GWS SPECIALISTS IN EMPIRICAL ECONOMIC RESEARCH

THE MAIN INPACTS ON ECONOMIC DEVELOPMENT IN GERMANY

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1| Who We Are

- The Institute of Economic Structures Research (GWS) is a private, independent economic research and business and policy consultancy organisation. Its goal is to provide objective, impartial, factual consultancy to aid social transformation and development processes
- Founded 1996, spin off University Osnabrück, scientific staff 28 Persons + 2 administration + 15 academic assistance (students)
- GWS is part of the **INFORUM**-Group (www.inforum.umd.edu)
  - ⇨ Inforum - **In**terindustry **For**ecasting at the **U**niversity of **M**aryland
  - ⇨ Founded nearly 50 years ago by Dr. Clopper Almon
  - ⇨ Building and using **structural economic models** of U.S. and other economies. Inforum pioneered the construction of dynamic interindustry-macroeconomic models that portray the economy in a unique "bottom-up" fashion.

1| Who We Are

- GWS works on two main topics:

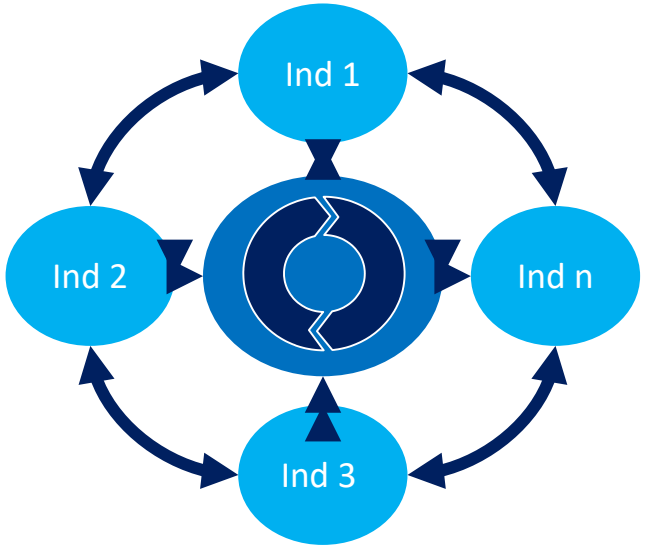
  ⇨ **Energy and Climate:** Link between economic development, emission avoidance, restructuring of the energy system and climate impact adaptation

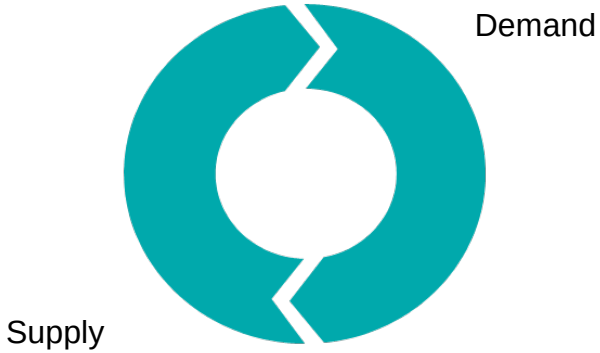
  ⇨ **Economic and Social Affairs:** Relationship between economic development and the labour market, private households as well as companies and the state

- Both divisions increasingly linked: "sustainability" in the sense of simultaneous consideration of social, ecological and economic issues

2| INFORGE

- We use the **economic model** INFORGE (**IN**ter-industry **FOR**ecasting **GE**rmany) to describe economic development and structural change
- Main characteristics of Inforum-Typ-Models
  - ⇨ **Bottom up**: GDP as a result of industry developments
  - ⇨ **complete integration**: using System of National Accounts
  - ⇨ **Interdependencies**: Input-Output-approach
  - ⇨ **Limited rationality** of agents
  - ⇨ **Imperfect markets**





Consequence:
Equal importance
of both sides of the market

2| INFORGE

- GWS is part of the QuBe-Projekt (www.qube-projekt.de)
  - ⇨ **QuBe** – **Qu**alifikationen und **Be**rufe (qualifications and occupations)
  - ⇨ Founded 2007, scientific staff 12 persons
  - ⇨ Together with:

Eqube-projekt.de
BIBB-IAB Qualifikations- und Berufsprojektionen

Bundesinstitut für Berufsbildung

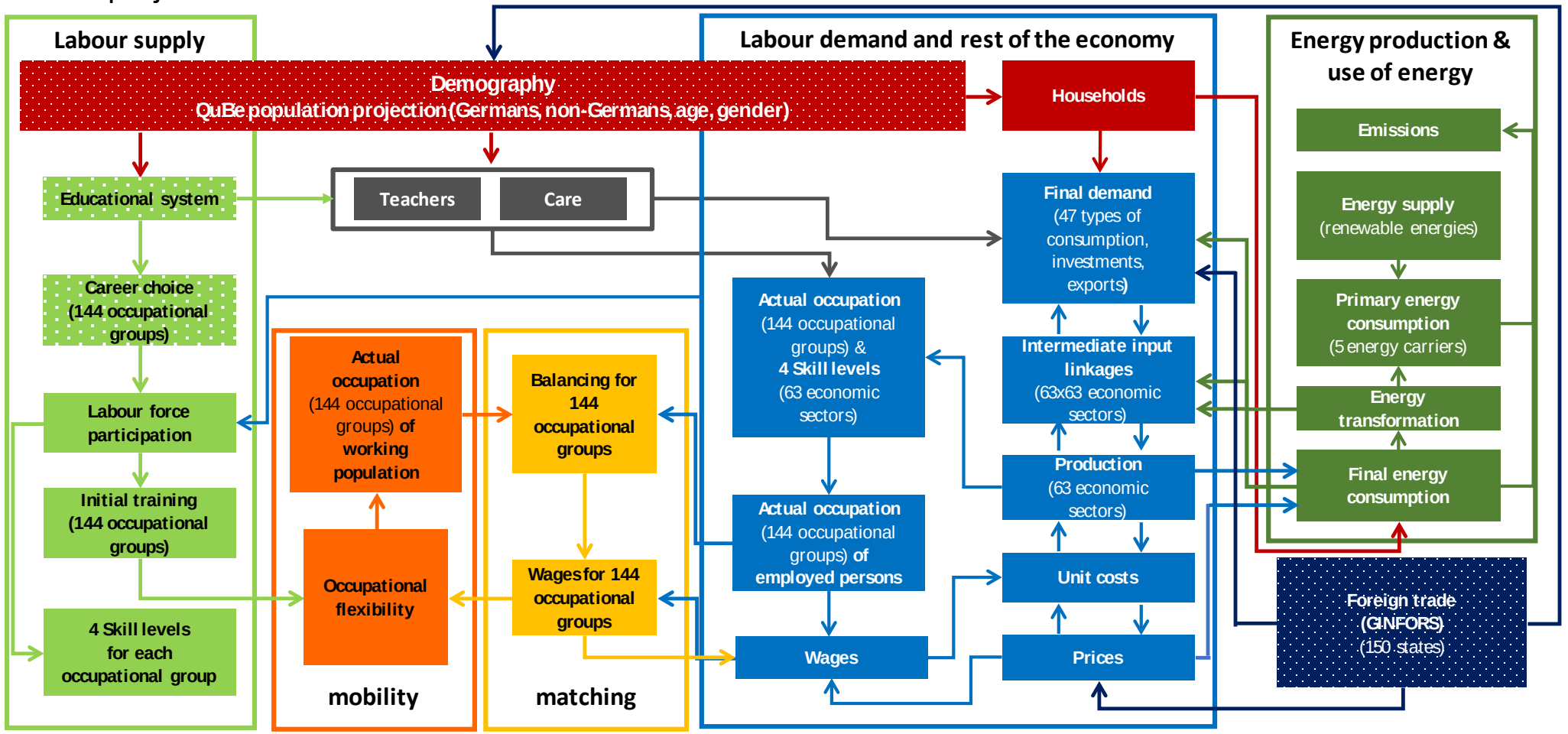
Federal Institute for Vocational Education and Training, Bonn
→ Federal Ministry of Education and Research

