GWS SPECIALISTS IN EMPIRICAL ECONOMIC RESEARCH

MODELLING AND UNDERSTANDING ECONOMIC DIVERSIFICATION

Methods and Examples

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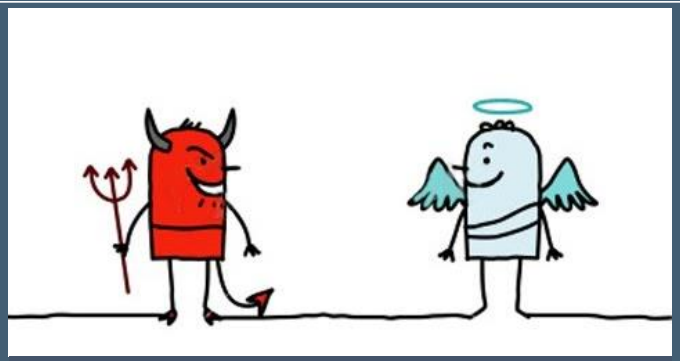
1. Structural change – friend or foe?



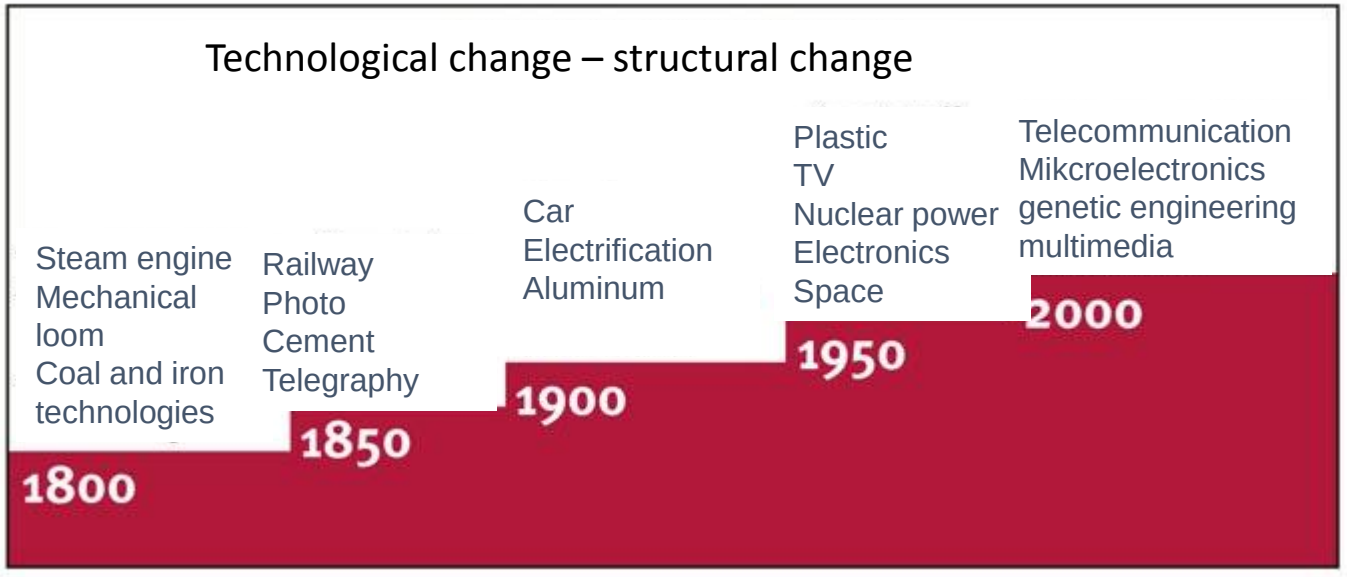
Not all eggs in one basket!

- Diversity enhances resilience:
  - ⇨ Diverse production structure is more resilient to changes in demand (nationale and global)
  - ⇨ Diverse import structure is more resilient to disasters/ shocks in import countries
  - ⇨ Diverse export structure in terms of goods is more resilient to demand changes
  - ⇨ Diverse export structure in terms of markets is more resilient to disasters and shock in the target countries
  - ⇨ Diverse economic structures provide a better tax base and sources of governmental revenue
  - ⇨ Diverse economies counterbalance resource curse

Structural change is important for sustainable growth

- Sustainable growth is about structural change!
- New products, new markets, different ways of producing , different ways of consuming = innovation and growth
- Structural change yields winners and losers
- If the net effects are positive, governmental measures can redistribute between winners and losers

Examples:



