Producing Carbon Footprints within the Realm of Official Statistics:
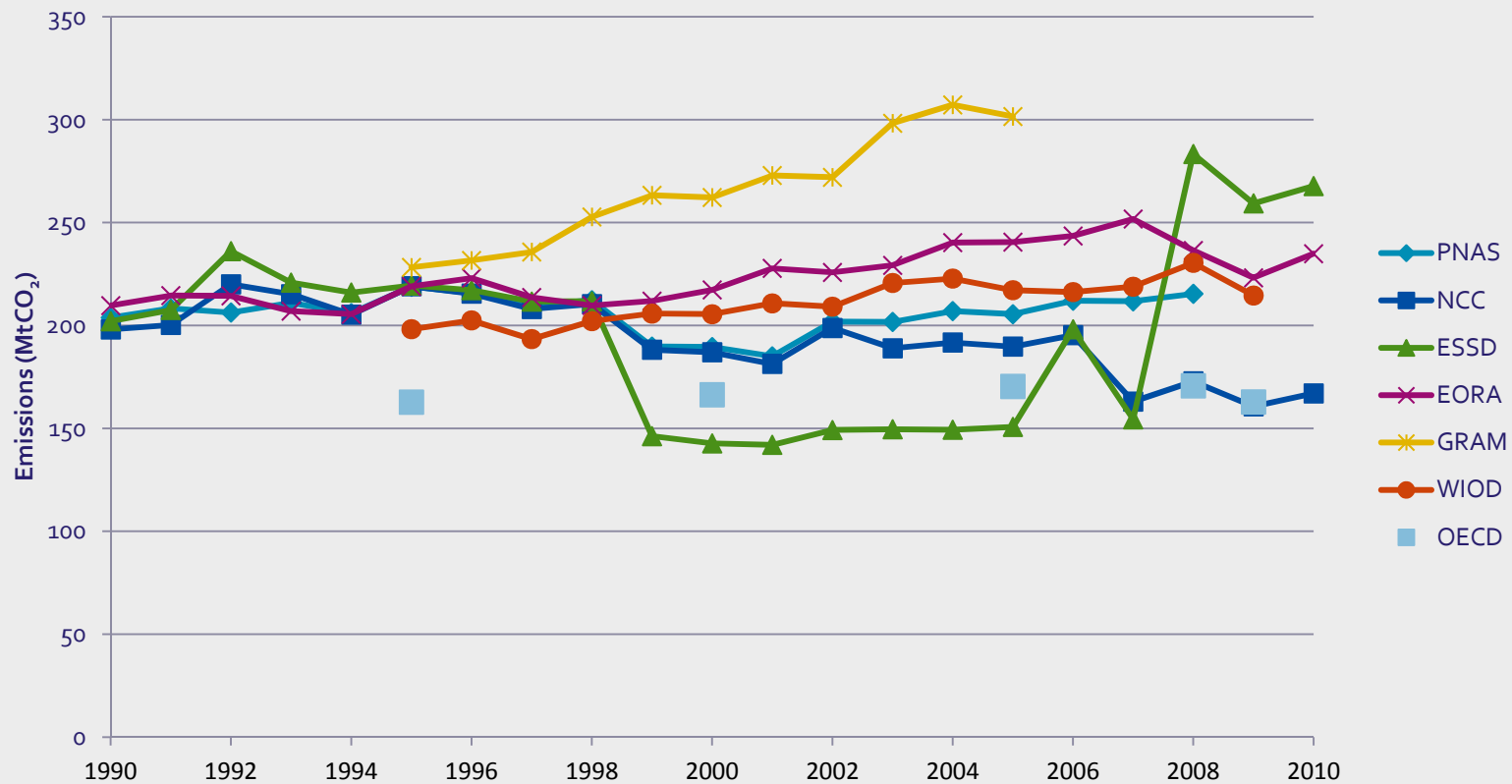
A single-country national accounts consistent (SNAC) footprint