IAB INSTITUT FÜR ARBEITSMARKT- UND BERUFSFORSCHUNG
Die Forschungseinrichtung der Bundesagentur für Arbeit

Institute for Labour Market and Career Research, Nürnberg
→ Federal Ministry of Labour and Social Affairs

- QuBe provides a long-term overview of the likely development of labour demand and supply in terms of qualifications and occupations.
- Modell based approach:
  national Level: **QINFORGE** – QuBe Inter-industrie Forecasting Germany
  regional Level: QMORE – Qube Monitoring Regional

«QuBe project» 7th wave



indicate independent models. All other components are integrated into the QINFORGE model.

2| INFORGE

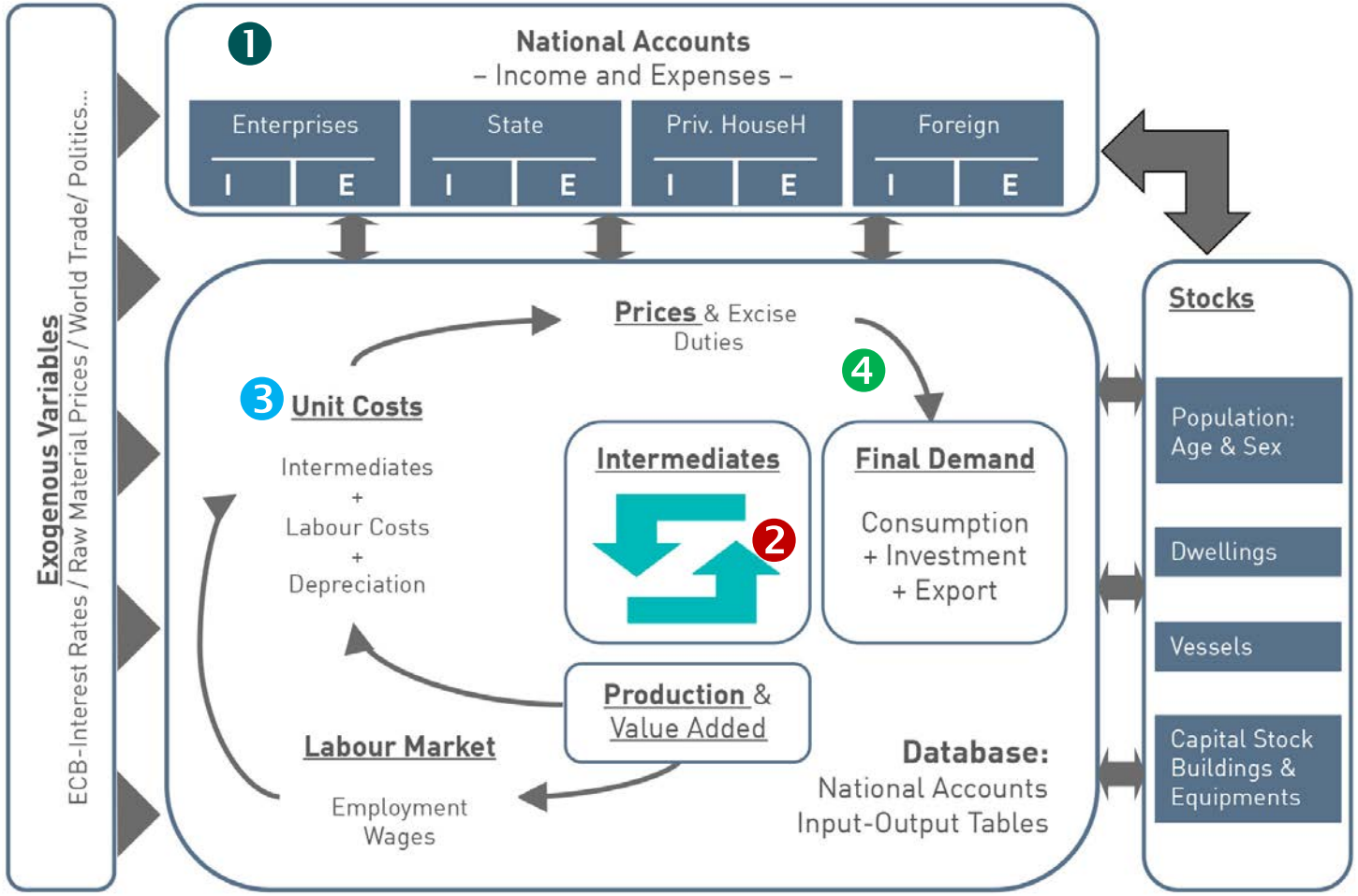
Main components of the economic part of INFORGE

❶ National Accounts
GNP, Income of private and public households

❷ Input-Output-Tables
interindustry demand

❸ Prices
unit costs, wages and consumption prices

❹ Prices and quantities are linked together

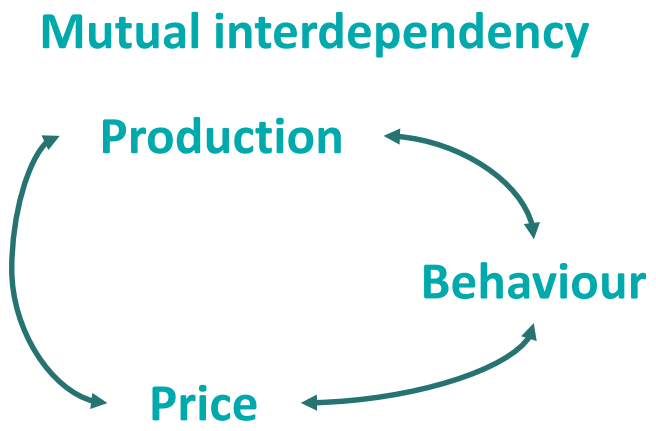


Two essential model equations

- Production: $y_j(t) = \text{intermediate demand}_j(t) + \text{final demand}_j(t) - \text{imports}_j(t)$
  for j={1, …, 72} sectors
  - ⇨ Intermediate demand ~ Demand from other sectors
  - ⇨ Final demand ~ government, households or investment, depends on the sector
- Prices: $p_j(t) = f\{\text{unit costs}_j(t)\}$
  - ⇨ unit costs$_j$(t) = (labor costs $_j$(t) + materials $_j$(t) + services $_j$(t) + depreciation $_j$(t))/output$_j$(t)

Consequence:

- if the mode of production changes
  (eg. more services but less materials)
  the output price will change and the
  demand side will buy more or less output
  (products or services)
  (changed behaviour of households or investors)



