Carbon footprints – reconciling academic and statistical work

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Introduction

– Footprint are increasingly popular for policy
– Footprints are increasingly based on IO/SEEA combinations
– Variety of Multi-regional input-output models (MRIO)
– Footprint estimates vary significantly

Question:
What role should NSI's play in footprint analysis?

Answer?
Single-country National Accounts Consistent (SNAC) footprint

Overview – Academic work (publically available)

|	GTAP	EXIOBASE	WIOD	Eora
Acronym	Global Trade Analysis Project	EXIOPOL: Externality data and input-output tools for policy analysis	World Input-Output Database	-
Institute	Purdue University	EXIOBASE: FP6 project (EXIOPOL) led by FEEM Database created by NTNU, TNO, SERI, CML	FP7 project lead by the University of Groningen	University of Sydney
Years	1990, 1992, 1995, 1997, 2001, 2004, 2007 (years are not comparable)	2000	1995-2011	1990-2009
Prices of previous year	-	-	1995-2009	-
Countries/ Regions	15-129 (depends on year)	43 (27 EU, 16 non-EU) (95% of the global GDP)	40 (27 EU and 12 non-EU) (80% of world GDP in 2006)	187
Number of industries	57 industries	130 industries	35 industries	100-500 industries
Environmental data	Greenhouse gases (CO_2, NO_2, CH_4) Energy use Land use (split agro-ecological zone)	Emissions (56) Materials (96) Land use (15) Water use (14)	Energy use / several energy carriers Water consumption Land use Emissions of greenhouse gases Air pollutants Resource use/extraction Generation and treatment of various types of waste	Greenhouse gases Air pollution Water use Ecological Footprint

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Overview - NSIs/government agencies

| NSI/Other	Institute	Type	Country specific IO	Years	Environmental	Regions	Industries
National Statistical Institutes	Australian Bureau of Statistics	SRIO	Y	2007/ 2008	GHG	1	40
	Statistics Canada	MRIO	Y	2002&2006	GHG	4	?
	Statistics Denmark	Partial	Y	2005	CO_2	13	60
	INSEE	Partial	Y	2005	CO_2	±15	60
	DESTATIS	Partial/ hybrid	Y	2007	Energy, CO_2	14	73
	Statistics Netherlands	Partial	N	2009	GHG (4)	17	60
	Statistics Sweden	SRIO	N	1993-2008	Energy; materials; air emissions	2	134
	GSO Vietnam	SRIO	N	2005, 2007	CO_2	1	5
Other government agencies	PBL Netherlands Environmental Assessment Agency	Partial and MRIO	Y	2001	GHG (3) and land	13	57
	DEFRA	MRIO	Y	1990-2009	CO_2 and GHG	4	123
International institutes	OECD	MRIO	Y	1995, 2000, 2005, 2008, 2009	CO2 (only emissions from fuel combustion)	57	18
	Eurostat	SRIO	N	2000-2007	8 pressures	2	64

Overview NSIs/government agencies

– Mostly carbon footprint

– NSIs often use simpler IO models

– Clear interest in additional breakdowns

  - Household characteristics such as income

– Dissemination practices of the institutes show that the results are not always presented as "official statistics"

