International Economics: Lecture 11
Basic Tariff Analysis

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Our purpose:

Identify the effects of tariffs on:

- national welfare, and specifically on
  - domestic producers,
  - domestic consumers,
  - government revenues.

Tariffs are taxes on imported (sometimes also exported) goods.

- ad valorem tariff - a tariff charged as percentage of the customs value,
- specific tariff - a tariff charged as fixed amount per quantity,
- compound tariff.
Armenian import tariffs

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen meat</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>50%, no less 1 euro per 1kg</td>
</tr>
<tr>
<td>Cars</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>23%, 0.83-1.2 euro per 1 cubic cm engine capacity</td>
</tr>
<tr>
<td>Sunflower oil</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>15%</td>
</tr>
<tr>
<td>Butter</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>15%</td>
</tr>
</tbody>
</table>

Starting from 2022 Armenian tariff rates will be fully harmonized with Eurasian Economic Community rates.

Armenia doesn’t impose tariffs on export.
Our assumptions:

- small country (price taker, i.e. the country has no impact on world price),
- a dollar of consumer, producer and government has equal welfare weight,
- perfect competition,
- homogeneous good,
- full employment.
Governments’ stated goals of trade policy:

- increase employment,
- increase production,
- increase government revenue,

IN REALITY by imposing trade barriers all the governments in the world mainly aim to favor (protect) politically influential interest groups.

The government is certainly able to increase the production & employment in protected industries, but what are the associated costs? Will the country really gain from trade barriers, or actually lose.
Import tariff in a SMALL country

partial equilibrium analysis

As the country is small, domestic price increases by the full amount of the tariff.
**Export tariff in a SMALL country**

*partial equilibrium analysis*

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As the country is small, domestic price decreases by the full amount of the tariff.
### Economic analysis of tariffs

**Import tariff in a LARGE country**  
*partial equilibrium analysis*

<table>
<thead>
<tr>
<th>Economic Impact</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>$-(a+b+c+d)$</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>$+a$</td>
</tr>
<tr>
<td>Government revenue</td>
<td>$+(c+e)$</td>
</tr>
<tr>
<td>National welfare</td>
<td>$e-(b+d)$</td>
</tr>
</tbody>
</table>

**Diagram:**
- **Large country:**
  - Demand curve: $D_{LC}$
  - Supply curve: $S_{LC}$
  - Market equilibrium before tariff: $P^W_0$, $Q^W_0$
  - Market equilibrium after tariff: $P^W_1$, $Q^W_1$
  - Tariff: $t$ (import tariff)

- **Rest of world:**
  - Demand curve: $D_{ROW}$
  - Supply curve: $S_{ROW}$
  - Market equilibrium before tariff: $P^W_0$
  - Market equilibrium after tariff: $P^W_1$

**Market for good X:**
- Price before tariff: $P^W_0$
- Price after tariff: $P^W_1$
- Quantity demanded before tariff: $Q^W_0$
- Quantity demanded after tariff: $Q^W_1$
Optimal tariff

Tariff distorts both consumption and production, therefore ...

for a small country optimal tariff rate is zero.

But for a large country optimal tariff rate may be positive. Specifically, if \( e^{-(b+d)}>0 \), then the optimal tariff should maximize \( e^{-(b+d)} \), provided there is no tariff retaliation.

A country which has monopsony power – is a large importer of a commodity from many competing suppliers – by increasing tariff may force exporters to lower their pre-tariff prices and therefore improve its terms of trade.
**Tariff escalation & Effective rate of protection**

**Tariff escalation** - higher import tariffs on finished goods, than on raw materials.

**Effective rate of protection (ERP)** - the effect of a tariff structure on an industry’s or firm’s value added, considering tariffs both on imported inputs and on output.

\[
ERP = \frac{(V_1 - V_0)}{V_0}
\]

\[
V_0 - \text{domestic value added under free trade}
\]

\[
V_1 - \text{domestic value added with tariffs on final output and imported inputs}
\]

\[
ERP = \frac{P(1 + t_f) - Pa(1 + t_i) - P(1 - a)}{P(1 - a)} = \frac{t_f - at_i}{(1 - a)} \quad \text{if } t_f > t_i
\]

\[
\text{then } ERP > t_f
\]

\[
t_f - \text{tariff rate on final output, } \quad t_i - \text{tariff rate on imported inputs,}
\]

\[
P - \text{final output price, } \quad a - \text{the ratio of the cost of imported input to the price of the final output prior to tariffs.}
\]
Effective rate of protection: **Smart-phones**

<table>
<thead>
<tr>
<th>Imported components</th>
<th>$200</th>
<th>Tariff on final imports</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly (domestic value added)</td>
<td>$100</td>
<td>Tariff on components imports</td>
<td>0%</td>
</tr>
<tr>
<td>Free trade price</td>
<td>$300</td>
<td>Domestic price after tariff</td>
<td>$330</td>
</tr>
</tbody>
</table>

\[ t_f = 10\%, \ t_i = 0\%, \quad a = \frac{2}{3}, \quad ERP = \frac{0.1-2/3(0)}{1-2/3} = 30\% \]

\[ V_0=$100, \quad \text{with 10% tariff on final output} \quad V_1=$130 \ (330-200), \quad \text{so ERP}=30\% \]

$30 tariff on each smart-phone represents a 10% nominal tariff rate, but a 30% effective tariff rate.

Consumers are only concerned, that the price increases by 10%, but producers view this as 30% rise on their domestic value added.

\[
\frac{t_f - a t_i}{(1 - a)} \quad \text{if} \quad t_f > t_i \quad \text{then ERP} > t_f
\]
**Effective rate of protection: **Smart-phones

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<tr>
<td>Assembly (domestic value added)</td>
<td>$100</td>
<td>Tariff on components imports</td>
<td>5%</td>
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<td>Free trade price</td>
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\[ t_f = 10\%, \; t_i = 5\%, \; a = \frac{2}{3}, \; \text{ERP} = \frac{(0.1-2/3(0.05))}{(1-2/3)} = 20\% \]

\[ V_0 = $100, \text{ with 10\% tariff on final output and 5\% tariff on imported inputs } V_1 = $120 \text{ (330-210), so ERP } = 20\% \]

\[ \frac{t_f - at_i}{(1 - a)} \text{ if } t_f > t_i \text{ then ERP} > t_f \]
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\[ t_f = 10\%, \quad t_i = 10\%, \quad a = 2/3, \quad \text{ERP} = \frac{(0.1 - 2/3(0.1))}{(1 - 2/3)} = 10\% \]

\[ V_0 = $100, \quad \text{with 10\% tariff on final output and 10\% tariff on imported inputs} \]
\[ V_1 = $110 \quad (330 - 220), \]
so ERP = 10%

\[ \frac{t_f - at_i}{(1 - a)} \quad \text{if} \quad t_f > t_i \quad \text{then ERP} > t_f \]
### Effective rate of protection: **Smart-phones**

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\[
t_f = 10\%, \ t_i = 20\%, \quad a = \frac{2}{3}, \quad ERP = \frac{0.1 - \frac{2}{3}(0.2)}{1 - \frac{2}{3}} = -10\%
\]

\[
V_0 = $100, \text{ with 10\% tariff on final output and 20\% tariff on imported inputs } V_1 = $90 \ (330 - 240),
\]

so ERP = $10\%

\[
\frac{t_f - at_i}{(1 - a)} \quad \text{if } t_f > t_i \Rightarrow ERP > t_f
\]
Thank you and good luck,

but remember

If a man neglects education, he walks lame to the end of his life.

Plato, “Timaeus”