3| Forecast

To build a forecast:

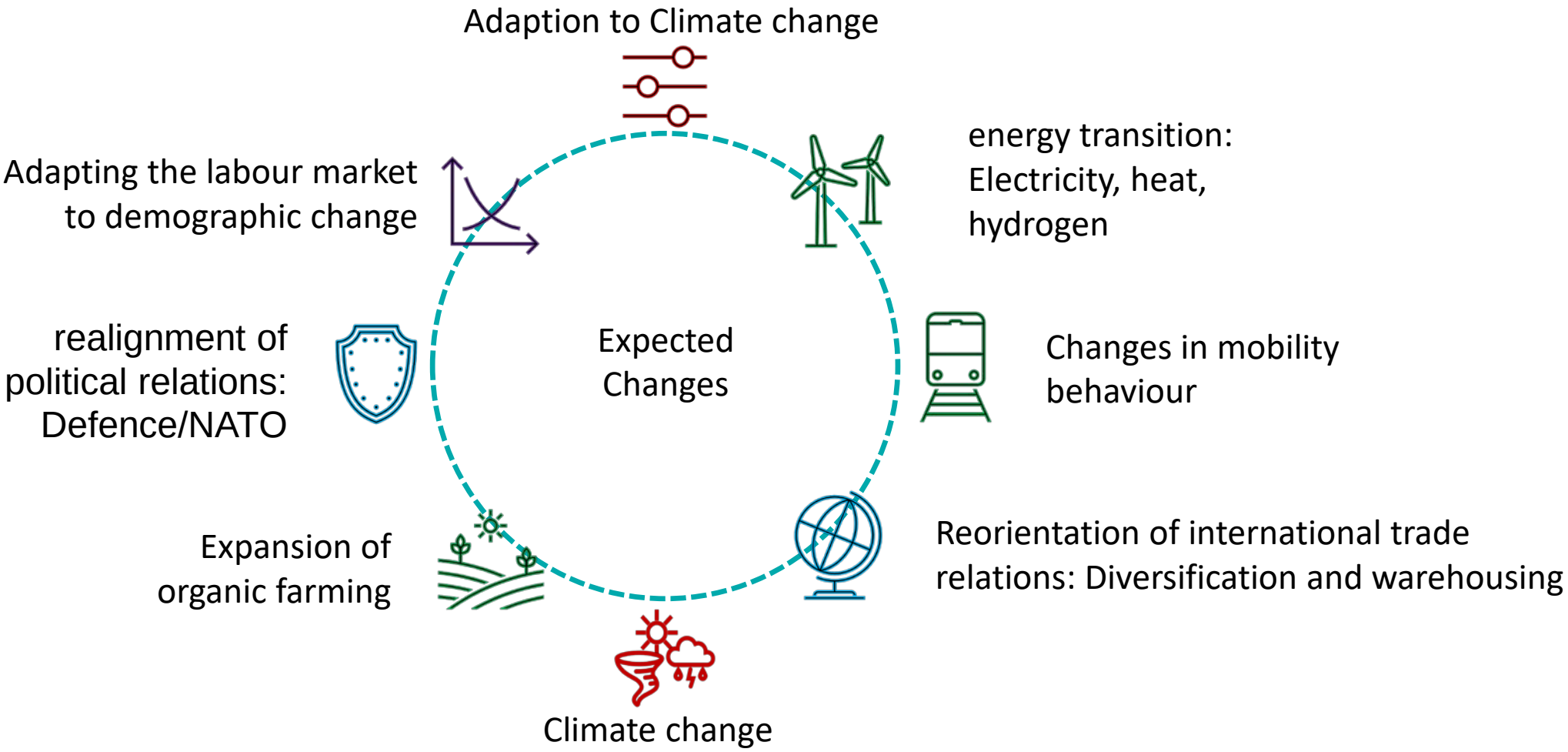
- **Part 1:** A projection of the future is made by extrapolating behaviours and trends that have been identified through **empirical work** (mainly OLS-regression on the sectoral level).
  - ⇨ Using historical data form 1991 up to 2022
  - ⇨ Result: most likely development, if nothing else happens

BUT: There are changes (expected or certain) that are not included in historical data, because they will only take on a clear form in the future or because laws have been passed that will have their effects in the future

- **Part 2:** for not historically measurable but expected changes plausible assumptions must be made

3| Forecast

- Not historically measurable but expected changes:



4| Impact Analysis

- To measure the impact of the expected changes we will look at five indicators
  - ⇨ **Value added**.
    → How strong is the additional effect on economic wealth?
  - ⇨ Total **Employment**
    → How strong is the additional effect on the number of jobs?
  - ⇨ **Producer prices**
    → Does the competitive position of Germany change?
  - ⇨ **Production** on the sectoral level
    → How strong is the effect on structural change?
  - ⇨ **Employment** on the sectoral level
    → How strong is the effect on structural change?

- Furthermore we look at the year 2030

4| Impact Analysis

- Chosen impacts:
  - ⇨ energy transition: Electricity, heat, hydrogen 
  - ⇨ Reorientation of international trade relations: Diversification and warehousing 
  - ⇨ Climate change 
  - ⇨ Expansion of organic farming 
- It is work in progress: The QuBe-Team has to finish its work until end of June.

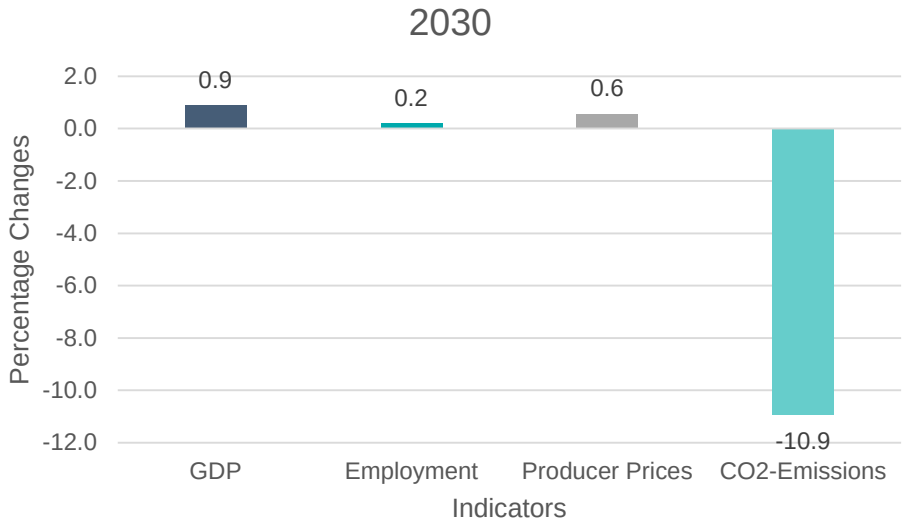
4| Impact Analysis - Energy Transition

- Some information about the scenario:
  - ⇨ 1. **Installation** of wind turbines and photovoltaics up to 33 GW per year
    - In comparison, current consumption is around 650 TWh of electricity.
  - ⇨ 2. **Industry: Processes** with less than 700 degrees Celsius use electricity others use hydrogen
  - ⇨ 3. for housing up to 900.000 **heat pumps** will be installed per year
    (in Germany we have 23 Billion houses)

