process that erodes (but not destroys) national boundaries, integrates sectors of national economies, cultures, consumption pattern technologies and produces complex relations of mutual interdependence.

Channels of Economic Globalization

- Trade in Goods
- Trade in Services
- Trade in Knowledge
- Foreign Direct Investment
- Financial Products
- Movement of People

Simplicissimus

- The carbon footprint of the Spring Campus is small or big?
- Why don't we have a huge Skype-Conference?
- Why do we appreciate face-to-face-meetings?
- Why are we getting coffee, beverages and food that traveled from afar?
- Why is a sustainability program handing out travel grants?
- Who of you bought offsets?

Take One

- Economic activities require use of energy and come with externalities (production as well as consumption)

- Activities are usually measured in the aggregate of economic growth, as growth of Gross Domestic Product

- For a first, the question is whether and if, to which degree does globalization add to GDP-growth?

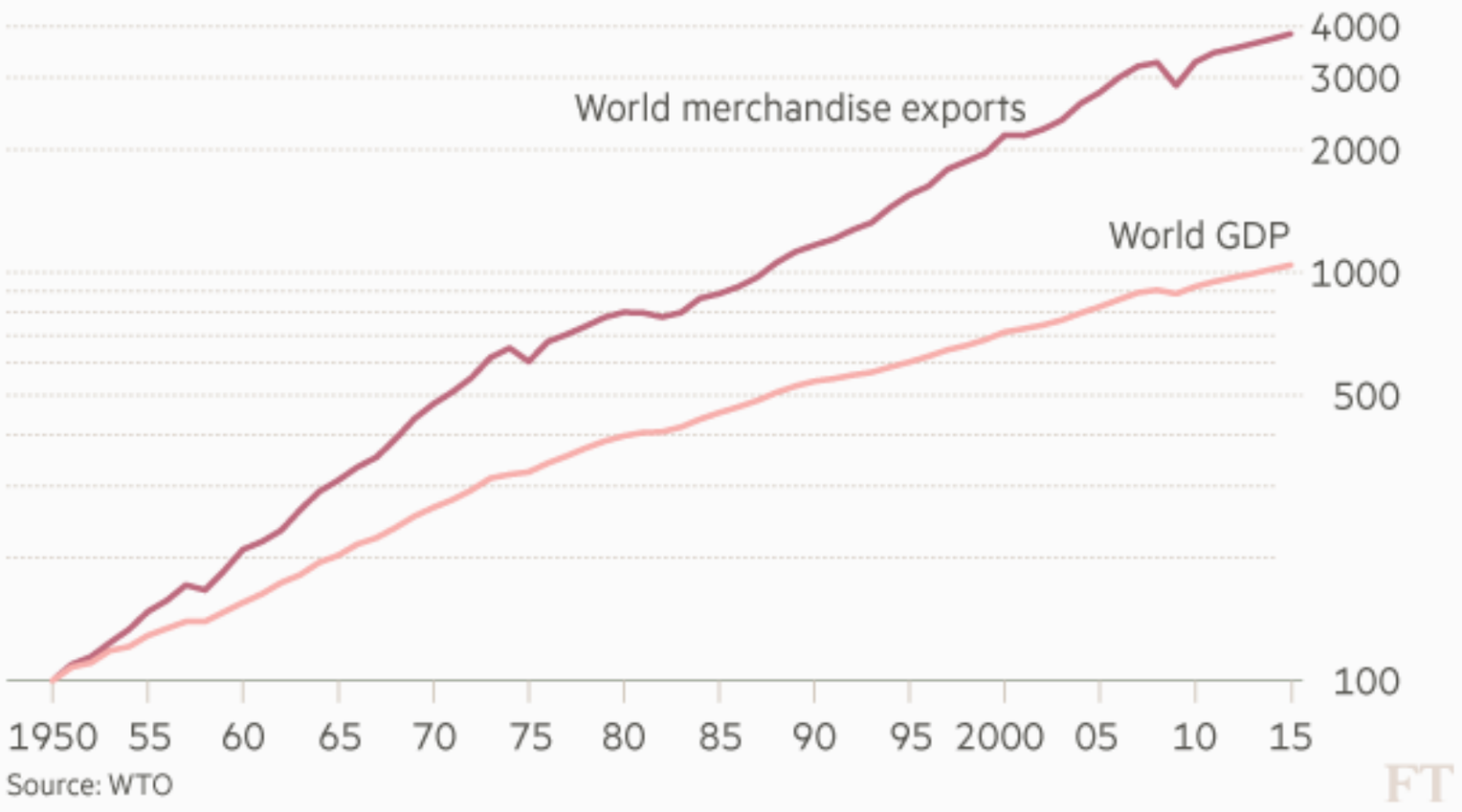
Globalization and Economic Growth

- Empirical studies across a range of national economies and using various indices and indicators show a relatively strong correlation between globalization and economic growth (Heshmati/Lee 2010)

