University of Stuttgart
IER Institute of Energy Economics
and Rational Energy Use

Fact sheet – IER project Hy4Daures Namibia

5.2 CGE Modelling

PURPOSE: WHY CGE MODELLING?

Captures interdependencies between sectors and regions → improved understanding of **macroeconomic relations**.

Enables welfare analysis and quantitative comparison of different policy frameworks → supports **policy impact analysis** and identification of an optimal policy design.

Captures indirect effects, such as feedback and rebound effects → allows the evaluation of **net effects**.

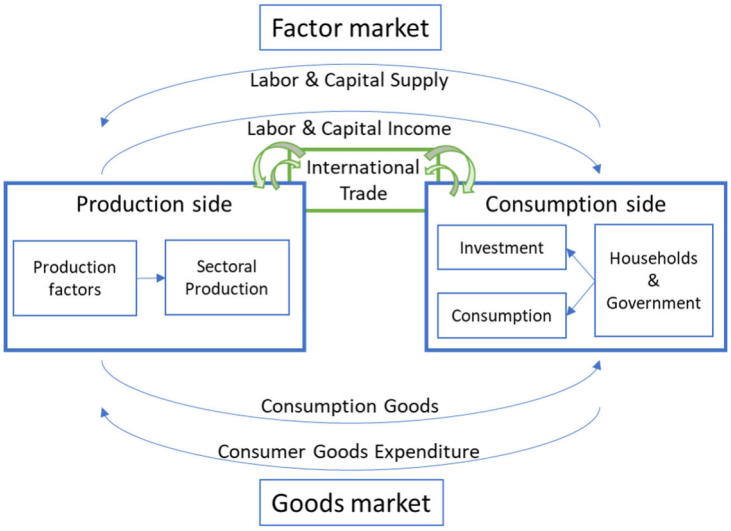
DEFINITION: WHAT IS A CGE MODEL?

Computable = solved numerically
General = captures the whole economy
Equilibrium = economy is balanced

Closed income cycle: Production factors used for production. Economic agents spend income on consumption and investment. Labor and capital are traded in the factor market. Consumption goods are traded in the Goods market.

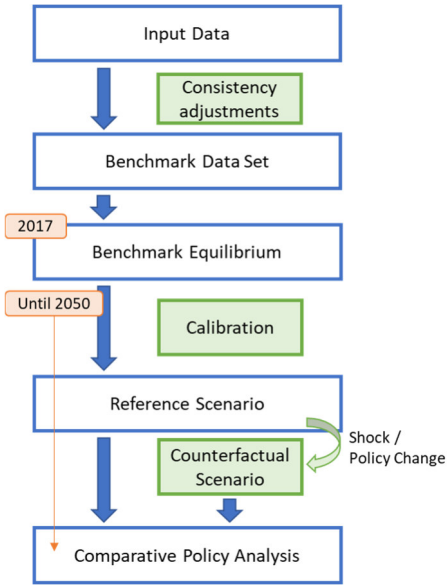
Behavioral rules: Firms maximize profits. Consumers maximize utility (consumption).

Equilibrium conditions: Perfect competition (zero profit). Only available income can be spent (budget restriction). No excess production or consumption (market clearing).



APPROACH: HOW TO DO CGE MODELLING?

1. Construction of a consistent **benchmark data set**
2. Definition of base year **benchmark equilibrium**
3. Calibration to a chosen **reference scenario**
4. Dynamization through **recursive dynamics** (see below)
5. Assumption of a shock or **policy change**
6. Solving for a **counterfactual scenario**
7. **Comparative policy analysis** (see below)



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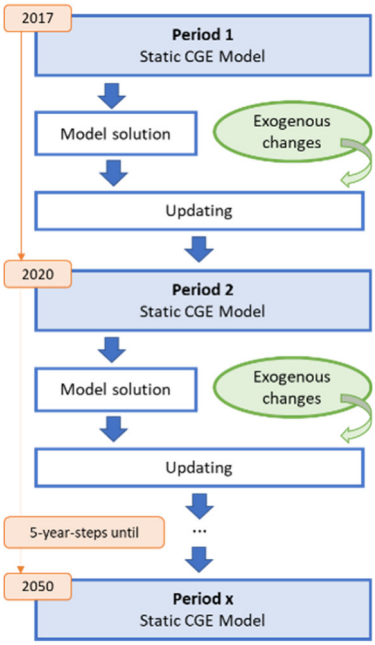


Recursive dynamics:

Solving for a series of interrelated static equilibria. Enables the consideration of feedback effects and inter-temporal dependencies.

Comparative policy analysis:

Comparison of reference and counterfactual scenario for analysis of the expected macroeconomic effects of the policy change.

For the comparative policy analysis a wide range of **policy instruments** can be represented in CGE models:

Policy instrument	Examples
Trade policies	Tariffs, quotas
Tax policies	Tax on income / consumption
Transfer payments	Subsidies
Environmental policies	Carbon tax, cap-and-trade system
Investment policies	Changes in investment incentives

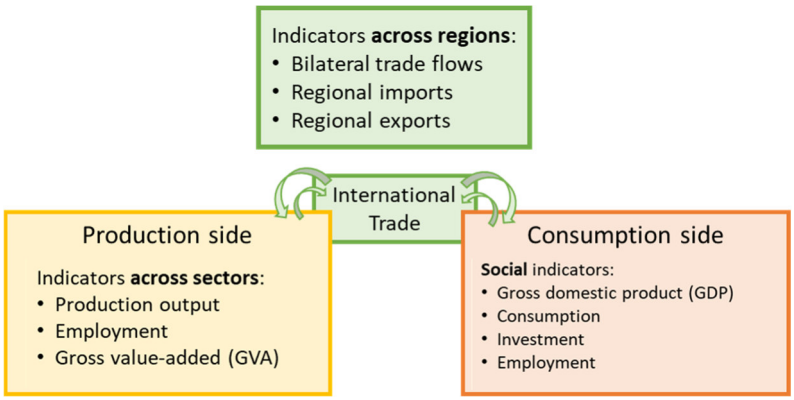
RESULTS: WHAT TO LEARN FROM A CGE MODEL?

Development of different indicators across the specified scenarios and over the modeled time horizon.

Indicators **across regions** → international trade and competitiveness

Indicators **across sectors** → sector-specific impacts / winners and losers within the economy

Social indicators at the macro-economic level → social and economic welfare



FOR FURTHER INFORMATION AND FEEDBACK

Have a look at our other Fact Sheets covering topics from Project Descriptions, Use Cases, Techno-Economic analysis, Indicators, Energy System Analysis, Macro-Economic modelling, and many more:

https://github.com/IER-Hy4Daures/Fact-Sheets

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In collaboration with