Workshop on Trade Policy and Trade Indicators

Module 4

UNITED NATIONS

ECLAC

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PARTIAL AND GENERAL EQUILIBRIUM MODELS

- Inputs in the analysis of possible public policies
- They are not projections
- They do no create trade where it doesn't exist
- They run on several assumptions of cæteris paribus
- General equilibrium requires time, training and specific inputs.

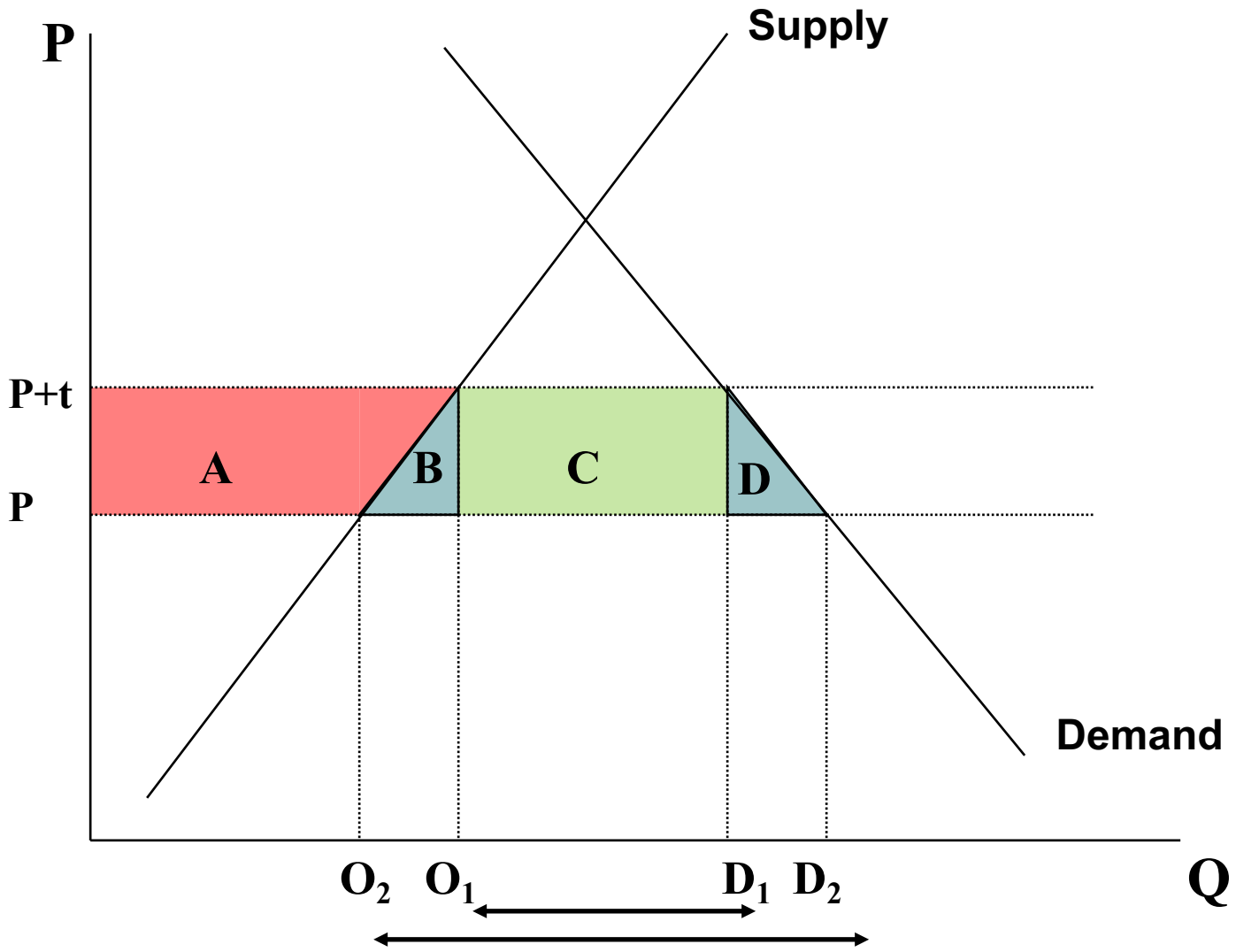
Partial Equilibrium modeling

- Partial equilibrium is a market access analysis tool that can be used to anticipate some of the likely economic effects of various policy alternatives.
- It considers the effects of a given policy action in the market(s) that are directly affected. The analysis does not account for the economic interactions between the various markets in a given economy.
- In general, it works with the assumption that the country is an international price taker

PE measures the impact on

- Creation or diversion of trade
- Changes in government revenues
- Changes in consumer surplus
- Changes in producer surplus

PE measures the impact on



Advantages of Partial Equilibrium

- Its simplicity and speed of application when compared to other methodologies like CGE.
- It has minimal data requirements. It only needs trade flows, trade policy (tariff) and (in some cases) elasticities.
- It permits an analysis at a fairly disaggregated level including a level of detail that is neither convenient nor possible in the framework of a general equilibrium model.
- This models tend to be more transparent and easy to implement. Modeling is straightforward and results can be easily explained.

Disadvantages of Partial Equilibrium

- The analysis involves only a pre-determined number of economic variables
- Due to their simplicity this model may miss important interactions and feedbacks between various markets
- When applied *ex ante*, certain elasticities are required in order to predict the future behavior of trade