Different effects of structural change

- Employment - different labor intensities can open new opportunities
  - ⇨ Examples
    - Coal – renewables
    - Conventional – organic agriculture
    - Not: conventional cars – electric, auto-drive
- Government revenues:
  - ⇨ Income from natural non-private resources,
  - ⇨ Income from taxes on fossil fuels
  - ⇨ Taxation of new activities and services
- Qualification:
  - ⇨ Former qualification can become obsolete (how to repair a gearing mechanism - EV do not have that)
  - ⇨ Need for new vocational, academic trainings

Leontief created a tool for measuring structural change and economic diversity

Environmental Repercussions and the Economic Structure: An Input-Output Approach

Wassily Leontief

The Review of Economics and Statistics
Vol. 52, No. 3 (Aug., 1970), pp. 262-271 (10 pages)
Published by: The MIT Press

A concise description of the technology governing the operations of a given industry and in particular its relations to other sectors of the economy can be visualized as a "cooking recipe," specifying the amounts of all current inputs—such as raw and intermediate materials, labor of various types, and so on—as well as the stocks of buildings, machinery, and inventories of different kinds required for production of its output. As in a kitchen cooking recipe, both the input flows and the stocks of implements needed to handle them are measured per unit of output. A change in technology can thus be described as a change in the cooking recipe. If an entirely new good is introduced, its position within the technological structure of the economy has to be specified in terms of the cooking recipe used in producing it and also in terms of the introduction of that good into the cooking recipes of sectors that will utilize it.

Successful efforts to enlarge the necessary data base permit us now to step back from simply tracing the direct and indirect repercussions of given structural change toward factual explanation of the choice processes leading to replacement of the old by a new technology.

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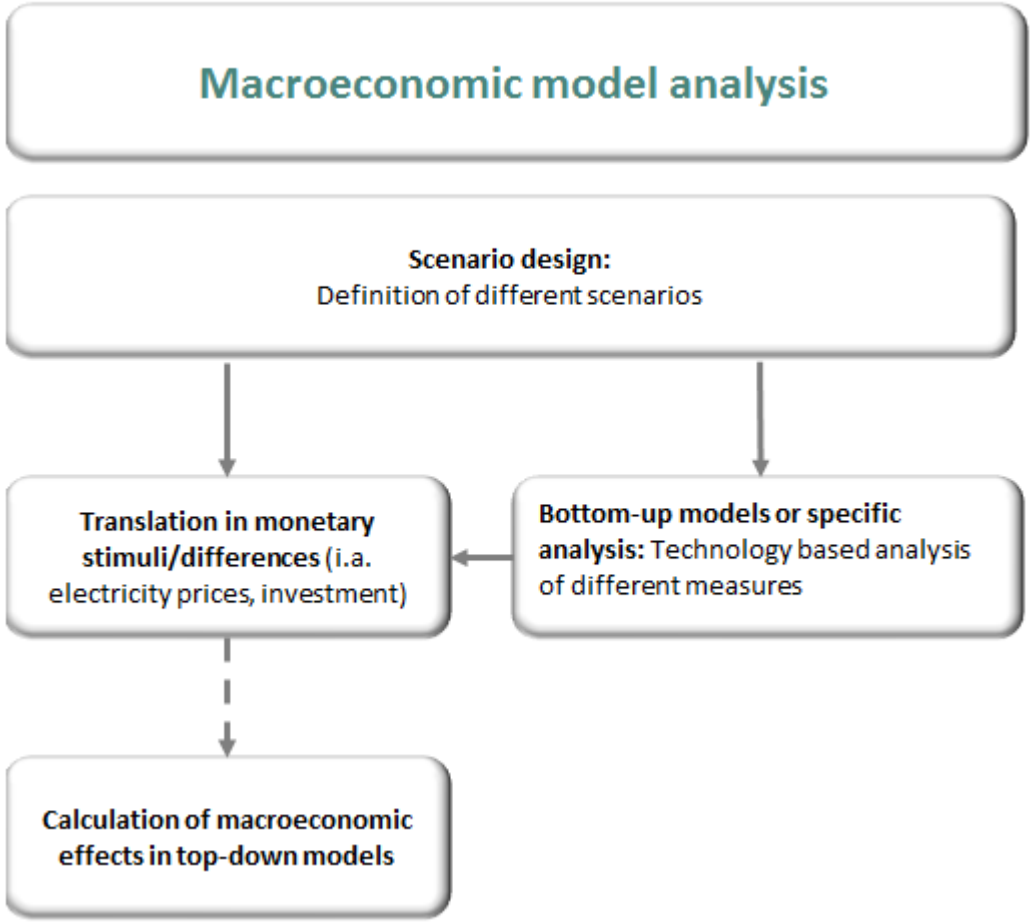
2. Application: Germany‘s energy transition