Carbon footprints for the Netherlands from various MRIO databases
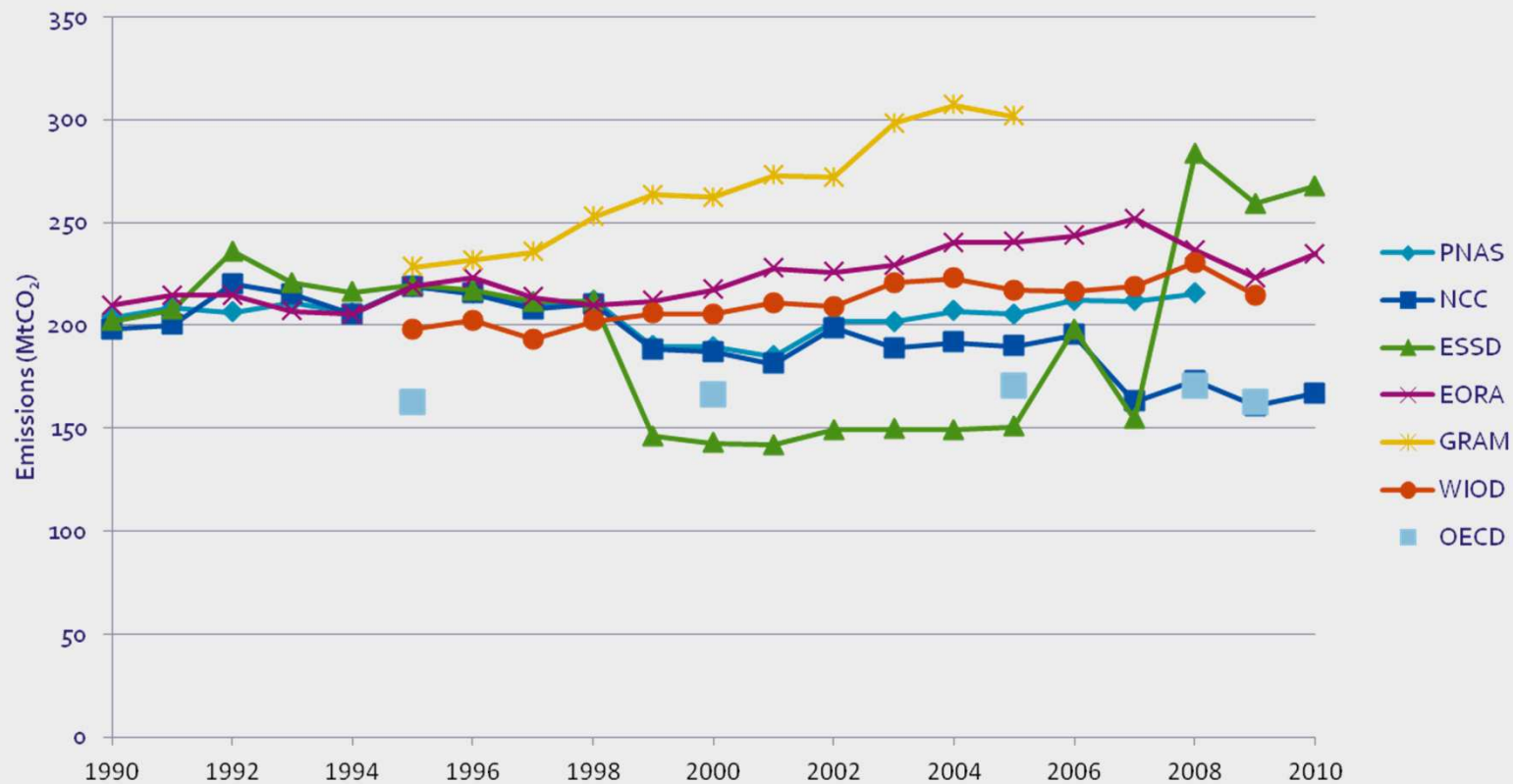
Data provided by
Glen Peters and Nori Yamano