WITS' partial equilibrium tool

WITS

Quick Search | Advanced Query | Tariff and Trade Simulations | Results | Utilities | Support Materials

SMART

Home > Tariff and Trade Simulations > SMART

SMART

SMART allows analysis of the impact of unilateral, preferential and multilateral trade reforms at home or abroad on variables including trade flows (imports, exports, trade creation, trade diversion), world prices, tariff revenues, and economic welfare. This market access analysis is a very useful tool that can be used to anticipate the likely economic effects of various policy alternatives. You can use databases from either UNCTAD or WTO. More details...

(•) New Query ( ) Existing Query - Select a Query -

SMART Query Name:

SMART Query Description:

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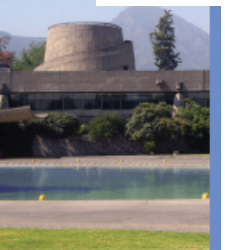


https://wits.worldbank.org/

Computable General Equilibrium (1)

- General: it involves several optimizer agents
- Equilibrium: prices are determined by supply and demand
- Computable: numeric and applied

Computable General Equilibrium (2)

- It has a long history that begins with Walras, but their use is only since the 1970s.
- They provide a base for welfare analysis.
- They are very flexible (in principle) and capable of managing a wide spectrum of problems.

Computable General Equilibrium (3)

- Must be flexible enough to handle structural changes;
- Must be able to handle large movements in relative prices;
- They need to work with explicit specifications or production possibilities (of producers) and consumer preferences;
- This contrasts with the partial specification and local approximation under the econometric models.

Applications of CGE models (1)

Effects over

- Macro,
- Sectorial,
- Regional,
- Labor markets
- Distribution, and
- Environmental variables

Of chances in

- Tax policies,
- Trade policies,
- Environmental policies,
- Technology,
- International commodity prices,
- Wage policies, and
- Mineral reserves.

