Ricardian Model

A lesson in Comparative Advantage

Mercantilism: 17th and 18th Century

- Trade was considered as a "Zero-Sum Game"
- It was viewed as a means to accumulate Gold & Silver
  - Exports were encouraged
  - Imports were discouraged

End of 18th Century: Major Shift in Paradigm

David Hume, 1752, "It is not the quantity of Gold & Silver that a nation holds that matter, rather it is the quality of goods & services that the gold and silver can buy."

Adam Smith’s Absolute Income Hypothesis, 1776

- Trade is not a zero-sum game
- Both economies can benefit if each specializes in the product in which it has absolute advantage.

A country is said to have absolute advantage in the product which can be produced at a lower labor cost compared to its trading partners.

Absolute Advantage

Labor Hour Requirement

<table>
<thead>
<tr>
<th></th>
<th>Wine</th>
<th>Cheese</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Portugal</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

The number in the table shows the amount of labor hours needed to produce each unit of the product in question.

- England has absolute advantage in Wine
- Portugal has absolute advantage in Cheese

Example 2: Production of Wine and Cheese

<table>
<thead>
<tr>
<th></th>
<th>Wine</th>
<th>Cheese</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Portugal</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

Who has absolute advantage in Wine?
Who has absolute advantage in Cheese?
Can these countries benefit from trade and specialization?
David Ricardo, 1817:
Theory of Comparative Advantage

The direction of Trade and Specialization should not be determined on the basis of absolute cost but should depend on comparative cost or opportunity cost.

A country is said to have comparative advantage in the commodity which can be produced in that country at a lower opportunity cost.

### Example 2: Production of Wine and Cheese

<table>
<thead>
<tr>
<th></th>
<th>Wine</th>
<th>Cheese</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>10</td>
<td>2 ch</td>
</tr>
<tr>
<td>Portugal</td>
<td>8</td>
<td>4 ch</td>
</tr>
</tbody>
</table>

In England, 1 Wine = 2 Cheese & 1 Cheese = ½ Wine
In Portugal, 1 Wine = 2 Cheese & 1 Cheese = ¼ Wine

International Exchange Rate, 1 Wine = 3 Cheese

---

Ricardian Model: Formal Exposition

Simplifying Assumptions:
1. Perfect Competition prevails both in the product and factor market.
2. Each Country has a fixed endowment of resources. Resources are internally mobile but can not move internationally.
3. Fixed technology and only one input (L) needed for the production of the goods in question. Constant Returns to Scale prevails.
4. There is zero transportation cost and product produced are homogeneous.

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Supply of Labor in Country A = L^A = 60

Given this supply, what is the maximum amount of Y country A can produce?

\[
\frac{60}{5} = \frac{L^A}{a_{lx}} \quad \frac{60}{10} = \frac{L^A}{a_{ly}}
\]
Country A: Production Possibility Frontier (PPF)

The equation of the PPF is,
\[ a_{LX}X + a_{LY}Y = L^A \]

The absolute value of the slope of the PPF:
\[ \frac{dY}{dX} = \frac{a_{LX}}{a_{LY}} \]

= Opportunity Cost of X

= Marginal Rate of Transformation (MRT)

Let's now look at the relative price of the two products.

Under Perfect Competition:

\[ P^A_X = a_{LX} \cdot w^A \quad P^A_Y = a_{LY} \cdot w^A \]

So the relative price of the two products will be

\[ \frac{P^d_X}{P^d_Y} = \frac{a_{LX} \cdot w^d}{a_{LY} \cdot w^d} = \frac{a_{LX}}{a_{LY}} \]

Country A: Production & Consumption in Autarky

Total Supply of Labor in Country B = L^B = 16

The resource Constraint that the country faces is,
\[ b_{LX}X + b_{LY}Y = L^B \]
Total Supply of Labor in Country B = \( L^B = 16 \)

Given this supply, what is the maximum amount of \( Y \) country B can produce?

\[
\frac{16}{8} = 2 = \frac{L^B}{b_{LX}} \quad \text{and} \quad \frac{16}{8} = 2 = \frac{L^B}{b_{LY}}
\]

For Country B:

The equation of the PPF is:-

\[ b_{LX}X + b_{LY}Y = L^B \]

The absolute value of the slope of the PPF:

\[ \frac{dY}{dX} = \frac{b_{LX}}{b_{LY}} = \text{Opportunity Cost of } X \]

\[ = \text{Marginal Rate of Transformation (MRT)} \]

\[ = \frac{P^B_X}{P^B_Y} \]

The international price ratio has to be between the two domestic price ratios. In other words,-

\[ \frac{a_{LY}}{a_{LX}} = \frac{P^A_X}{P^A_Y} < \frac{P^A_X}{P^A_Y} < \frac{P^B_X}{P^B_Y} = \frac{b_{LX}}{b_{LY}} \]

Direction of Trade and Specialization:

If, \((a_{LY}/a_{LX})<(b_{LX}/b_{LY})\), as has been shown in our numerical example, then Country A should completely specialize in the production of \( X \).

If the above is true then, by construction it will also be true that, \((b_{LY}/b_{LX})<(a_{LY}/a_{LX})\), and Country B should completely specialize in the production of \( Y \).
Country B: Free Trade Equilibrium

Figure 8a: What Does a Country Gain from Exchange?

Figure 8b: What Does a Country Gain from Exchange and Specialization?

Figure 9: Domestic Markets for Goods X and Y in Autarky under Constant Costs

Figure 9a: Domestic Market for Good X in Autarky under Constant Costs
Figure 9b: Domestic Market for Good Y in Autarky under Constant Costs

Figure 9c: Domestic Market for Good X in Autarky under Constant Costs

Figure 9d: Domestic Market for Good Y in Autarky under Constant Costs

Figure 10: International Markets for Goods X and Y under Constant Costs

Figure 11: Does Relative Labor Productivity Really Affect Export Performance?