- We have a strong direct impact on:
  - ⇨ Investment in construction and equipment,
  - ⇨ Households: increasing consumption of electricity (heat pump),
  - ⇨ Enterprises: change in intermediate demand → shift from fossil fuels to electricity & hydrogen

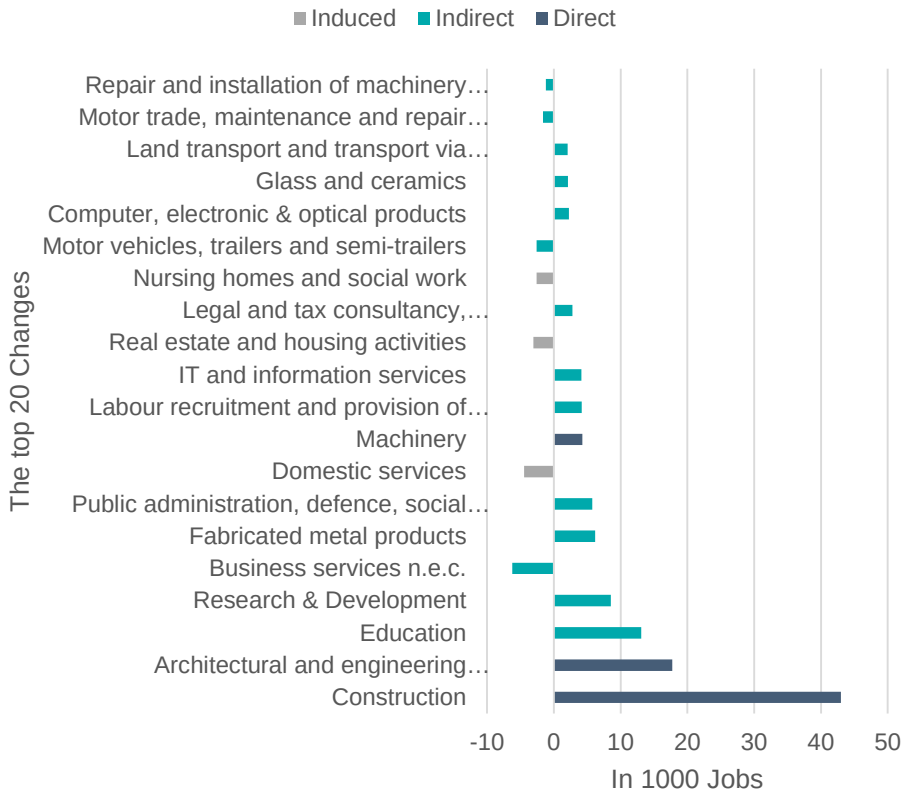
4| Impact Analysis - Energy Transition

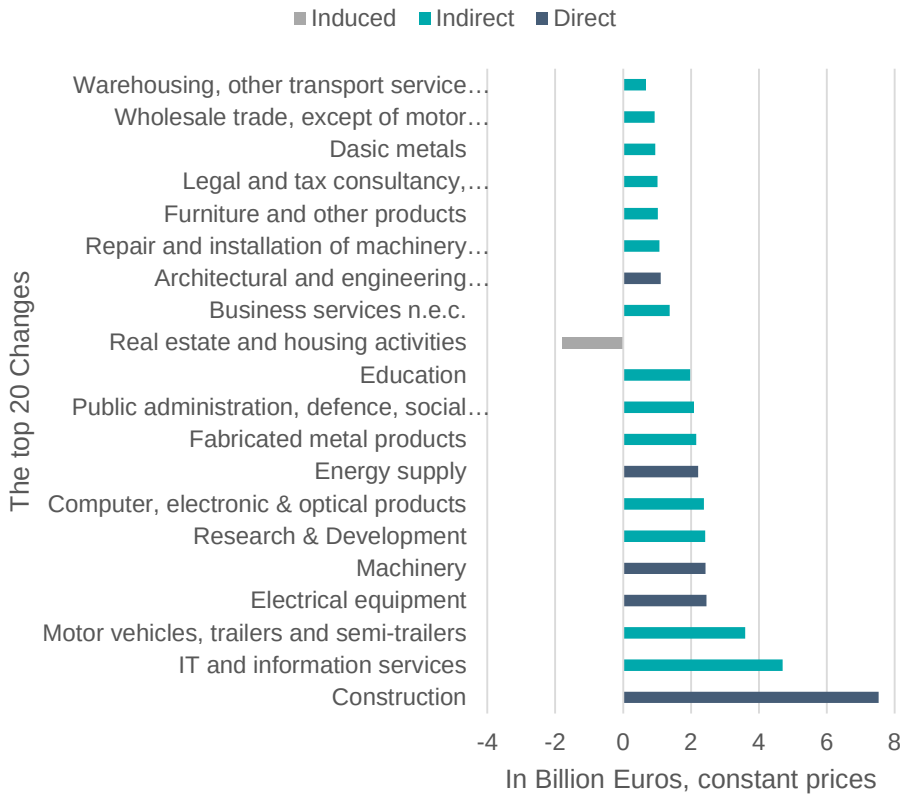
- Results for the year 2030 (strongest impact) – main indicators
  - ⇨ Strong impact on **emission** (→ what the goal is!)
  - ⇨ Impact on **GDP**: Investment and lower imports
  - ⇨ Increasing **employment**
  - ⇨ Higher **prices** (even for export goods)



4| Impact Analysis - Energy Transition

- Results for the year 2030 (strongest impact) – sectoral change
  - ⇨ Employment (left): not only positive changes; strong construction
  - ⇨ Production (right): Strong impact on production sector





Direct: due to assumptions

Indirect: mainly through intermediate demand

Induced: mainly through income cycle

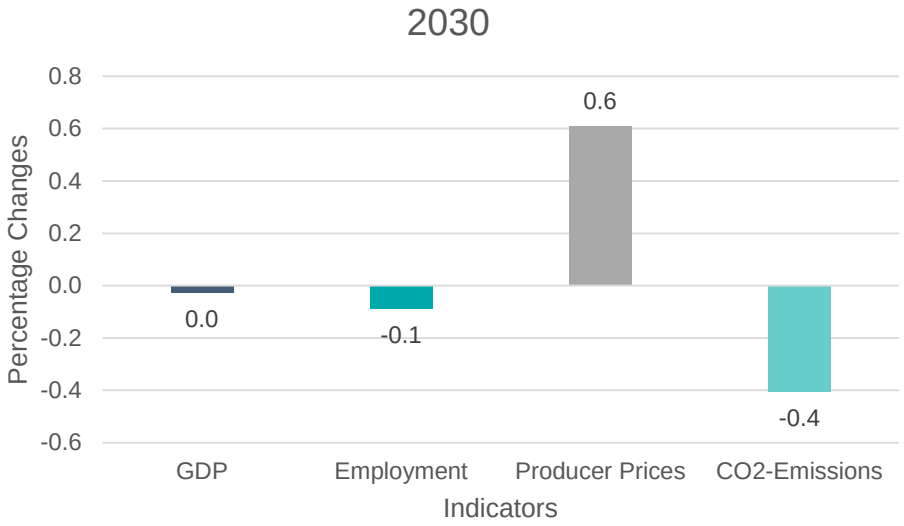
4| Impact Analysis - Reorientation of Trade Relations