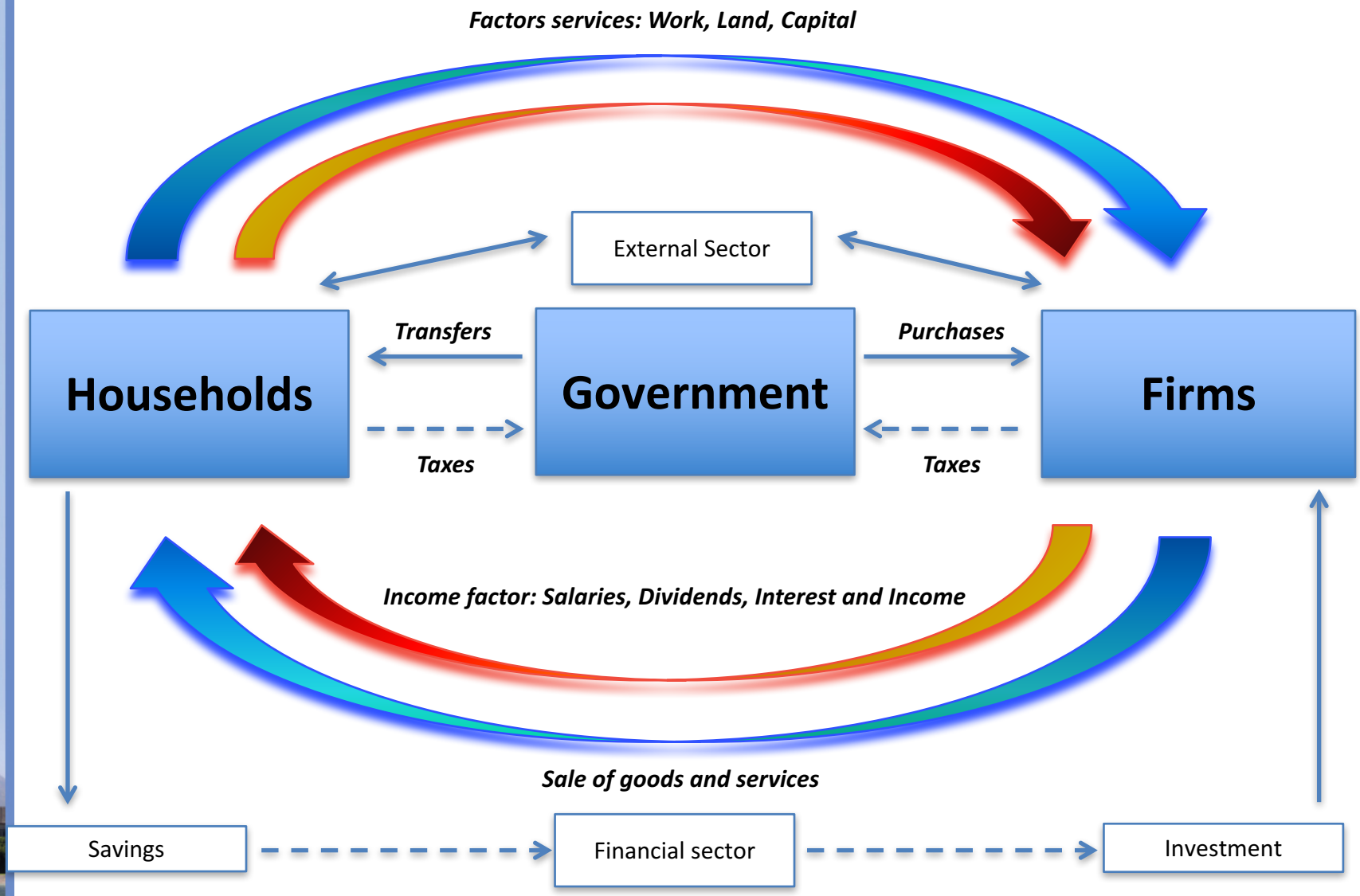
Applications of CGE models (2)

- They can carry out an *ex ante* analysis of the effects of public policies such as trade liberalization upon household welfare.
  - This analysis takes into account explicitly the interrelations between sectors of the economy - households, firms, government, other countries - ensuring equality between expenditure and income.
  - The main feature of CGE anlysis is that it captures the fact that markets are connected and that they affect each other
- When also connected with a microsimulation analysis, changes in income distribution can be evaluated.

