

# Modeling Tariffs and Other Interventions

Short Course on CGE Modeling, United Nations ESCAP

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July 22-26, 2013



# Introduction

- So far we have considered economies that are free from policy-induced distortions to the economic system.
- In this session we will consider how trade taxes, subsidies, and other interventions can be incorporated into the models of the small and large economy.
- This will allow us to examine the production, consumption, trade, income distribution, and economic welfare implications of interventions.
- Since almost all real world trade patterns are riddled with distortions of various kinds, introducing these types of distortions is also a crucial step in building the components we need for a CGE model applied to an actual economic system.

# Session Outline

- 1 Tariffs for the small country
- 2 Symmetry
- 3 Other price interventions
- 4 Quotas
- 5 Tariffs for the large country

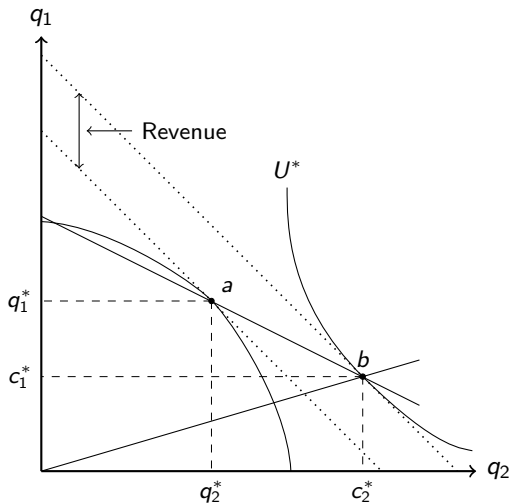
# Small Economy Tariffs

- For a small economy, in the absence of distortions, optimal policy is free trade. In other words the MRS and MRT both equal the world relative price.
- A trade tax/subsidy has the effect of driving a wedge between domestic and world prices. We can define the wedge in percentage terms as  $t_i = (p_i - p_i^*)/p_i^*$ ,  $i = 1, 2$ , with the price of foreign exchange normalized to unity.
- For an importable good (i.e.,  $x_i < 0$ ) a positive value of  $t_i$  represents a tariff.
- A tariff pushes the domestic price up relative to a world price.
- Tariffs can drive the relative domestic price no further away from the relative world price than the relative autarky price. Beyond that point they are said to contain 'water'.

# Formal Problem

- Given world prices, the domestic prices are determined by the tax wedge.
- Solving the production problem reveals that firms will produce on the production possibilities where the MRT is equal to the domestic price ratio.
- Solving the consumer's problem reveals that households will consume where the MRS is equal to the domestic price ratio, and will spend all of their income.
- Finally, we determine income as the sum of the value of output at domestic prices, plus the tariff revenue. This completes the model.
- Note that although the consumption choice affects tariff revenue, this should not form part the consumer decision (why?)

# Small Country Tariff



# Other Price Interventions

- For an importable good (i.e.,  $x_i < 0$ ) a negative value of  $t_i$  represents an import subsidy.
- For an exportable good ( $x_i > 0$ ) a positive  $t_i$  represents an export subsidy while a negative value represents an export tax.
- Hence, all price based interventions can be dealt with in the same manner as a tariff.
- Both a tariff and an export subsidy push the domestic price up relative to a world price, while an import subsidy or export tax pushes the domestic price down relative to the world price.
- Like tariffs, export taxes can drive the relative domestic price no further away from the relative world price than the relative autarky price.
- In the two good case, an export tax and an import tariff are the same intervention, a result known as the Lerner symmetry theorem.

- First we need to introduce the tax wedge, either by creating a new equation or by substitution.
- The first order conditions for firms need to be adjusted to reflect decision making at domestic prices.
- The first order conditions for households need to be adjusted similarly.
- Income needs to be adjusted to include tariff revenue.

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