

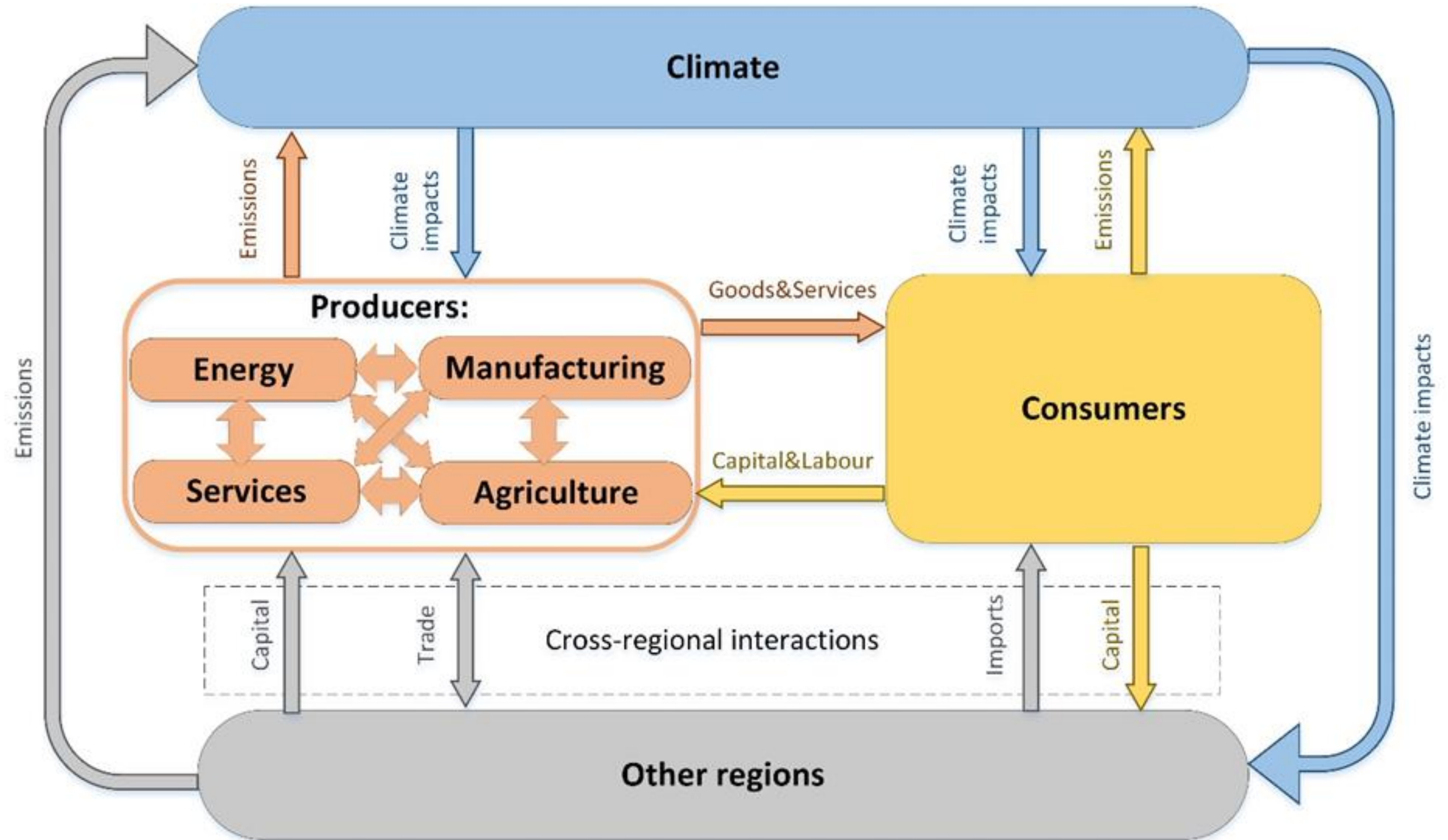
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GTAP10Nor: Adjusted GTAP database v10 based on national accounting data of Norway

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GRACE model: based on GTAP database



Why GRACE-Nor? Zoom in Norway

- Develop a tool to analyze issues specific for Norway
- Better describe specific features of Norwegian economy and policy
 - Energy: electricity – hydrogen
 - CCS
 - Climate and energy policy
 - Contributions of a community to national mitigation
- GTAP data differ from SSB data for 2014: production, consumption, energy, and CO2

GDP from SSB?

Two sources:

- Input-output tables (IOT)
- Institutional accounts (Table 11123), which is the updated data.