Main uses of the CGE models

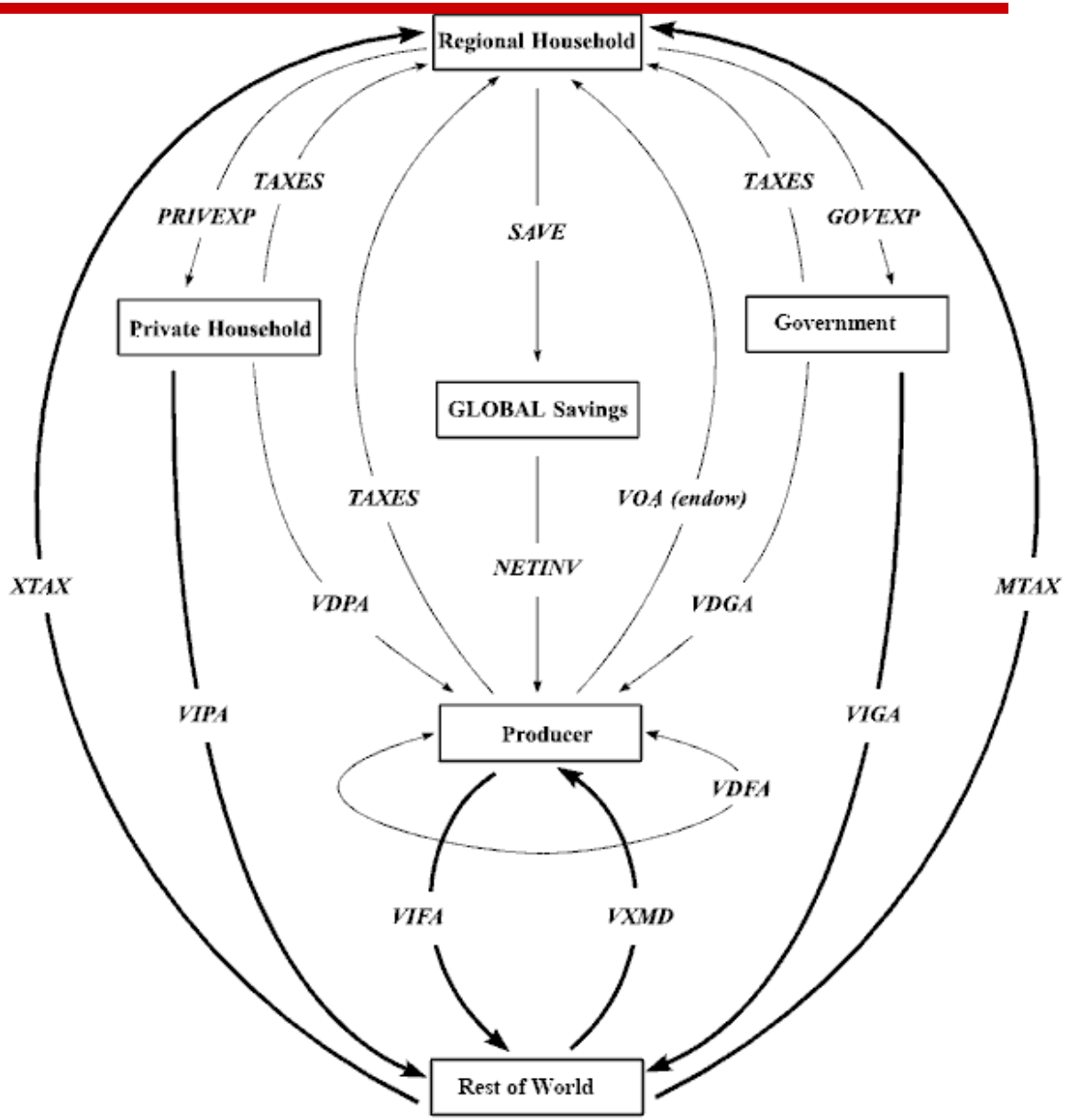
- Determine macroeconomic effects (GDP, X, M, I, C) before a policy change
  - E.g.: Tariff increases or reductions; entry into force of FTA, etc.
- Determine welfare gains or losses due to an agreement (ex-ante analysis);
- Determine winners and losers after signing an agreement
- Provides inputs to perform microsimulations

