Using GEMPACK software to analyse and build scenarios for the economy of Mo Cay, Ben Tre, Viet Nam

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1. Describing CGE (Computable General Equilibrium) and I-O (Input Output) models.
3. Describing GEMPACK software (General Equilibrium Modeling Package).
4. Describing how simulations are carried out in GEMPACK.
What are CGE and I/O models?

- A Computable General Equilibrium (CGE) model describes a wide range of economic behaviors. These behaviors are modeled through building a very flexible system of equations.

- Input-output (I-O) Model is also a system of equations of economic behaviors.

- The fundamental difference between them is that while a CGE is based on market equilibrium conditions, I-O model is based on technical input output relationship.
Why to use a CGE and I/O model?

Why to use a CGE and I/O model.
- The quantitative results are clear and exact.
- It may be too complex if using algebraic or geometric methods.
- It is based on explicit assumptions.
- It may generate good ideas about the role of certain assumptions.

Why to use a I/O model.
- Countries have a non-market economy (NME).
- The data is shortage and incorrect.
What is the I/O model at Mo Cay district, Ben Tre Province, Viet Nam?

- It recognizes 41 sectors and each sector producing a single commodity.
- Three final demands are households, government and investment.
- Two primary factors are labour and capital.
- There are differences between incoming and outgoing goods.
- Output of each sector is a Cobb-Douglas aggregate of labour, capital and intermediate inputs.
- Final demands are also Cobb Douglas.

• THE I-O MODEL
What is the GEMPACK software?

- GEMPACK (General Equilibrium Modeling Package) is a suite of economic modeling software designed for building and solving applied CGE or I-O models.

- It can handle a wide range of economic behaviors through a system of the equations.

- These equations can be written as linear or nonlinear equations or a mix of these two.
What is the data of the I/O model?

- The data for a model consists of input-output data (giving dong values) and parameters.
- The data given are usually sufficient to read off an initial solution to the equations.
- The data consist of:
  - DVCOMIN(i,j) Intermediate inputs
  - DVHOUS(i) Household consumption
  - DVFACIN(f,j) Factor use by industry
- Then, if we set all the prices to one for
  - PC(i) Price of commodities
  - PF(f) Price of factors
Describing how simulation are carried out by GEMPACK

There are three steps involved in carrying out a simulation using GEMPACK:

- Step 1: Implementing the model.
- Step 2: Solving the equation of the model.
- Step 3: Analysing the results.
Step 1 : Implementing the model.

A CGE model is implemented in GEMPACK when:

- The data are assembled (Mocay.HAR – Header Array)
- The equations are written by Fortran language (Mocay.TAB – TABLO)
- The scenarios are written by Fortran language (Mocay.CMF – Comand File)

**Step 1.1** : Create file Mocay.HAR in ViewHAR program

**Step 1.2** : Create Mocay.TAB in TABmate program

**Step 1.3** Create Mocay.CMF in TABmate program

**Step 1.4** : Implementing the model
Step 2 : Solve the equation of the model

**Step 2.1:**
Solve the equations of the model

select simulation/ GEMSIM / Select file Mocay. CMF)

**Step 2.2**
View the result (press Go to View SOL)
Step 3 : Analysing the results

Step 3.1
The shocks for the simulation

Step 3.2:
Real GDP (Gross Domestic Product) in the model

Step 3.3
Real GDP from the income side (supply of add value)

Step 3.4
Real GDP from the expenditure side (Final demand)

Step 3.5
Real GDP from the production side (production supply)

Step 3.6
Demand for factors in each sector
Step 3 : Analyzing the results

**Step 3.7**
The prices of labor and capital

**Step 3.8:**
The prices of commodity

**Step 3.9**
Demand for factors in each sector.

**Step 3.10**
household demand for the commodities

**Step 3.11**
Total final demand for the commodities

**Step 3.12**
Results for factor prices
Comparing between GEMPACK and Excel

• While GEMPACK software is convenient for both linear, nonlinear and mix, Excel software is only convenient for linear equations.

• GEMPACK is convenient for analysing the results and building scenarios. Otherwise, it is too difficult using by Excel.

• GEMPACK can solve more equations than EXCEL.

• GEMPACK is not as popular as EXCEL.
Comparing the model of Mocay and the model of FTA

- The system of equations (table)
- The primary factors
- The environment of the scenarios
The model of Mocay and the model of FTR – Australia & Viet Nam

The primary factors

- The model I/O of Mocay is emphasized to increase labor from local (unemployment)
- The Model I/O of FTR is emphasized not only labor, capital from Australia but also tariff system to reduce the price of intermediate input.
The model of Mocay and the model of FTA – Australia & Viet Nam

Association of Southeast Asia Nations (ASEAN) are entering into force the free trade agreements (FTAs):

• ASEAN-China Free Trade Agreement (ACFTA-1/7/2005).
• ASEAN-Korea Free Trade Agreement (AKFTA -1/6/2007).
• Agreement On Comprehensive Economic Partnership Among Japan And Member States Of The Association Of South East Asian Nations (AJCEP -1/12/2008).
• ASEAN- India Free Trade Agreement (AIFTA-1/1/2010).
• ASEAN - Australia - New Zealand Free Trade Agreement (AANZFTA -1/1/2010).

The formation of the ASEAN Economic community (AEC) by 2015

Viet Nam, Singapore and Malaysia are negotiating to sign up the Trans-Pacific Partnership (TTP) in 2013.

Free Trade Agreement of Viet Nam – China and Viet Nam - USA
Conclusion