Larger deviations

- Other taxes on prod, net
- Gross capital formation
- Import (Net export)
- Gov. Consumption
- Consumption of fixed capital

Adjust IOT to align with Table 11123

	Table11123 (million NOK)	IOT (million NOK)	Deviation from Table 11123 (%)
Production output	5220797	5223615	0.05
- Intermediate consumption	2412222	2415758	0.15
= GROSS VALUE ADDED	2808575	2807857	-0.03
+ VAT and taxes on imports	332239	332514	0.08
= GROSS DOMESTIC PRODUCT (GDP)	3140814	3140371	-0.01
- Consumption of fixed capital	522912	519598	-0.63
- Compensation of employees	1442239	1448528	0.44
- Other taxes on production, net	-24495	-30647	25.12
= OPERATING SURPLUS, NET	867919	870378	0.28
GDP by expenditure	3140814	3140371	-0.01
Household consumption	1288402	1284876	-0.27
Government consumption	686825	691969	0.75
<i>Gross capital formation</i>	872567	883931	1.30
Export	1224803	1220367	-0.36
Import	-931783	-940772	0.96
Net export	293020	279595	-4.58

How far is GTAP from SSB?

Macroeconomic variables:

- Assume GDP is the same

Larger deviations

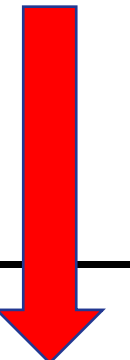
- Consumption of fixed capital
- Gross capital formation
- Import & export
- Intermediate consumption
- VAT
- HH & Gov. Consumption

	Table11123 (million NOK)	GTAP(million NOK)	Deviation from Table 11123 (%)
Production output	5220797	5359220	2.65
- Intermediate consumption	2412222	2569748	6.53
= GROSS VALUE ADDED	2808575	2789471	-0.68
+ VAT and taxes on imports	332239	351344	5.75
= GROSS DOMESTIC PRODUCT (GDP)	3140814	3140815	0.00
- Consumption of fixed capital	522912	360031	-31.15
- Compensation of employees	1442239	1402752	-2.74
- Other taxes on production, net	-24495	-26482	8.11
= OPERATING SURPLUS, NET	867919	870378	0.28
GDP by expenditure	3140814	3140815	0.00
Household consumption	1288402	1348200	4.64
Government consumption	686825	718407	4.60
<i>Gross capital formation</i>	872567	766492	-12.16
Export	1224803	1149824	-6.12
Import	-931783	-842108	-9.62
Net export	293020	307716	5.02

Adjust GTAP to align
with Table 11123

How far is GTAP from SSB?

Sectoral input shares (>1%): examples



Production sector		Input sector				
Code	Description	Code	Description	SSB	GTAP	Diff
R01	Agriculture	R10_12	Food products, beverages and	21.6	19.5	-2.1
R01		R21	Basic pharmaceutical product	9.5	5.6	-4.0
R01		trd	Wholesale and retail trade; re	4.7	3.0	-1.7
R01		RF	Constructions and constructio	4.5	2.5	-2.0
R01		LAB	Compensation to employees	14.7	21.2	6.6
R01		CAP	Returns to captial	58.5	39.5	-19.1
R01		SaleTax	Intermediate input tax	1.7	-0.3	-2.0
R01		SddTax	Other production taxes	-33.5	-4.6	28.9
R02	Forestry	LAB	Compensation to employees	14.7	12.0	-2.7
R02		SaleTax	Intermediate input tax	1.5	4.0	2.5

Adjust GTAP data for Norway: basedata

- Adjust IOT to make macroeconomic variables consistent with Table 11123
- Adjust sectors in IOT to be the same as the 65 sectors in GTAP: Direct aggregate or split proportional to GTAP data.
- Replace GTAP data with corresponding IOT data
 - Intermediate inputs
 - Primary factor inputs
 - Imports
 - Final demand: HH & Gov. consumption, investments, and exports
- Rebalance GTAP data
 - Introduce «Changes in inventories» in GTAP database for Norway – the same as IOT
 - Also introduce «Changes in inventories» for trading partner countries: to list the differences of imports and exports from original GTAP data.

Adjust GTAP data: energy use and related CO2 emissions in Norway

- SSB energy balance data are used to replace GTAP energy use data in physical terms: Direct aggregate or split proportional to GTAP data.
- Similarly, CO2 emissions from SSB Table 08940 are allocated proportional to energy use in the new GTAP data for Norway.
- No adjustment for regions other than Norway

GRACE-Nor model based on the adjusted GTAP data

- What is new?
 - The **adjusted GTAP data based on SSB national accounting** are adopted in the static model
 - An exogenous new final demander «Inventory agents» is introduced to deal with the «Changes in inventories». Leontief function of all sectors with «Changes in inventories».
- **Dynamic part of GRACE:**
 - The «Changes in inventories» will phase out gradually within a given period, e.g. 10 years.
 - Calibrate to a given baseline: e.g. SSPs or IEA scenarios

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