- Some information about the scenario:
  - ⇨ 1. **Higher import prices:** Enterprises import not only from countries with lowest prices, but also from those with stable political situation
    2. **Higher investments in stocks:** In order to avoid supply bottlenecks, warehousing is being expanded

- We have a strong direct impact on:
  - ⇨ Producing sector

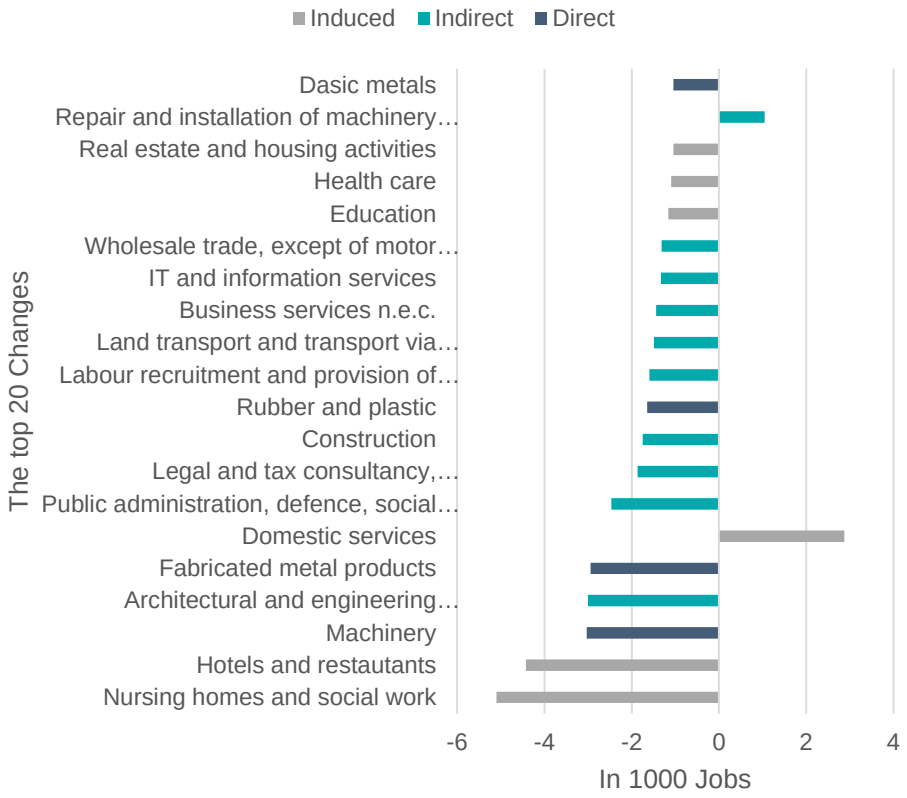
4| Impact Analysis - Reorientation of Trade Relations

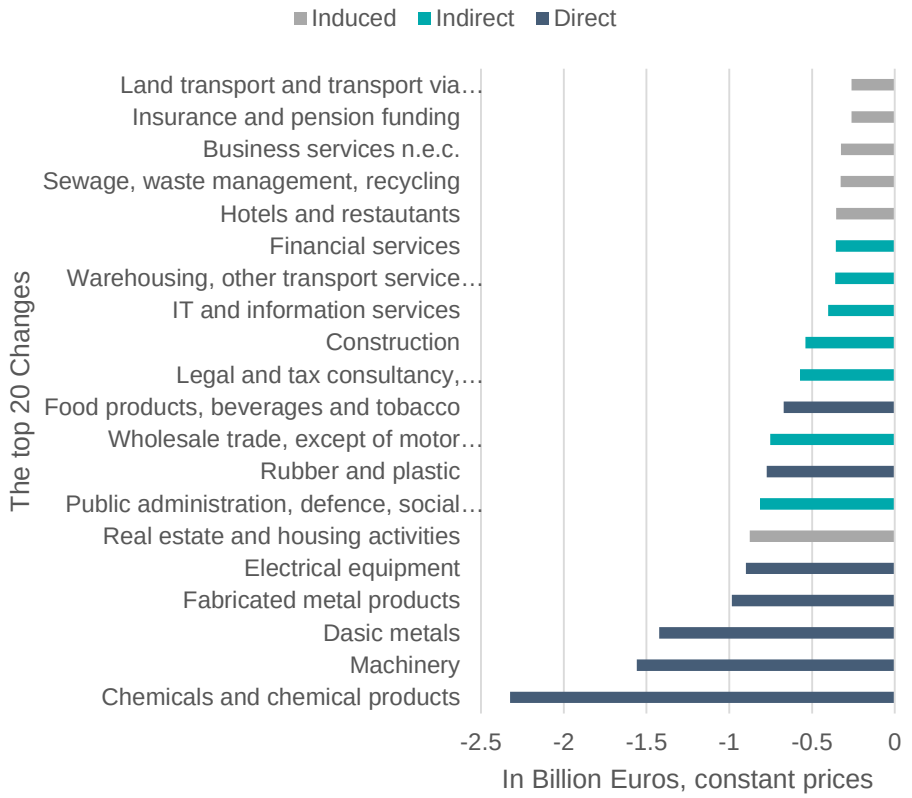
- Results for the year 2030 (strongest impact) – main indicators
  - ⇨ Strong impact on **prices** (→ due to geopolitical situation)
  - ⇨ Negative impact on **GDP**:
  - ⇨ Decreasing number of jobs
  - ⇨ Lower **emissions** because of shrinking growth



4| Impact Analysis - Reorientation of Trade Relations

- Results for the year 2030 (strongest impact) – sectoral change
  - ⇨ Employment (left): positive changes only because of relative prices (services)
  - ⇨ Production (right): negative





Direct: due to assumptions

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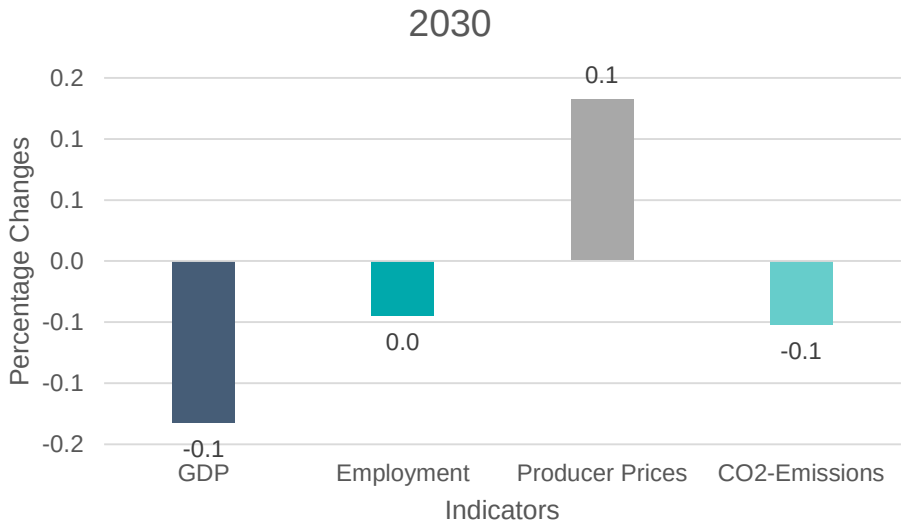
4| Impact Analysis – Climate Change