Circular flow of an economy

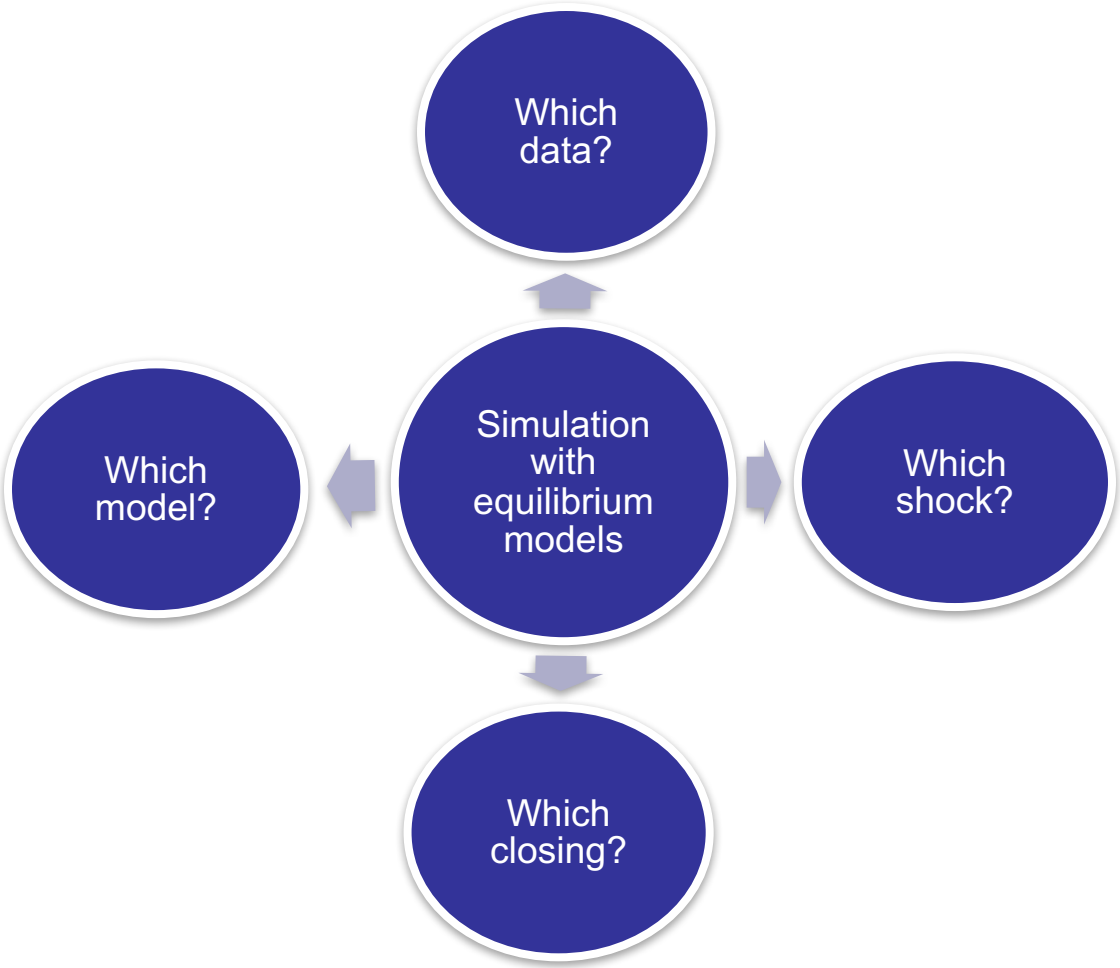


Example of an open economy

Tariffs are a determining factor for the difference between market values and world prices.



