LECTURE 10
INTERNATIONAL TRADE AND TRADE POLICY
February 18, 2016

I. OVERVIEW

II. REVIEW OF COMPLETE SPECIALIZATION
   A. Example of the United States and China
   B. Terms of trade and world prices

III. INCOMPLETE SPECIALIZATION
   A. Changing opportunity cost within each country
   B. Optimal level of specialization
   C. Consumption possibilities with trade

IV. SUPPLY AND DEMAND ANALYSIS OF INTERNATIONAL TRADE
   A. Export good
   B. Import good

V. WELFARE AND EMPLOYMENT EFFECTS OF TRADE
   A. Welfare analysis of trade
      1. Export good
      2. Import good
   B. Employment effects of trade

VI. TRADE POLICY
   A. Some definitions
   B. Effects of a tariff
   C. Welfare analysis of a tariff
   D. Possible arguments for protection
Announcements

• Midterm 1 Logistics:
  • Tuesday, February 23rd, 3:30–5:00
  • Sections 102, 104, 107, 108 (GSIs Pablo Muñoz and David Green) go to 245 Li Ka Shing Center (corner of Oxford and Berkeley Way).
  • Everyone else come to usual room (2050 VLSB).
  • You do not need a blue book; just a pen.
  • You also do not need a watch or phone.
Announcements (continued)

• Collecting the Exams:
  • If you finish *before* 4:45, you may quietly pack up and bring your exam to the front.
  • After 4:45, stay seated.
  • We will collect all of the exams by passing them to the nearest aisle.
  • Please don’t get up until all of the exams are collected.

• Academic honesty: Behave with integrity.
Announcements (continued)

• Hints for writing good answers:
  • Figure out the appropriate tool.
  • Draw diagrams carefully and label things.
  • Explain why you have shifted a curve the way you did and give the intuition behind your results.

• Hints for doing well more generally:
  • Budget your time.
  • Get a good night’s sleep.
Announcements (continued)

• Review Session:

• Friday, February 19, 4:30–6:00 p.m. in 155 Dwinelle.
I. Overview
II. REVIEW OF COMPLETE SPECIALIZATION
Example of the U.S. and China

Output per Day of a Typical Worker:

<table>
<thead>
<tr>
<th></th>
<th>Tons of Wheat</th>
<th>Washing Machines</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>China</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Opportunity Cost of a Ton of Wheat:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>1 washing machine</td>
</tr>
<tr>
<td>China</td>
<td>2 washing machines</td>
</tr>
</tbody>
</table>

Opportunity Cost of a Washing Machine:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>1 ton of wheat</td>
</tr>
<tr>
<td>China</td>
<td>$\frac{1}{2}$ ton of wheat</td>
</tr>
</tbody>
</table>
Production Possibilities Curve for Each Country

**United States**

- **Washing Machines**
- **Wheat**

**Slope of the PPC = \(-1\)**

**China**

- **Washing Machines**
- **Wheat**

**Slope of the PPC = \(-2\)**
Terms of Trade

• The terms at which the goods trade in world markets.

• For both countries to want to trade, the terms of trade must be between 1 and 2 washing machines per ton of wheat.

• Or, equivalently, the terms of trade must be between $\frac{1}{2}$ and 1 ton of wheat per washing machine.
Terms of Trade and World Prices

• The terms of trade reflect the prices of the two goods in world markets.

• Suppose $P_{\text{Wheat}}$ is $400 and $P_{\text{Washing Machine}}$ is $300.

• Then 1 ton of wheat trades for $1\frac{1}{3}$ washing machines in world markets.

• Or, equivalently, 1 washing machine trades for $\frac{3}{4}$ of a ton of wheat in world markets.
Consumption Possibility Curves with Trade
(Assuming 1 ton of wheat trades for $1\frac{1}{3}$ washing machines)

United States

\[ \text{Washing Machines} \]

\[ \text{Wheat} \]

\[ \text{Slope of the CPC} = -1\frac{1}{3} \]

\[ \text{CPC} \]

\[ \text{PPC} \]

Gains from Specialization and Trade

China

\[ \text{Washing Machines} \]

\[ \text{Wheat} \]

\[ \text{Slope of the CPC} = -1\frac{1}{3} \]

\[ \text{CPC} \]

\[ \text{PPC} \]

Gains from Specialization and Trade
III. INCOMPLETE SPECIALIZATION
Limitations of the Previous Analysis

• The PPC for a country is almost surely curved; that is, the opportunity cost of producing more of either good rises as more is produced.