- Some information about the scenario:
  - ⇨ 1. **Water:** Enterprises have higher costs for water
  - ⇨ 2. **Agriculture:** Higher import prices, higher prices for land, less production per km^2, lower labour productivity
  - ⇨ 3. **Forestry**: Higher import price, higher prices for land, higher depreciation
  - ⇨ 4. **Fishing**: Higher import price, lower labour productivity, higher depreciation
  - ⇨ 5. **Shipping**: more expensive for other sectors (Low water in rivers)
  - ⇨ 6. **Health**: more illness because of heat
  - ⇨ 7. **Insurances**: higher insurance premiums for sectors
- We have a strong direct impact on the economy as a whole with stronger impacts on the listed sectors

4| Impact Analysis – Climate Change

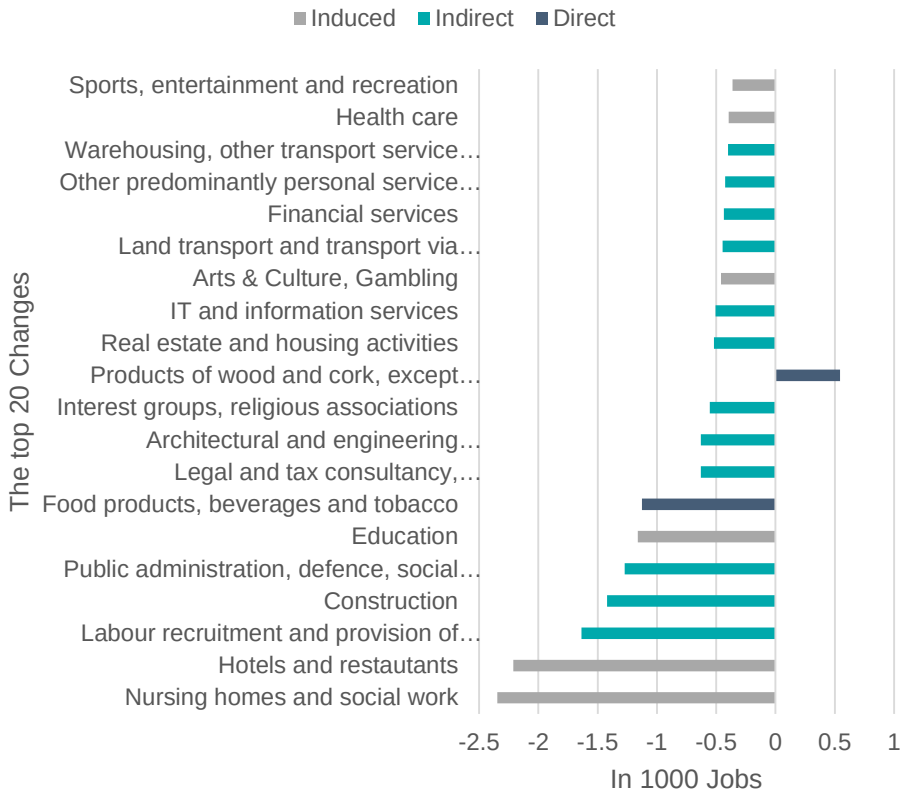
- Results for the year 2030 (strongest impact) – main indicators
  - ⇨ Strong impact on **prices** (→ due to limitation of production)
  - ⇨ Negative impact on **GDP**:
  - ⇨ Decreasing number of jobs
  - ⇨ Lower **emissions** because of shrinking growth

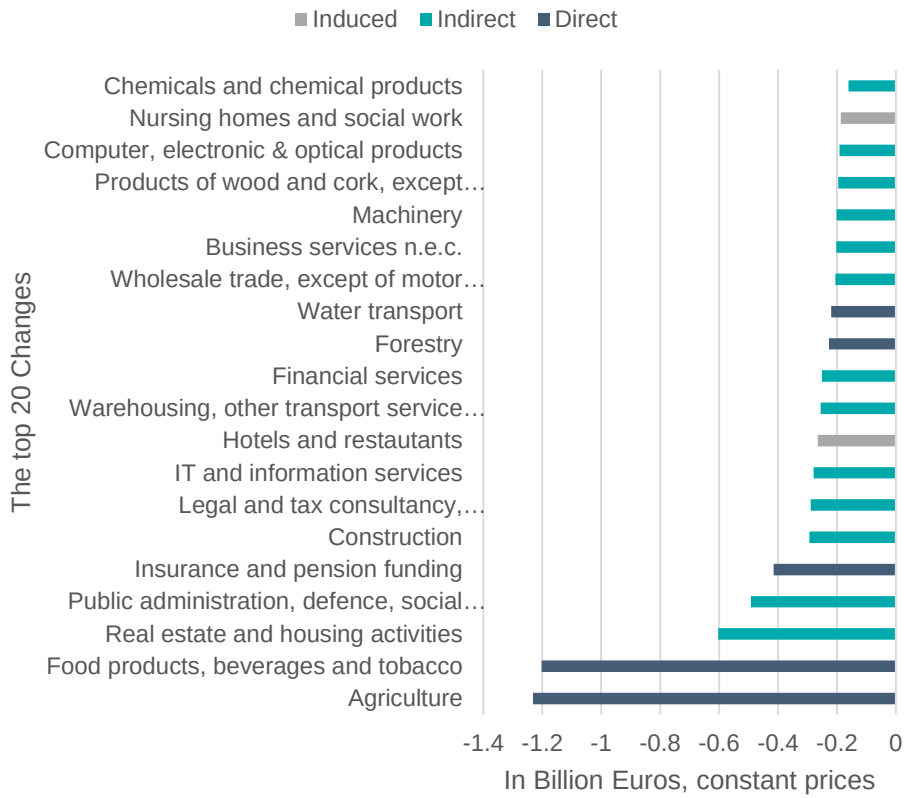


- In the long run (2050) the impact will be even worse

4| Impact Analysis – Climate Change

- Results for the year 2030 (strongest impact) – sectoral change
  - ⇨ Employment (left): positive changes only because shrinking imports due to higher import prices
  - ⇨ Production (right): negative





Direct: due to assumptions

Indirect: mainly through intermediate demand

Induced: mainly through income cycle

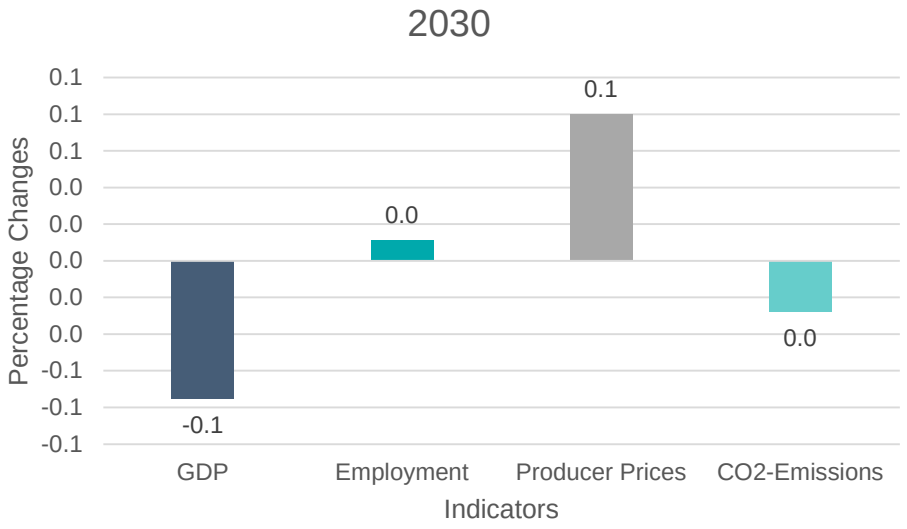
4| Impact Analysis – Organic Farming

- Some information about the scenario:
  - ⇨ 1. shift in the production function: Less fertiliser and feeding stuff but more labour input and more investment
  - ⇨ 2. Higher price for organic food
  - ⇨ 3. Households throw away less and are more economical
  - ⇨ 4. shrinking exports because of less production