Applying CGE models (1)



Applying CGE models (1)

- Main assumptions:
  - work and capital are of full disposition
  - Perfectly competitive goods and factor markets
  - Domestic and foreign products are not perfect substitutes (depending on the Armington elasticity used)
- The model looks for the prices that produce equilibrium in the market (demand = supply)
  - Demand for factors of production is equal to its endowment
  - Consumers consume the basket of goods that maximizes their utility
  - Companies choose the level of production that maximizes their profits
- Different exogenous variables will produce different market equilibrium
  - For example, estimate consumer welfare generated by different levels of tariffs
  - Policymakers can compare different outcomes and choose the scenario that produces the balance that maximizes consumer utility.

Data requirements

- Social Accounting Matrix (SAM). Represents all interactions in the economy in a systematic way and is constructed with:
  - Input-output tables
  - National macroeconomic accounts (consumption, savings, investment)
  - Government budget
  - Balance of Payments
  - Trade Statistics
- Estimated elasticities of the exogenous parameters that characterize the behavior of producers and consumers
  - Elasticities of substitution in aggregate value of the factors of primary productions
  - Armington elasticities that determine the possibility of substitution between domestic and foreign products
  - Income and demand elasticities of consumer households

Social Accounting Matrix

- The heart of the CGE model is the Social Accounting Matrix or SAM.
- It is an accounting representation of a single entry of the flow of goods and services and payments between sectors, classes of economic actors and other accounts.
- For each income there must be a corresponding expense.
- The SAM fulfills two functions:
  - The description of an economy
  - Provides a basis for modeling

Institutions considered in the SAM

- Households (distinguished by types)
  - Households supply the factors of production (capital, land and labor) to the firms; consume goods and services in the market; pay taxes to the government and receive subsidies from it; consume public goods; they make transfers to the rest of the world; save and invest.
- Government
  - Imposes taxes on households, firms and products; makes transfers to households, firms and the rest of the world; saves and invests (in capital for certain sectors and in public infrastructure).
- Corporate sector
- Rest of the world
  - Supplies goods and services to the domestic market (imports) and consumes national production (exports); makes net transfers (remittances, net interest payments, loans); provides savings (official loans or private savings).

Calibration

- The SAM is a photograph of the economy at a certain point in time and each cell records the value of each transaction (i.e. the product of prices and quantities).