- If economic growth as such is seen as the problem, then it needs a strategy to de-globalize

The trade engine

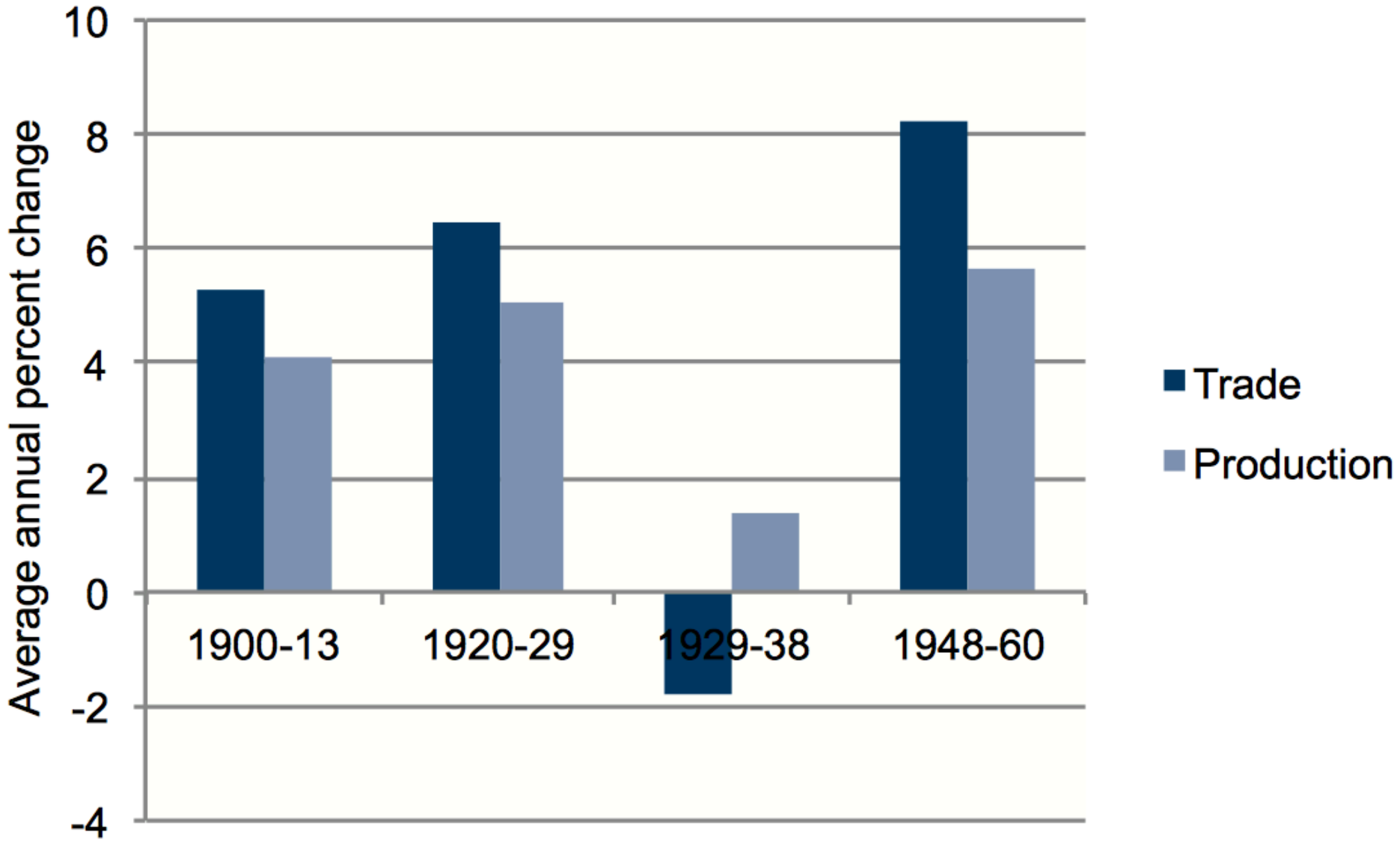
Volume indices (1950=100, log scale)



