

# General Equilibrium Analysis Part III

## Working With the Model

Capacity Building Workshop  
"Enhancing Capacity on Trade Policies and Negotiations in Laos"  
May 8-10, 2017  
Vientienne, Lao PDR

John Gilbert

Professor  
Department of Economics and Finance  
Jon M. Huntsman School of Business  
Utah State University  
[jgilbert@usu.edu](mailto:jgilbert@usu.edu)

# Introduction

- In this session we will consider various ways that changes in the economic environment that may occur with a PTA can be incorporated into CGE models.
- We will demonstrate the ideas and techniques using the CGE model of Lao PDR that we developed in the previous sessions.
- By the conclusion of the session you should have a good idea of the mechanics of simulating various intervention and how to interpret the results.

# Running Simulations

- Running a simulation with the model is the same as with the partial equilibrium models: After calibration we change the values of the required parameters (shocking), resolve the model, and examine the new 'counterfactual' solution.
- The new solution is reported in the list file.
- The easiest way to see how this works is to run lots of examples!

# Tariff Changes

- The most basic change in the economy associated with a PTA will be changes in the country's import tariffs.
- In the Lao PDR model, import tariffs are represented by the parameter  $TM$  which is specified by industry as an ad-valorem rate.
- Tariffs can be removed by setting them equal to zero, partially removed, or set to any new value. [Examples](#)
- Note that negative values of  $TM$  correspond to import subsidies.

# Export Tax/Subsidy Changes

- A PTA may also involve changes in the rates of intervention on the export side.
- In the Lao PDR model, export subsidies are represented by the parameter TX which is specified by industry as an ad-valorem rate.
- As with tariffs, export subsidies can be removed by setting them equal to zero, partially removed, or set to any new value. [Examples](#)
- Note that negative values of TX correspond to export taxes.

# International Supply Shifts

- Because the Lao PDR model is a representation of only the Lao PDR economy, effects of reform in other countries are represented by shifts in the terms of trade.
- If other countries reduce their export taxes, that results in a decrease in the price of importables from the perspective of Lao PDR. This can be simulated by changing PW. [Examples](#)
- The opposite will be the case for reductions in other country's export subsidies.

# International Demand Shifts

- Similarly, if other countries reduce their tariffs against Lao PDR, that results in an increase in the price of exportables from the perspective of Lao PDR.
- Because the export price is a variable in the model, it can't be shocked directly.
- Instead, we need to shift the intercept of the demand for exports. This is the parameter XSHIFT, which is specified by commodity.
- This parameter needs to be treated a bit carefully, since its value is calibrated. Generally it should be changed by a proportion rather than set to a particular value. [Examples](#)

- A PTA may also involve commitments to facilitate technology transfer.
- In the Lao PDR model, the overall level of productivity by industry is represented by the parameter GAMMA.
- Like XSHIFT, this parameter is calibrated, and so generally it should be changed by a proportion rather than set to a particular value.

Examples



- If a PTA is expected to raise the level of FDI in the economy, this can be simulated by increasing the size of the capital stock.
- In the Lao PDR model, all factor endowments are represented by the parameter FBAR, which is defined by factor.
- The element associated with capital can be shocked in the usual way. [Example](#)
- If the scenario involves changing the capital stock in one industry, then the closure should be adjusted. [Example](#)

- If an agreement involves commitments on transfers, these can be simulated by changing the parameter  $CA$ .
- This parameter represents the current account deficit, which is fixed in the default closure.
- It is defined as a positive monetary value – so an inward transfer is an increase in the parameter value. [Example](#)