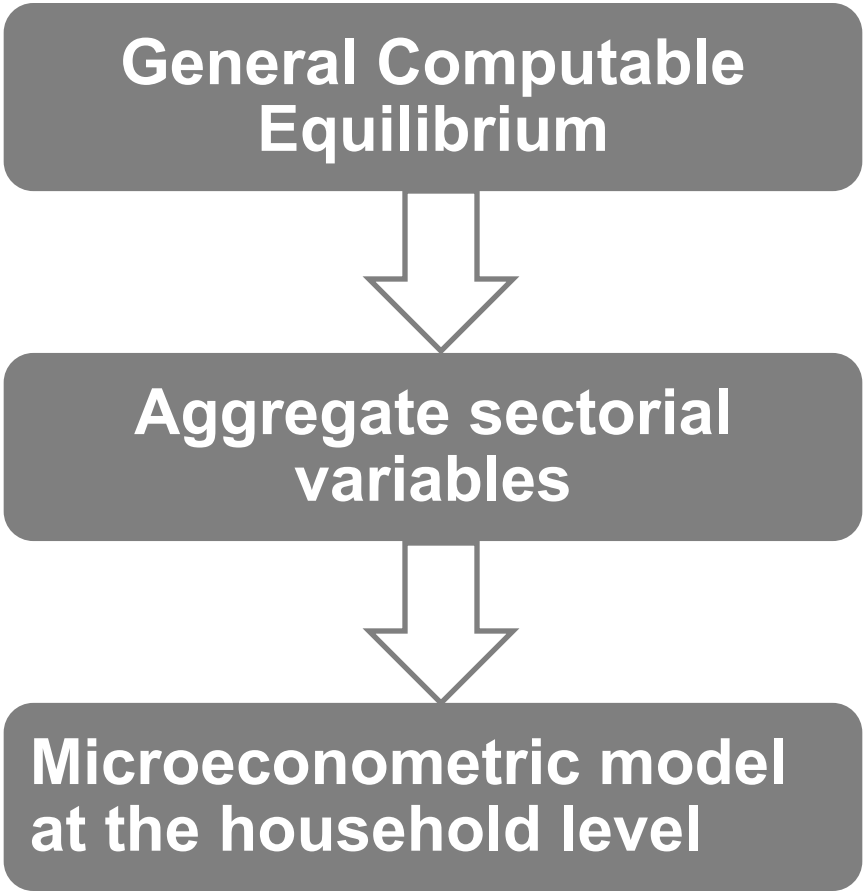
- When the economy is subject to a change - by an exogenous shock or an endogenous change in supply or demand - how much of this change will be represented by a change in price and how much by a change in quantities will depend on the structure of the model.

Microsimulation: An Introduction

- Microsimulations are models that use information at the level of the individual microeconomic agent (individuals, households, firms)
  - Capture heterogeneity
- Therefore, they allow to obtain results of
  - alternative economic policies at a disaggregated level
  - in general, it is an ex-ante policy evaluation tool
- Take parameters from the CGE model and feed them into the micro module without any further interaction between the macro and the micro levels

Microsimulation and CGE

- Top down approach:



Microsimulation: An Introduction

- Which data?
- Typically, microdata from a household survey are used with information (individual's socio-economic characteristics, employment status, household income, expenditure)
- Differences between individuals shown in the microdata are considered.
- Work in partial equilibrium
  - Prices, salaries, macro phenomena are not simultaneously modeled

Microsimulation: Classification

- Not behavioral or arithmetic
  - only capture first-order effects
  - economic agents do not modify their behavior;

- Behavioral
  - capture second-order effects
  - economic agents modify their behavior in the face of changes in prices (for example, labor supply change)
    - Ex: ex-ante evaluation of treaties

Microsimulation: Classification (II)

- Parametric
  - In general, they involve econometric estimation (for example, Mincer equation, occupational category, hours worked)
- Non-parametric
  - In general, "similar" individuals are looked for to simulate change

Microsimulation: Example

- Initial inputs: CGE results and household surveys
- Identification of the workforce and “similar” individuals
- Estimation of a probit/logit model to determine the probability of individuals with different characteristics to enter the workforce
- Assign the employers to different sectors according to the result of the CGE
- Estime a Mincer equation to determine a remuneration to the previously unemployed workers

Microsimulation: Results

- Impact of a policy on the poverty count
  - Allows the researcher to analyze how many people would move out of poverty
- Impact of a policy on the distribution of income
  - Allows the researcher to analyze how inequality would be compared to the baseline scenario

Microsimulation: Use

- Initially, used in developed countries
  - Mainly, to analyze direct tax changes
    - For example, STINMOD+ (Australia), DYNACAN (Canada), EUROMOD (EU)
- In developing countries they are relatively recent
  - improvement in data availability

Microsimulation: Conclusion

- "Macro-micro synthesis"
  - The macro model component, usually a computable general equilibrium (CGE) model, accounts for impacts of trade policies and external shocks on macro variables and the labor market.
  - The micro compenent account for impacts at the household level and analyze the effects on income distribution.

- Micro models allow us to explain changes in poverty and distribution of income due to macroeconomic policies such as trade reforms and public spending policies

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