Source: WTO

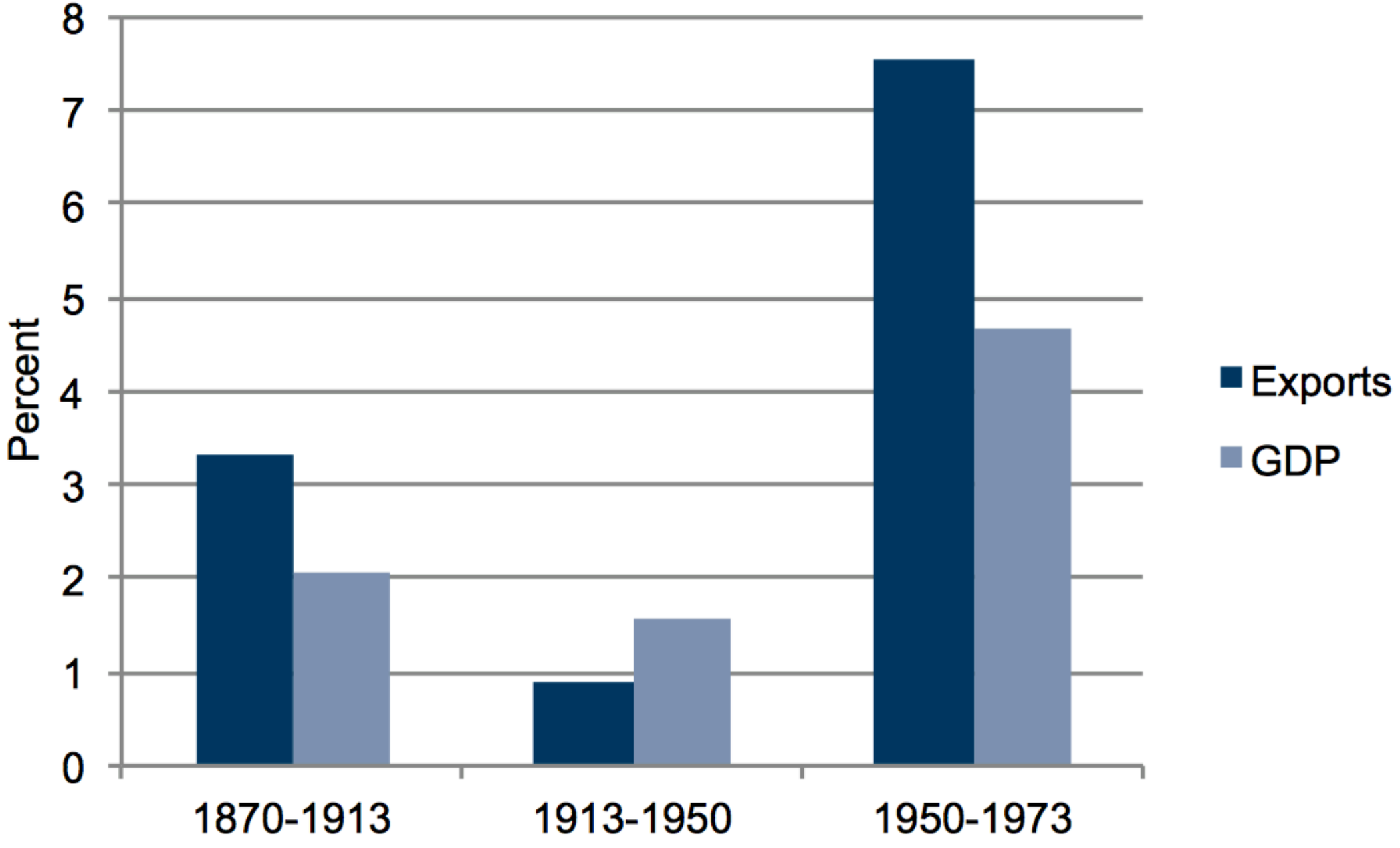
FT

Figure 2 UN data on trade and production of manufactured goods, various periods

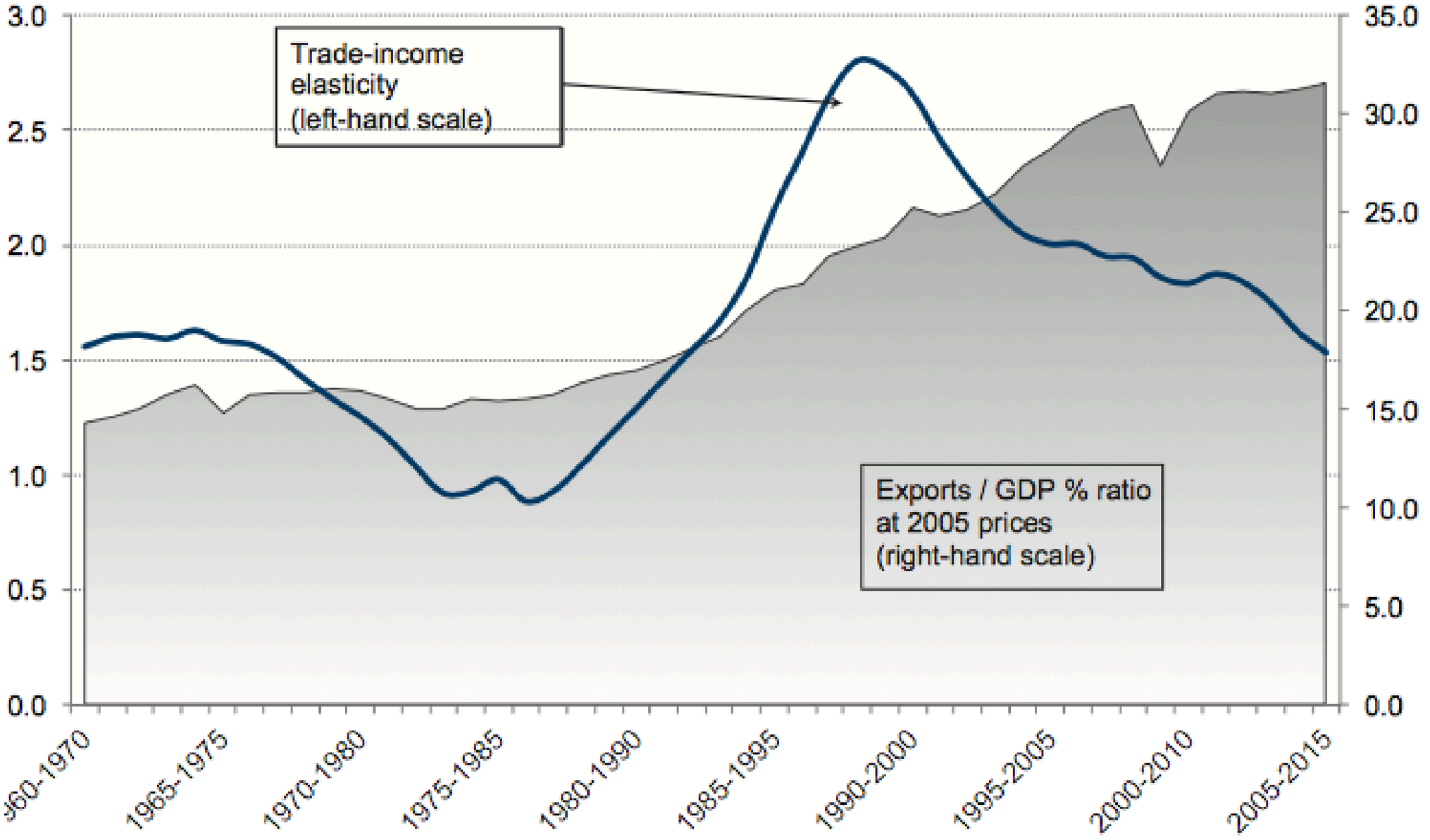


Source: United Nations (1962), Table 1.

Figure 1 Maddison data on world exports and GDP, constant dollars



Source: Maddison (2006), Table A-a and F-3.



Source: Escaith and Miroudot (2015).

Peak trade?