Project: Rutger Hoekstra, Daan Zult, Bram Edens, Harry Wilting (PBL), Ronghao Wu (intern) and Aksshat Goel (intern)
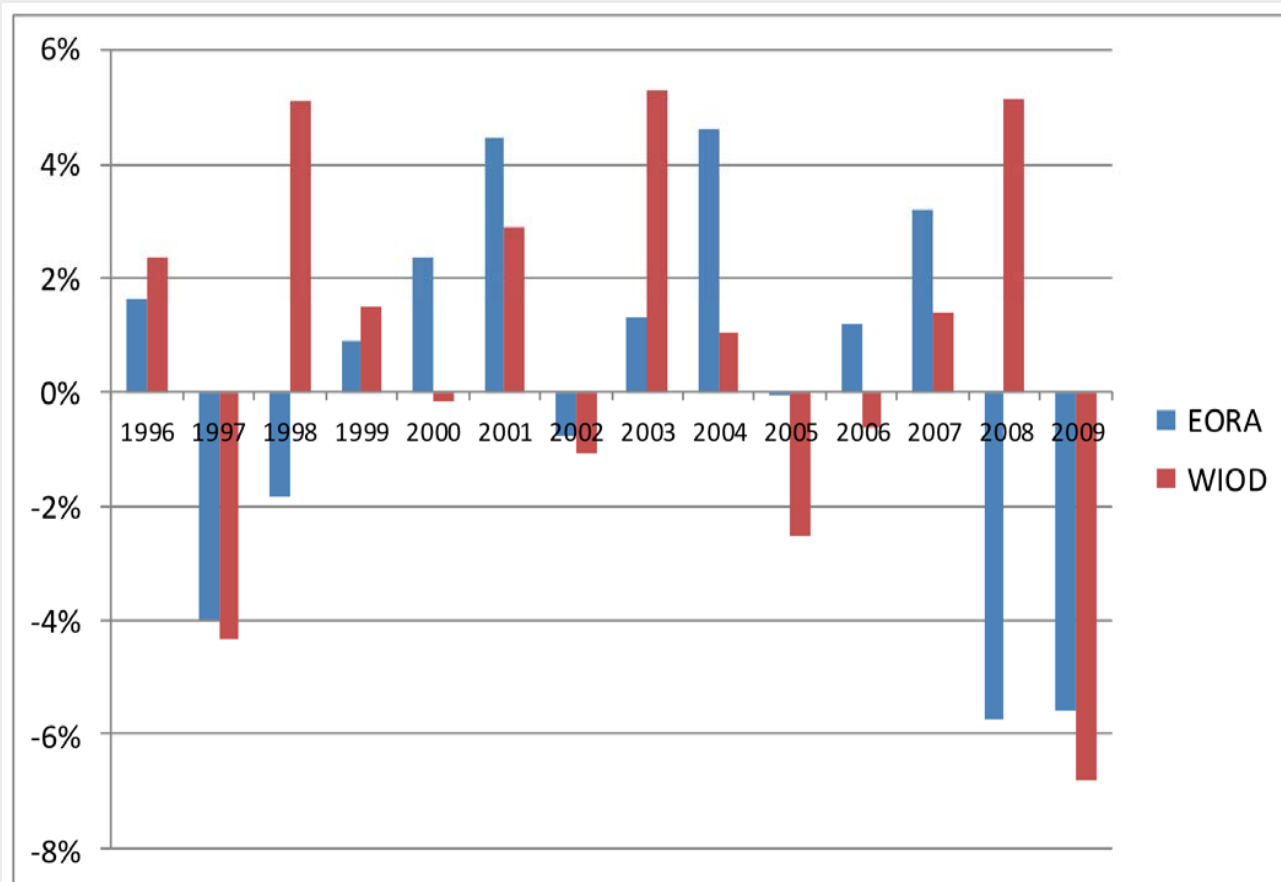
cbs Statistics Netherlands

Carbon footprints for the Netherlands from 7 MRIO databases

Data provided by
Glen Peters and Nori Yamano

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Year on year changes of EORA and WIOD

Differences?