- We have a strong direct impact on:
  - ⇨ Agriculture and on consumption prices
  - ⇨ Investment (construction, equipment and Research and development)

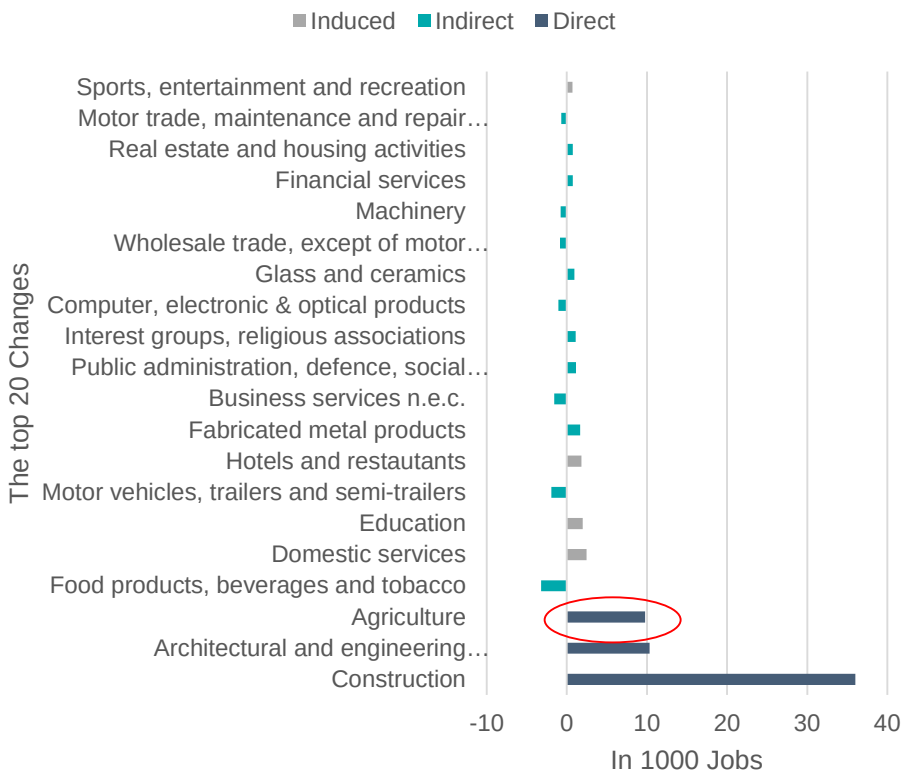
4| Impact Analysis – Organic Farming

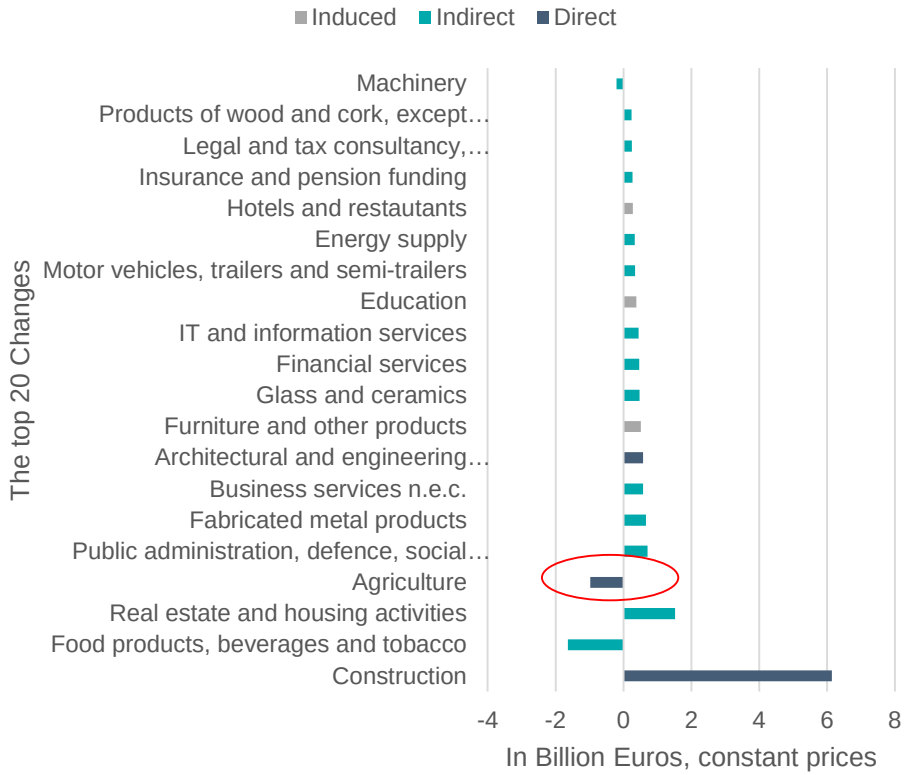
- Results for the year 2030 (strongest impact) – main indicators
  - ⇨ Impact on **prices** (→ due to more expensive production of agricultural products)
  - ⇨ Negative impact on **GDP**:
  - ⇨ Increasing number of jobs
  - ⇨ Lower **emissions** because of shrinking growth



4| Impact Analysis – Organic Farming

- Results for the year 2030 (strongest impact) – sectoral change
  - ⇨ Employment (left): the new production function gives a shift to sectors
  - ⇨ Production (right): the same
  - ⇨ Look at both pictures → Agriculture: more employment and less production