- Trade intensity
- Trade in informational goods and services
- Trade may no longer be one of the key components of globalization

Transportation and Globalization

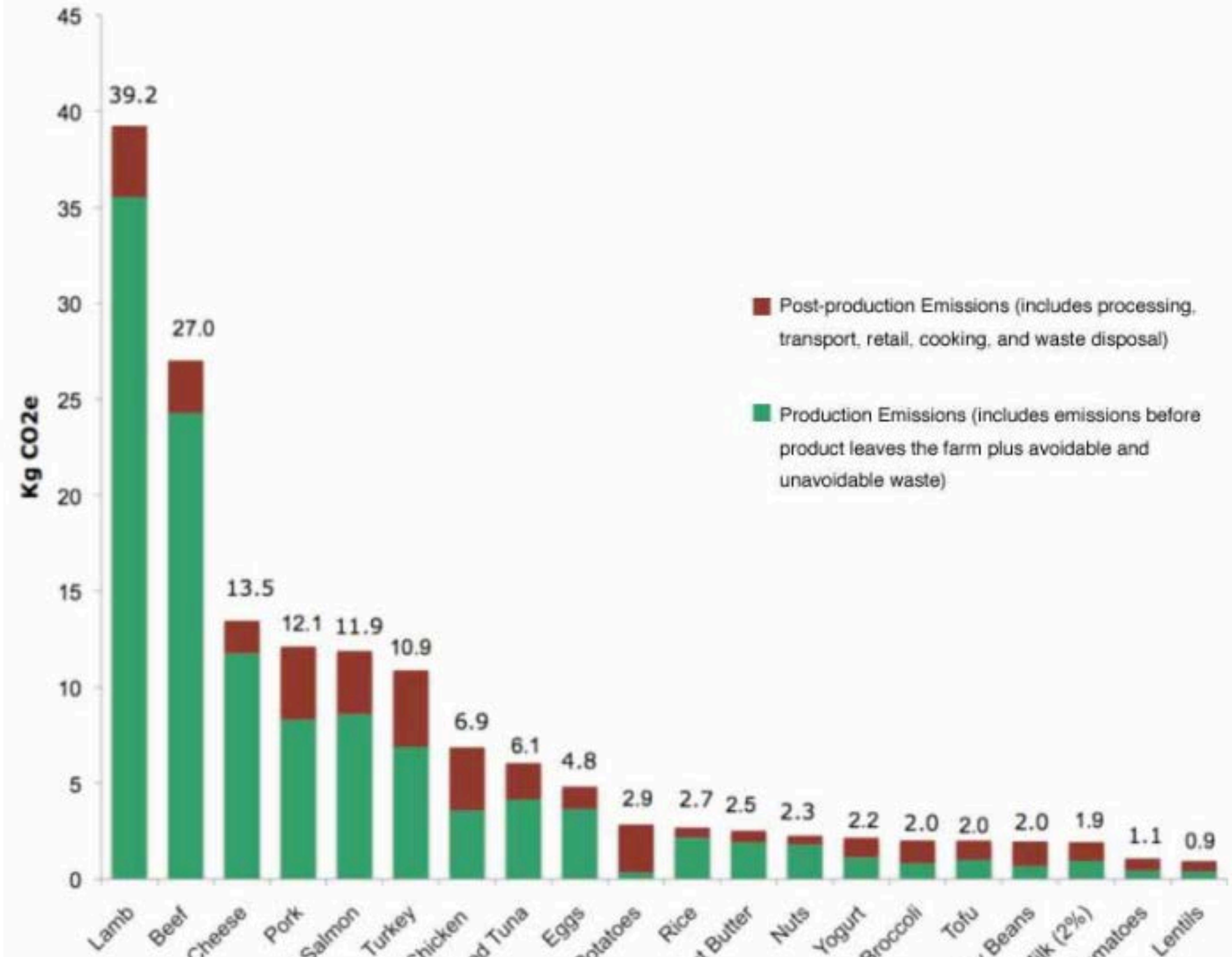
- Early studies show that an increase in global trade by 1% point increases green house gases by .4% points

- Depending on calculation methods, the composition of trade in goods and services and the more, the relation is even weaker

- The idea, for example, that locally sourced food is advantageous in terms of CO2 to globally sourced food is not covered by evidence

- transport mode (air, road, maritime or rail) and distance are not the only significant contributors to CO2 emissions. Life cycle of the products, including production methods (e.g. heated greenhouses vs. open-air production; energy-intensive modern techniques vs. hand labour) also plays a critical role

Figure 1. Full Lifecycle Assessment of Greenhouse Gas Emissions: Most Emissions from Common Proteins and Vegetables Occur During Production



The journey of a single Zara dress

BBC

Globalization and Ecological Footprint

- What about globalization and its ecological footprint?