Background

- Long term targets
  - Renewables most important source of energy in 2050 (60% of gross final energy consumption)
  - Reduction of primary energy consumption (-50% until 2050)
  - Drastic reduction of GHG emissions (80-95% against 1990 until 2050)
- Regular monitoring
- Discussion on the macroeconomic costs and benefits
- Update of earlier work
  - Broader definition of the energy transition
  - Start in 2000

Methodology

- Soft link of top-down and bottom-up models



Scenarios

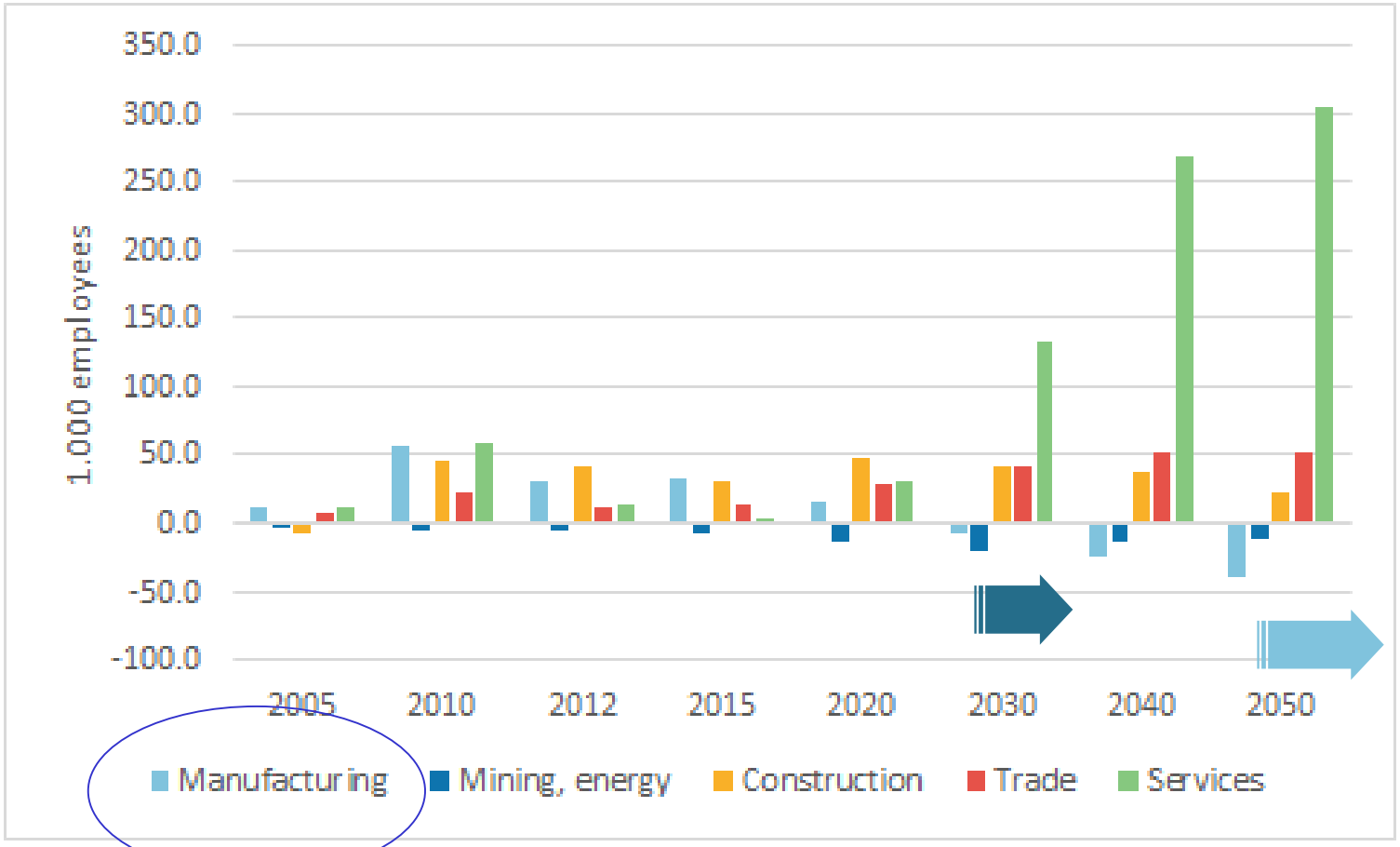
Energy transition (ETS)

- Past: historic development
  - ⇨ Ex-post simulation (2000-2014)
- Future:
  - ⇨ Building on different up-to-date scenarios
  - ⇨ Main goals in 2050 are reached
  - ⇨ Simulations from 2015