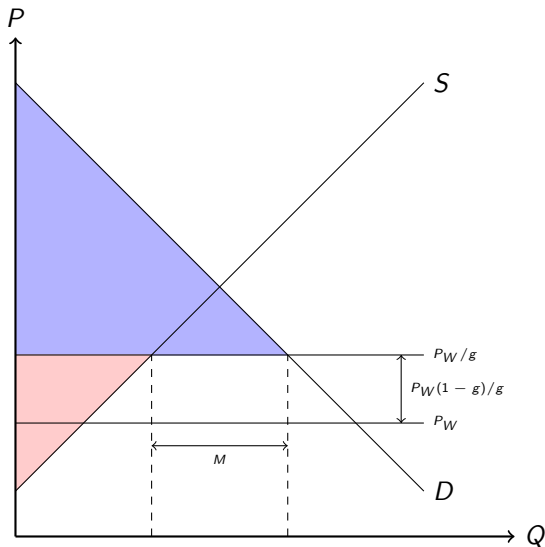
# Trade Facilitation

- Important parts of many PTAs are measures to facilitate trade.
- Changes in iceberg trade costs are a simple way of modeling trade facilitation effects. The idea is that some of the product is lost between the the buyer and the seller (think a melting iceberg).
- This process is modeled using an [iceberg parameter](#). This parameter,  $g$ , which lies between 0 and 1, represents the proportion of goods shipped that actually make it to import consumption.
- Hence, if  $M$  units are shipped, only  $gM$  units arrive. If  $M$  are consumed, then  $M/g$  units were shipped.
- We can think of iceberg costs as representing 'sand in the wheels' of trade.
- This might be appropriate when modeling the impact of standards harmonization, and so on.

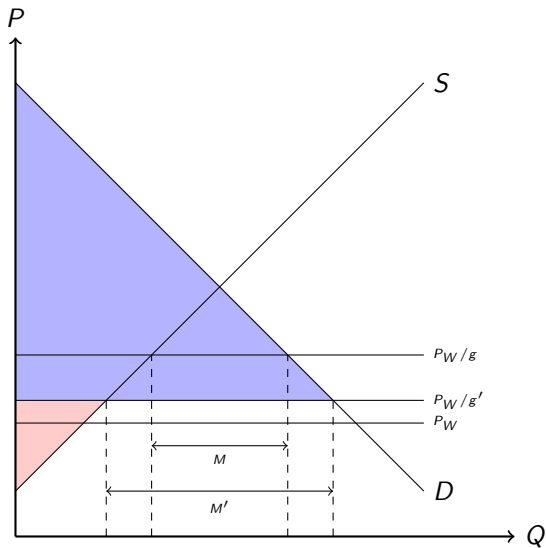
# NTMs as Iceberg Costs

- Iceberg trade costs drive a wedge between world and landed prices much like a tariff, although they do not generate any revenue.
- A reduction in iceberg trade costs is sometimes called **import augmenting technical change**.
- It means that for a given payment to suppliers, a greater quantity becomes available for import consumption.
- Alternatively, for a given quantity of import consumption, the price that must be paid falls.

# Iceberg Trade Costs



# Reductions in Iceberg Trade Costs



- The fact that there are no revenues involved with iceberg trade costs lends a major advantage technical – no adjustments need to be made to the underlying equilibrium data.
- The assumed iceberg parameter can be adjusted directly, and then shocked as needed.
- In the Laos PDR model, the relevant parameter is ICE, which is defined by commodity.
- It has a default value of 1, and increases represent reductions in costs. [Examples](#)

- It is important to note that CGE simulation models are an important policy tool beyond international trade policy.
- For example, Lao PDR has a policy of trying to open up new mining resources. What kind of impact would this have on the economy as a whole?
- We can get some ideas by simulating an expansion of the natural resource stock. Again, the relevant parameter is FBAR, and we need the element for natural resources. [Example](#)



# Shock Magnitudes

- We have concentrated on the mechanics of simulation, but serious consideration should also be given to determining the size of the shocks.
- In some cases this might be simple – e.g., in the case of tariffs, or monetary transfers.
- For NTMs, estimates of AVEs may be required, along with estimates of how much they might fall.
- For technological shocks, getting good estimates might be a lot harder. In this case [sensitivity analysis](#) may prove useful.