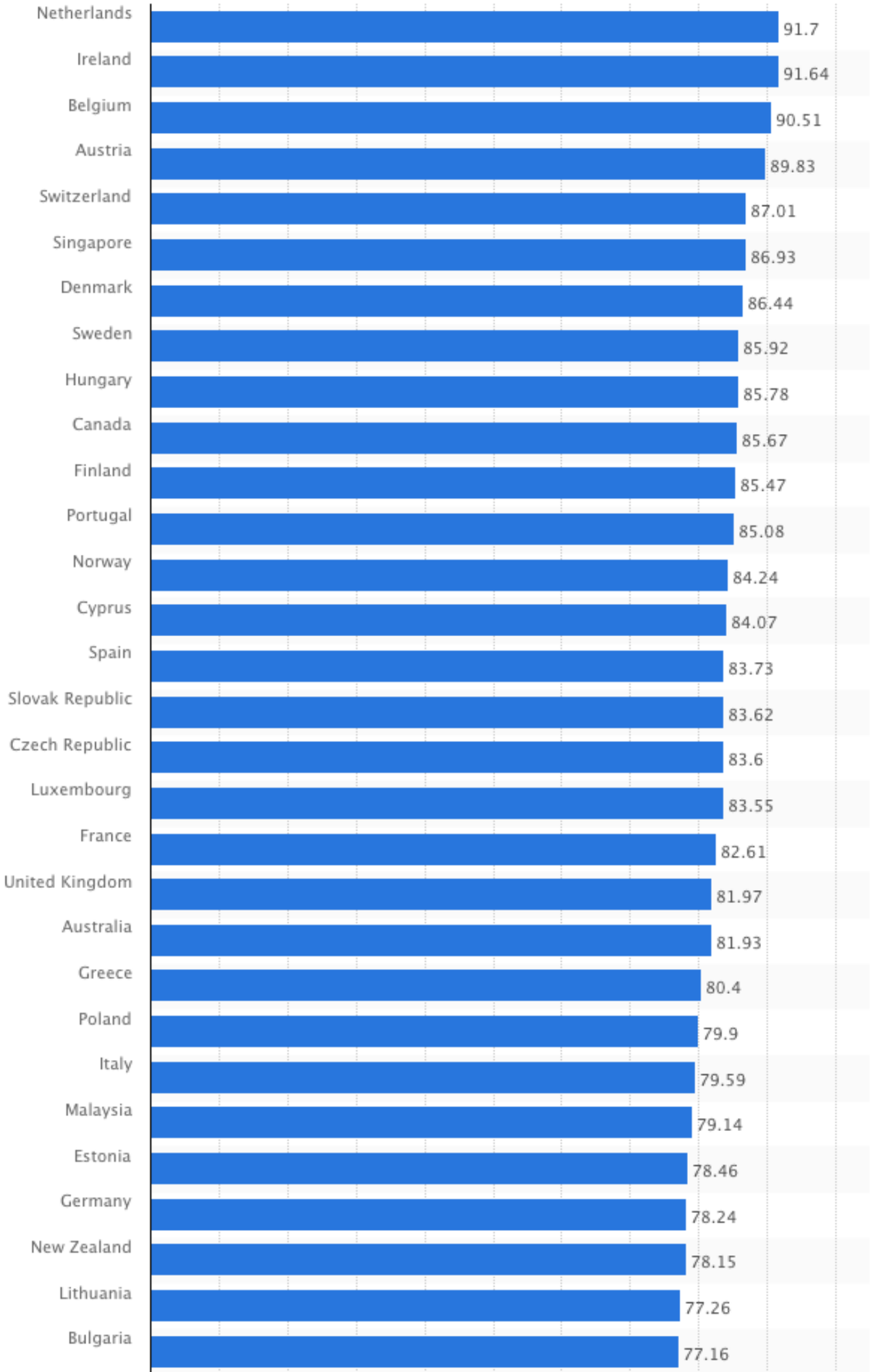
- It seems plausible to state that globalization has negative effects on the environment. And yet, early studies could not show a correlation between globalization and environmental damages.