- Counterfactual Scenario (CFS)
  - ⇨ „what would have happened, if…“
  - ⇨ Development without energy transition (renewables, efficiency, nuclear) since 2000
  - ⇨ No transformation of the energy system

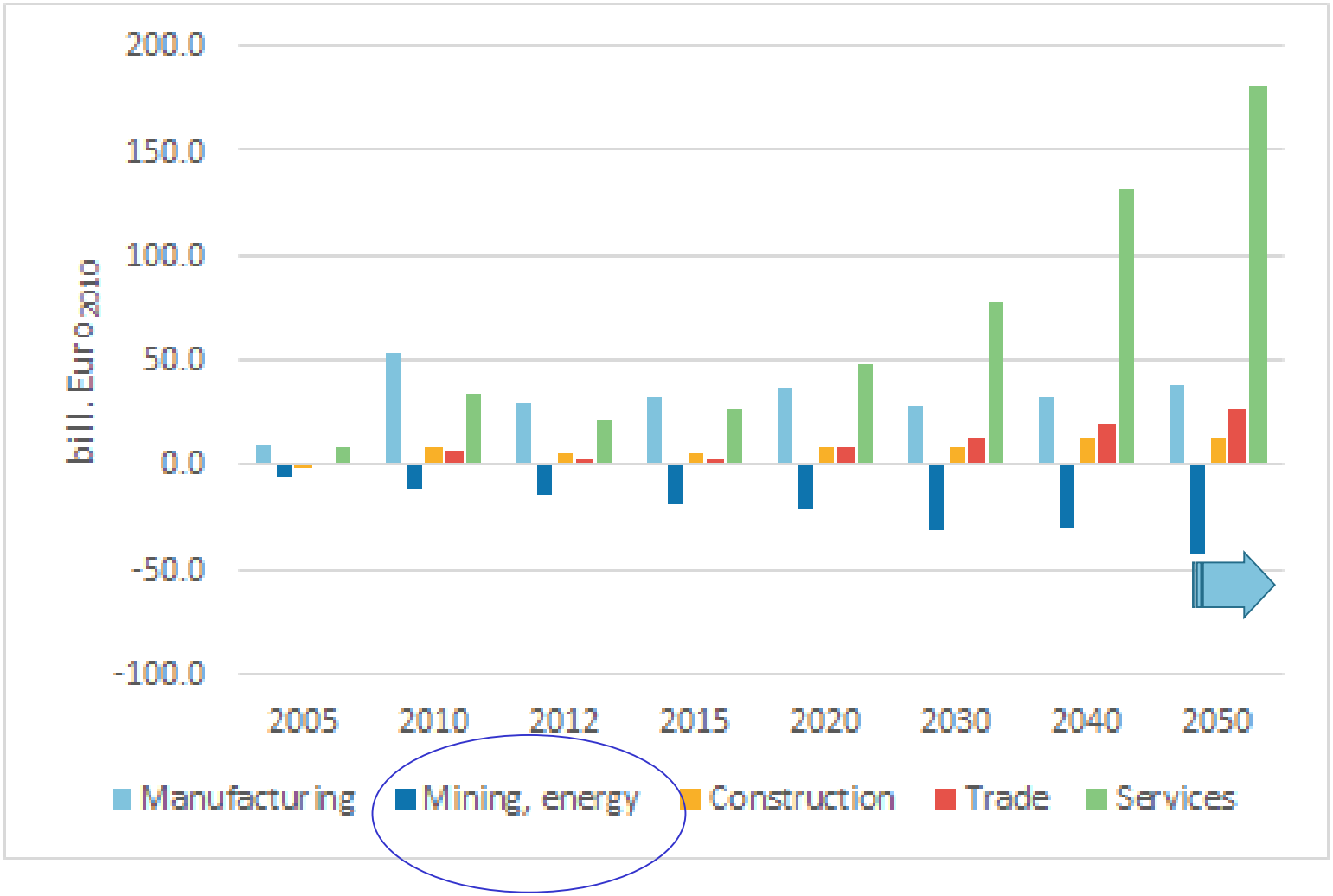
Sector results

Employment



Sector results

- Production



To close with Leontief

- To better manage economic diversification, we need to understand it
- To better understand diversification, we need to analyse data
- To analyse data, we need capacity building in the respective techniques.

Studies of regional and multi-regional systems, multi-sectoral projections of economic growth and, in particular, the effects of anticipated technological changes, as well as all other special types of input-output analysis can, thus, be extended so as to cover the production and elimination of pollution as well.

The compilation and organization of additional quantitative information required for such extension could be accelerated by systematic utilization of practical experience gained by public and private research organizations already actively engaged in compilation of various types of input-output tables.

Thank you for your attention.

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