• Countries rarely specialize completely.
Optimal Specialization when the PPC is Curved

(Slope = (minus) WM per 1 W; in our example it is −1\(\frac{1}{3}\))
The Consumption Possibilities Curve (CPC) shows the combinations of the two goods that a country can have with trade. It is the line with a slope equal to (minus) the terms of trade (expressed as per 1 of the good on the horizontal axis) that is just tangent to the Product Possibilities Curve (PPC). The point of tangency shows the combination of the two goods that the country can produce that has the largest value in world markets. The country can trade the combination of goods at the point of tangency for any other combination along the CPC.
IV. Supply and Demand Analysis of International Trade
Supply and Demand Diagram for an Export Good

- World Price with Trade
- U.S. Price without Trade
- Exports

\[
P^\text{World} \quad \text{World Price with Trade}
\]

\[
P^\text{US}_1 \quad \text{U.S. Price without Trade}
\]

\[
Q^\text{US}_D \quad Q^\text{US}_1 \quad Q^\text{US}_S
\]

Exports
Supply and Demand Diagram for an Import Good

- **S^US**: Supply curve for the U.S.
- **D^US**: Demand curve for the U.S.
- **P^World**: World price with trade.
- **Q_S^US**: Quantity supplied in the U.S.
- **Q_D^US**: Quantity demanded in the U.S.
- **Imports**: Difference between quantity demanded and quantity supplied.

- **P^1^US**: U.S. price without trade.
- **Imports**: Quantity of imports.
V. Welfare and Employment Effects of Trade
Welfare Analysis of Trade (Export Good)

Without Trade ($Q^1_{US}$) With Trade ($Q^D_{US}, Q^S_{US}$)

<table>
<thead>
<tr>
<th></th>
<th>Without Trade ($Q^1_{US}$)</th>
<th>With Trade ($Q^D_{US}, Q^S_{US}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Surplus</td>
<td>$a+b+c$</td>
<td>$a$</td>
</tr>
<tr>
<td>Producer Surplus</td>
<td>$e+f$</td>
<td>$b+c+d+e+f$</td>
</tr>
<tr>
<td>Total Surplus</td>
<td>$a+b+c+e+f$</td>
<td>$a+b+c+d+e+f$</td>
</tr>
<tr>
<td>Gains from Trade</td>
<td></td>
<td>$d$</td>
</tr>
</tbody>
</table>
Welfare Analysis of Trade (Import Good)

Without Trade ($Q_{1}^{US}$) | With Trade ($Q_{D}^{US}$, $Q_{S}^{US}$)
--- | ---
Consumer Surplus | $a$ | $a+b+c+d$
Producer Surplus | $b+e$ | $e$
Total Surplus | $a+b+e$ | $a+b+c+d+e$
Gains from Trade | $a+b+e$ | $c+d$
Price Index for All Goods and Major Appliances

Source: FRED, Federal Reserve Bank of St. Louis.
Employment Effects of Trade

• When a country goes from no trade to free trade, it will produce less of the good it imports and more of the good it exports.

• Employment will tend to fall in the import industry and rise in the export industry.

• Trade tends to rearrange jobs, rather than raise or lower employment overall.

• But, the rearrangement can be very painful for workers who lose their jobs (and who may not have the skills needed to move to the industries where jobs are available).
VI. TRADE POLICY
Some Definitions

• **Trade policy:** A country’s policies toward trade.

• **Free trade:** A country puts no barriers to international trade.

• **Protection:** A country puts limits on trade.
Methods of Protection

• **Tariff:** A tax on imports.

• **Quota:** A limit on the number of imports.

• **Subsidies for domestic production.**
Average U.S. Tariff Rates on Dutiable Imports
Effects of a Tariff

$p_{\text{World}} + \text{tariff}$

$p_{\text{World}}$

Imports before Tariff
Imports after Tariff
Welfare Analysis of a Tariff

Before Tariff ($Q_{S1}^{US}, Q_{D1}^{US}$)

- Consumer Surplus: $a+b+c+d+e+f$
- Producer Surplus: $g$
- Tariff Revenue: $e$
- Total Surplus: $a+b+c+d+e+f+g$
- Deadweight Loss: $d+f$

After Tariff ($Q_{D2}^{US}, Q_{S2}^{US}$)

- Consumer Surplus: $a+b$
- Producer Surplus: $c+g$
- Tariff Revenue: $e$
- Total Surplus: $a+b+c+e+g$
- Deadweight Loss: $d+f$
Possible Arguments for Protection

• National defense or diversification.
• Jobs for particular kinds of workers.
• Learning by doing.