- Frankel and Rose (2005), for example, add into their approach a gains-from-trade-hypothesis, more or less accepting the ‘Kuznets curve’ which says that with rising income levels negative environmental effects decrease

- With the growth of literature we also see a increase in the level of sophistication in terms of methodologies and data generation

Encompassing Approach: KOF Index of Globalization

- This index was introduced by Axel Dreher and experienced since some updates and modifications
- three dimensions: (i) economic globalization; ()ii) political globalization; and (iii) social globalization.
- Each dimension consists of various variables which are transformed to an index on scale of 1 to 100, where 100 is the maximum value. Calculations are prepared for the period 1970-2013


Netherlands 91.7
Ireland 91.64
Belgium 90.51
Austria 89.83
Switzerland 87.01
Singapore 86.93
Denmark 86.44
Sweden 85.92
Hungary 85.78
Canada 85.67
Finland 85.47
Portugal 85.08
Norway 84.24
Cyprus 84.07
Spain 83.73
Slovak Republic 83.62
Czech Republic 83.6
Luxembourg 83.55
France 82.61
United Kingdom 81.97
Australia 81.93
Greece 80.4
Poland 79.9
Italy 79.59
Malaysia 79.14
Estonia 78.46
Germany 78.24
New Zealand 78.15
Lithuania 77.26
Bulgaria 77.16

Results

- Various studies who make use of KOF and modified KOF indices conclude a positive and overall significant relation between globalization and carbon emissions

- Yet, globalization is negatively related to emissions in case of OECD-countries, and positively related in case of non-OECD-countries (1990-2009 period for 166 countries) (Bu/Lin/Zhang 2016)

- This came be read as another confirmation of the Kuznets curve…or as a problem in the way the data are organized. Asa matter of fact, encompassing studies tend to overlook the concrete amount of embodied carbon emissions in trade

Embodied Carbon-Approach

- The term “embodied carbon” refers to carbon dioxide emitted at all stages of a good’s manufacturing process, from the mining of raw materials through the distribution process, to the final product provided to the consumer.

- Climate policy targets are usually calculated in terms of territorial emissions. Given the intensity of international trade in goods and services, one can argue that consumption-based calculations are superior as they show the eventual carbon intensity of growth regimes.

Key indicators of top 25 countries emitting highest CO_2 emissions.

World rank	Total CO_2 Emissions (2012) (million tons) and % change (1990–2012) Source: IEA	CO_2 emissions/GDP (2012) Source: IEA	CO_2 intensity (kg per kg of oil equivalent energy use) (2012) Source: World Bank	Per capita energy consumption (2011) Source: IEA	Openness (Trade/GDP) (2012) Source: World Bank	Per capita GDP (2012) Source: World Bank	GDP (billon) (current, 2012, US$) Source: World Bank
1. China[a]	8250 (262%)	1.73	3.29	2029	45.71	6092	8229
2. United States	5074 (4%)	0.36	2.45	7032	30.6	51,495	16,163
3. India[a]	1954 (236%)	1.41	2.77	613	55.5	1503	1858
4. Russian Fed.	1659 (−23%)	1.69	2.47	5113	51.8	14,090	2017
5. Japan	1223 (15%)	0.26	2.34	3610	31.3	46,679	5954
6. Germany	755 (−20%)	0.25	2.26	3811	85.9	43931	3533
7. Korea, Rep.[a]	592 (158%)	0.55	2.27	5231	109.8	24453	1222
8. Canada	533 (24%)	0.41	1.98	7333	62.0	52,409	1821
9. Iran, Isl. Rep.	532 (197%)	2.17	2.71	2812	–	6578	502
10. Saudi Arabia	458 (203%)	0.92	2.41	6738	83.7	25,945	733
11. United King.	457 (16%)	0.19	2.44	2973	62.5	41,053	2614
12. Brazil[a]	440 (128%)	0.39	1.57	1371	25.2	11,319	2248
13. Mexico[a]	436 (64%)	0.42	2.47	1559	66.3	9817	1186
14. Indonesia[a]	435 (198%)	1.02	2.05	857	49.5	3551	876
15. Australia	386 (48%)	0.42	3.04	5500	42.7	67,524	1534
16. South Africa[a]	376 (48%)	1.22	3.23	2740	60.7	7313	382
17. Italy	374 (−5%)	0.22	2.38	2819	56.1	35,132	2091
18. France	333 (−5%)	0.15	1.38	3869	59.2	40,908	2686
19. Turkey[a]	302 (138%)	0.48	2.83	1539	57.7	10,660	788
20. Poland	293 (−14%)	0.72	3.12	2629	90.3	12879	496
21. Ukraine	281 (−59%)	2.94	2.30	2766	104.0	3873	1766
22. Spain	266 (29%)	0.23	2.11	2686	59.0	28992	1355
23. Thailand[a]	256 (219%)	1.15	2.51	1789	148.8	5479	365
24. Kazakhstan	225 (−4%)	2.59	3.34	4717	75.5	12,120	203
25. Malaysia[a]	195 (288%)	0.99	2.98	2639	158.9	10,439	305

Note: Using IEA (2014) and WDI (2015), the table is composed by authors.