- Difference in MRIOs:
  - Main reason: Emissions data (Peters et al, 2012)
  - Other reasons: Aggregation, RoW, Construction MRIO
- MRIOs vs Official Statistics
  - Always inconsistent! Unless:
    - Trade asymmetries are resolved
    - Trade statistics and national accounts are the same

A SNAC footprint

- Aim of MRIO
  - Information about global developments (consistent)
  - No claim to be 100% correct at national level
- Our aim: produce a footprint, based on MRIO, that is consistent to official statistics of the Netherlands
  - Single-country National Accounts consistent (SNAC)
  - "Adjust WIOD to be consistent to Dutch NA data"

Four main improvements

1. Trade data
   – Trade in goods: Bilateral trade data (re-exports and domestic trade) from micro data
   – Trade in services: Trade in services (confidential)
2. National Accounts
   – Conceptual differences margins/services
   – Expand from 35 industries to 135
   – Expand from 59 goods and services to 221
3. Environmental accounts
   – Expand from 35 to 72 industries (CO_2 only)
4. Balancing using the WIOD procedure but keeping the Dutch data fixed – programmed in R

The SNAC-footprint vs MRIOs

Name	SNAC-footprint	WIOD		EORA		NCC		ESSD	
Absolute/Percentage	$MtCO_2$	$MtCO_2$	%	$MtCO_2$	%	$MtCO_2$	%	$MtCO_2$	%
Total Footprint	**198**	**210**	**6%**	223	13%	161	-19%	259	31%
Domestic indirect emissions	77	71	-8%						
Domestic direct emissions	38	39	0%						
Total Domestic	**116**	**109**	**-6%**						
Total Foreign	**82**	**101**	**23%**						

Sensitivity analysis –Aggregation and emissions data

	SNAC-footprint	Aggregation		CO_2 data		Original WIOD	
No. industries (IO calculations)	71	35		35		35	
CO_2 data	SNAC	SNAC		WIOD		WIOD	
Total Footprint	**198**	**205**	**3%**	**207**	**5%**	**210**	**6%**
Domestic indirect emissions	77	84	8%	86	11%	71	-8%
Domestic direct emissions	38	38	0%	38	0%	39	0%
Total Domestic	**116**	**122**	**5%**	**125**	**8%**	**109**	**-6%**
Total Foreign	**82**	**83**	**1%**	**83**	**1%**	**101**	**23%**

Results for top 10 countries/regions

Country	SNAC-footprint		WIOD	
Absolute/Percentage	ktCO$_2$	%	ktCO$_2$	%
RoW	20874	25,4%	21624	21,5%
CHN	15787	19,2%	21109	21,0%
DEU	7874	9,6%	8987	8,9%
RUS	6827	8,3%	8220	8,2%
USA	4974	6,1%	6060	6,0%
BEL	3160	3,8%	4299	4,3%
GBR	3152	3,8%	4278	4,3%
IND	2397	2,9%	3541	3,5%
POL	1774	2,2%	2423	2,4%
FRA	1488	1,8%	2052	2,0%
JPN	1282	1,6%	1775	1,8%

Why do SNAC and WIOD results differ?

WIOD aggregates (dollars, tens of billions, rounded)

	Industries	FD (domestic)	Exports	Output
Industries	500	590	430	1520
Imports	250	110	150	510
Value added	710	0	0	710
Taxes less subsidies	50	40	0	90
International trade margin	10	10	0	10
Total input	1520	740	580	2840

Statistics Netherlands aggregates (dollars, tens of billions, rounded)

	Industries	FD (domestic)	Exports	Output
Industries	570	620	340	1530
Imports	220	80	180	480
Value added	710	0	0	710
Taxes less subsidies	20	70	0	90
International trade margin	0	0	0	0
Total input	1530	760	520	2810

Differences

	Industries	FD (domestic)	Exports	Output
Industries	14%	5%	-22%	0%
Imports	-13%	-29%	26%	-5%
Value added	0%			0%
Taxes less subsidies	-53%	57%		-1%
International trade margin				
Total input	0%	2%	-10%	-1%

Conclusions

1. MRIOs are produced for global questions, a SNAC-footprint is more relevant for national policy makers
2. MRIO producers could quite easily make a footprint for individual countries using "SNAC-philosophy"
3. SNAC makes a difference! (at least for the Netherlands)
   - But inconsistent at the global level
4. Cooperation
   - Statistical offices
   - MRIO-Statistical offices
5. SNAC-approach can also be applied to other globalization indicators: e.g. trade in value added

Next Steps

1. Paper
   1. Calculate SNAC-footprint for 2003
   2. Domestic IO calculations
   3. Reproduce WIOD with our R-script
2. Project
   1. Calculate SNAC-footprint for 2010-2011
   2. Calculate other GHGs
      - Expand agricultural sector using GTAP data
   3. Calculate other footprints
      - Expand agricultural sector using GTAP data
   4. Calculate trade in value added
   5. SNA2008