Direct: due to assumptions

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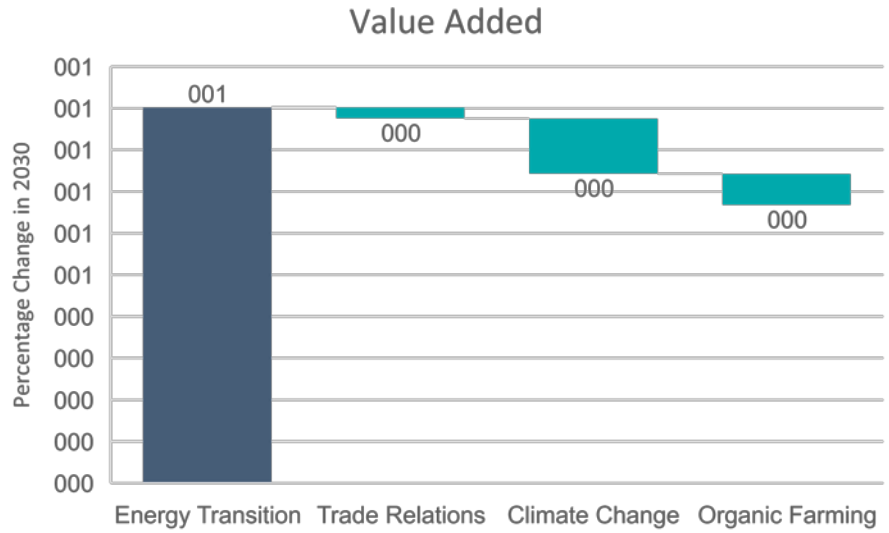
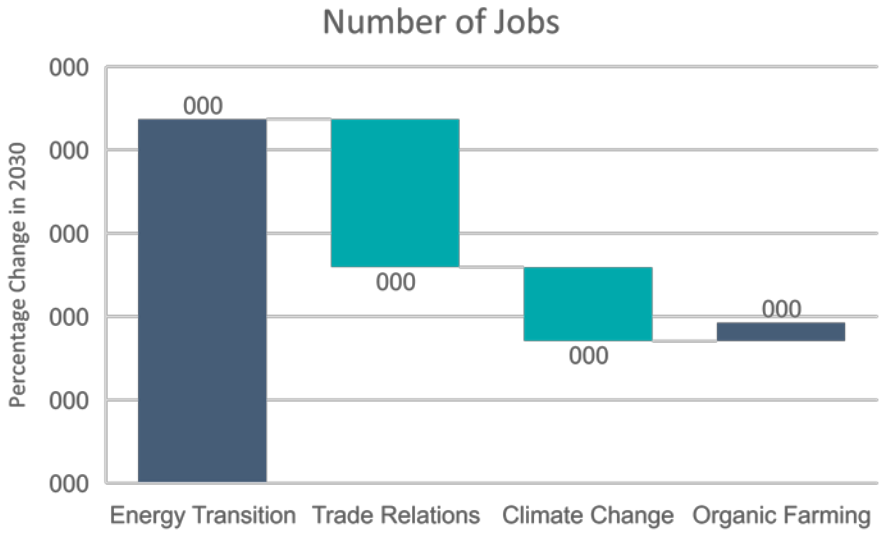
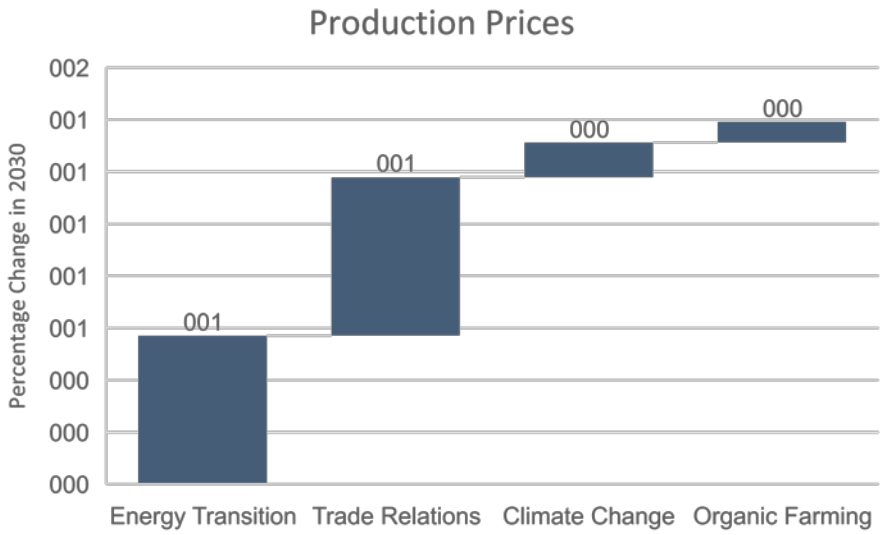
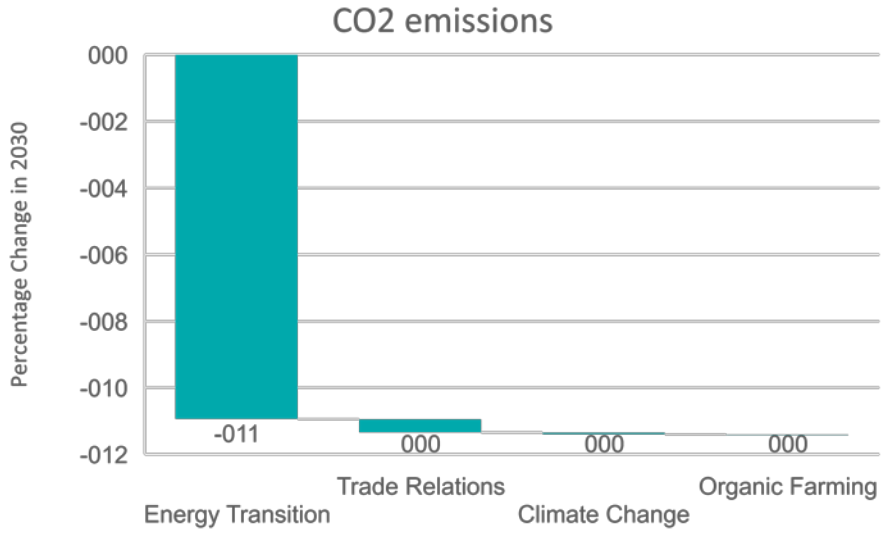
5| Put the Pieces Together

- Aggregated results in 2030









5| Put the Pieces Together

- Results at the **aggregate level**
  - ⇨ Only energy transition has a positive effect on value added!
    - Because of high investments
  - ⇨ Number of jobs? Not so bad!
  - ⇨ Prices: only negative effects
  - ⇨ CO2-emissions shrinking
- Results at the **sectoral level**
  - ⇨ negative impact of climate change and reorientation of trade
  - ⇨ Energy transition and organic farming will have positive and negative shifts between sectors

6| Results

Expectations

- **We have to expect higher prices!**
  - ⇨ But not only in Germany, even other countries must act because of climate change
  - ⇨ Higher prices have always effects on the income distribution and on poor households
- **There will be enough to do!**
  - ⇨ The number of jobs is not likely to shrink
  - ⇨ Labour-intensive production and high investment
  - ⇨ But there is a shift between sectors → employees will have new work content, they have to learn new things to stay employed ➔ a lot of training
- **We will have to finance a lot of investments!**
  - ⇨ The impact on households will be different: energy and food have high shares in consumption of poor households!
  - ⇨ Not easy to find a “just transition”

Grazie per l'attenzione
Vielen Dank für ihre Aufmerksamkeit!

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Bereichsleitung Wirtschaft und Soziales

Weitere Informationen:

(1) GenDIs (Förderung BMBF; SOFI, BIBB & GWS)

https://sofi.uni-goettingen.de/projekte/gesellschaftlich-notwendige-dienstleistungen-sicherstellen-ist-arbeit-am-gemeinwohl-attraktiv-gendis/projektinhalt/

(2) QuBe Projekt (IAB, BIBB & GWS)

www.qube-Projekt.de

(3) Fachkräftemonitoring für das BMAS (IAB, BIBB & GWS)

https://www.bmas.de/DE/Arbeit/Fachkraeftesicherung-und-Integration/Fachkraeftemonitoring/fachkraeftemonitoring.html

GenDis

qube-projekt.de
BIBB-IAB Qualifikations- und Berufsprojektionen

Bundesministerium für Arbeit und Soziales