Carbon footprints for the Netherlands: WIOD and Eora
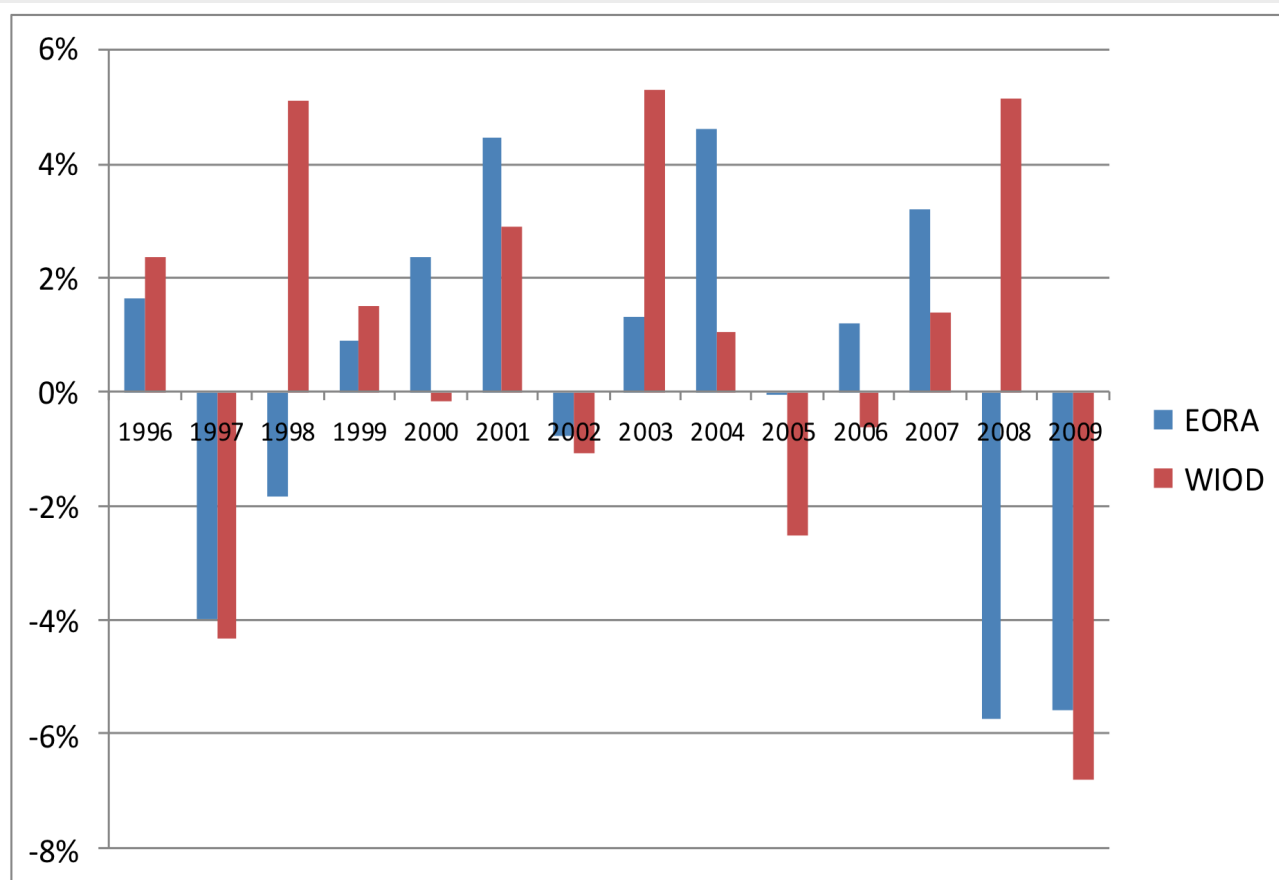
Reconciling academic and statistical work

– Growing policy interest in footprints, but no clear answers
– MRIOs have set the standard, but outside NSIs capabilities
  • Labour intensive
  • Assumptions
– MRIOs vs. official statistics
  • Always inconsistent due to integration/balancing required:
    • Trade asymmetries
– Can we reconcile statistical and academic work?

A SNAC footprint

- Produce a footprint, based on MRIO, that is consistent with official statistics of the Netherlands
  - Single-country National Accounts consistent (SNAC)
- Main approach: "Adjust WIOD to be consistent to Dutch data"
- Why WIOD?
  - Transparency
  - Time series availability

SNAC-Method for the Netherlands

– Follow WIOD procedure, but
  - with improved data
    - Trade in goods: re-exports microdata
    - Trade in services: Confidential data
    - Expand SUT from 35 to 72 industries (+official valuation layers)
    - <u>Official SEEA accounts</u>
  - .....and keeping the Dutch data fixed

Results: SNAC vs. WIOD

Name	2009		
	SNAC-footprint	WIOD	
Absolute/Percentage	$MtCO_2$	$MtCO_2$	%
Total Footprint	202	210	-4%
Domestic indirect emissions	80	71	11%
Domestic direct emissions	40	39	5%
Total Domestic	120	109	9%
Total Foreign	83	101	-22%
Resident emissions	205		

- Overall difference in footprint: 4%
- Mainly due to lower foreign emissions (-22%)
- China footprint reduces significantlly (see paper)
- Results are similar for 2003

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Conclusions and discussion

1. MRIOs are produced for global questions while a SNAC-footprint is more relevant for national policy makers
2. SNAC makes a difference! (at least for the Netherlands)
3. Need for IO and SEEA data
4. Need for enhanced cooperation
   - Between statistical offices
   - Between MRIO producers
   - Statistical and academic community