Second Part of the Story

- The more developed an economy (measured in GDP), the more they tend to import carbon emissions

- China and Russia in particular are huge carbon exporters (for different reasons)

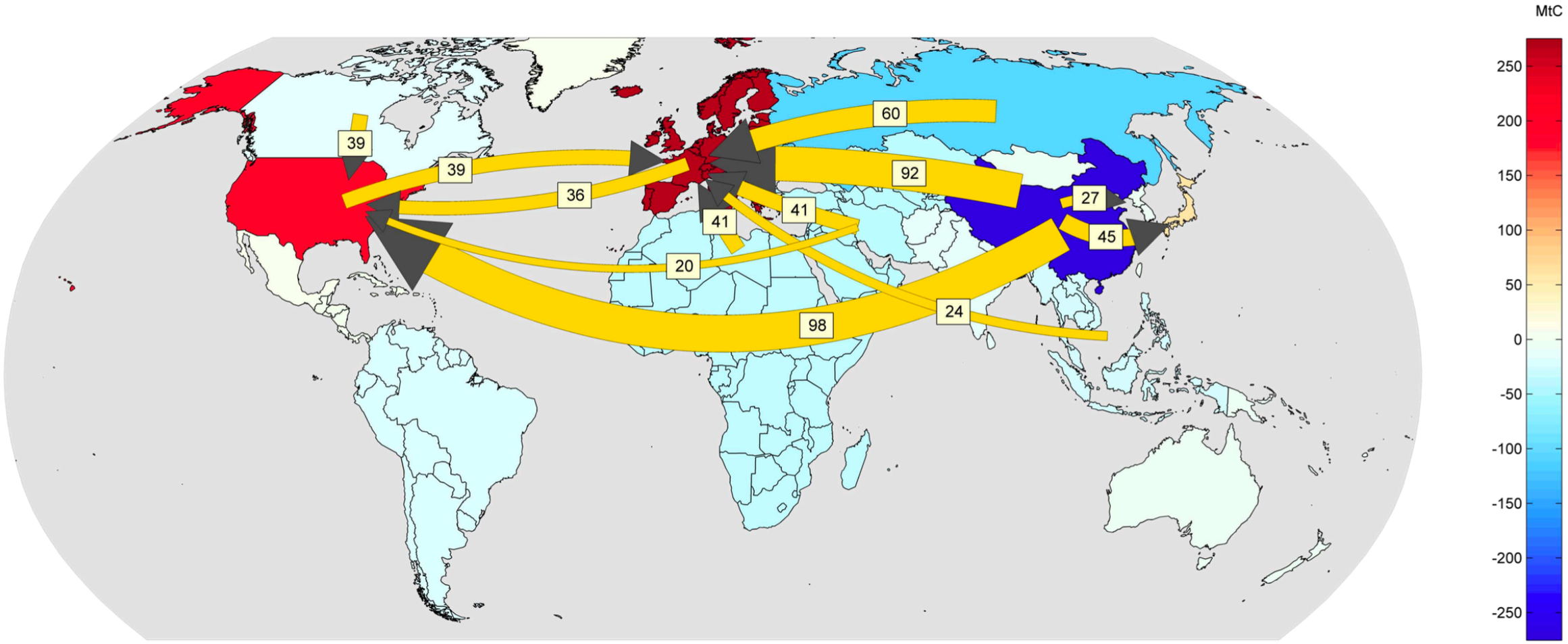


Fig. 8. The 12 largest inter-regional flows of carbon embodied in trade, from origin of emissions to the region of final consumption, with key regions disaggregated (2004). The largest single inter-regional flow is from China to USA (98 MtC). These 12 flows account for 40 % of all inter-regional flows using this grouping.

De-Globalization vs. Low Carbon Emission Strategy

- One way to bring down carbon emissions is de-globalization, in particular ending the export opportunities for carbon-intensive goods and services

- This would also require substitution of those products/services by domestic sectors with lower carbon intensity

- Alternatively, one needs to reduce carbon emissions at the source by strict innovation and modernization policies. This would allow ongoing but probably lower intensity of globalization

- Border adjustment taxes respectively a global carbon price as policy tools