Interdependence and Trade

Chapter 3

Interdependence and the Gains from Trade

Consider your typical day:
- You wake up to an alarm clock made in Korea.
- You pour yourself some orange juice made from oranges grown in Florida.
- You put on some clothes made of cotton grown in Georgia and sewn in factories in Thailand.
- You watch the morning news broadcast from New York on your TV made in Japan.
- You drive to class in a car made of parts manufactured in a half-dozen different countries.

...and you haven’t been up for more than two hours yet!

Interdependence and Trade

Remember, economics is the study of how societies produce and distribute goods in an attempt to satisfy the wants and needs of its members.

Self-Sufficiency

By ignoring each other:
- Each consumes what they produce.
- The production possibilities frontier is also the consumption possibilities frontier.

Without trade, economic gains are diminished.

How do we satisfy our wants and needs in a global economy?

- We can be economically self-sufficient.
- We can specialize and trade with others, leading to economic interdependence.

Interdependence and Trade

A general observation . . .

Individuals and nations rely on specialized production and exchange as a way to address problems caused by scarcity.
Interdependence and Trade

But, this gives rise to two questions:
- Why is interdependence the norm?
- What determines production and trade?

A Parable for the Modern Economy

- Imagine...
  ...only two goods: potatoes and meat
  ...only two people: a potato farmer and a cattle rancher
- What should each produce?
- Why should they trade?

Can both people gain from trade?

- Scenario 1: The farmer can produce only potatoes and the rancher can produce only meat.

- Scenario 2: Each person can produce both goods, however, the farmer is poor at producing meat and the rancher is poor at producing potatoes

Can both people gain from trade?

- Scenario 3: Both the farmer and the rancher can produce both goods. However, the rancher is better at producing meat AND better at producing potatoes. Is it still in the best interest of the rancher to trade with the farmer?

The Production Opportunities of the Farmer and the Rancher

<table>
<thead>
<tr>
<th>Hours Needed to Make 1 lb. of:</th>
<th>Amount Produced in 40 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Meat</td>
</tr>
<tr>
<td>Farmer 20 hours/lb</td>
<td>2 lbs</td>
</tr>
<tr>
<td>Rancher 8 hours/lb</td>
<td>40 lbs</td>
</tr>
</tbody>
</table>

Production Possibilities Frontiers

(a) The Farmer's Production Possibilities Frontier
Production Possibilities Frontiers

Gains from trade

- If a farmer is producing on his PPF, and gains from trade imply that you will make yourself better off, where does this put you on your PPF?
- After trading, it is possible to be on a point outside your PPF. That is, trading allows you to obtain a combination of goods that would be unfeasible otherwise.

The Farmer and the Rancher Specialize and Trade

Each would be better off if they specialized in producing the product they are more suited to produce, and then trade with each other.

- The farmer should produce potatoes.
- The rancher should produce meat.

The Gains from Trade: A Summary

<table>
<thead>
<tr>
<th>What They Produce</th>
<th>What They Trade</th>
<th>What They Consume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer</td>
<td>4 lbs potatoes</td>
<td>3 lbs meat (A*)</td>
</tr>
<tr>
<td>Rancher</td>
<td>24 lbs meat</td>
<td>Gives 3 lbs meat for 1 lb potatoes</td>
</tr>
</tbody>
</table>

(a) How Trade Increases the Farmer’s Consumption

Trade Expands the Set of Consumption Possibilities
Trade Expands the Set of Consumption Possibilities

(b) How Trade Increases The Rancher's Consumption

Rancher's consumption without trade

Rancher's consumption with trade

The Gains from Trade: A Summary

The Gains From Trade:

The Increase in Consumption

Farmer
2 lbs meat \( (A^*- A) \)
1 lb potatoes

Rancher
1 lb meat \( (B^*- B) \)
1/2 lb potatoes

The Principle of Comparative Advantage

Differences in the costs of production determine the following:

- Who should produce what?
- How much should be traded for each product?

Who can produce potatoes at a lower cost—the farmer or the rancher?

Differences in Costs of Production

Two ways to measure differences in costs of production:

- The number of hours required to produce a unit of output. (for example, one pound of potatoes)
- The opportunity cost of sacrificing one good for another.

Absolute Advantage

- Describes the productivity of one person, firm, or nation compared to that of another.
- The producer that requires a smaller quantity of inputs to produce a good is said to have an absolute advantage in producing that good.

Comparative Advantage

- Compares producers of a good according to their opportunity cost.
- The producer who has the smaller opportunity cost of producing a good is said to have a comparative advantage in producing that good.
Specialization and Trade

- Who has the absolute advantage?
  The farmer or the rancher?
- Who has the comparative advantage?
  The farmer or the rancher?

Absolute Advantage

<table>
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<th>Hours Needed to Make 1 lb. of</th>
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<tr>
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<td>Potatoes</td>
</tr>
<tr>
<td>Farmer</td>
<td>20 hours/lb</td>
</tr>
<tr>
<td>Rancher</td>
<td>1 hour/lb</td>
</tr>
</tbody>
</table>

- Who has the absolute advantage in growing potatoes?
  The Rancher needs only 8 hours to produce a pound of potatoes, whereas the Farmer needs 10 hours. Therefore, the rancher has an absolute advantage in growing potatoes.

<table>
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<tr>
<th>Hours Needed to Make 1 lb. of</th>
<th>Amount Produced In 40 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>Potatoes</td>
</tr>
<tr>
<td>Farmer</td>
<td>20 hours/lb</td>
</tr>
<tr>
<td>Rancher</td>
<td>1 hour/lb</td>
</tr>
</tbody>
</table>

- Who has the absolute advantage in producing meat?
  The Rancher needs only 1 hour to produce a pound of meat, whereas the Farmer needs 20 hours. Therefore, the rancher has an absolute advantage in producing meat.

Comparative Advantage

- Now, we will determine which person has the comparative advantage for each good.
- The first step in determining who has the comparative advantage is to calculate each person's opportunity cost.

The Opportunity Cost of Meat and Potatoes

<table>
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<tr>
<th>Hours Needed to Make 1 lb. of</th>
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<tbody>
<tr>
<td>Meat</td>
<td>Potatoes</td>
</tr>
<tr>
<td>Farmer</td>
<td>20 hours/lb</td>
</tr>
<tr>
<td>Rancher</td>
<td>1 hour/lb</td>
</tr>
</tbody>
</table>

- What is the opportunity cost of producing one pound of meat for the rancher?
- What is the opportunity cost of producing one pound of meat for the farmer?
The Opportunity Cost of Meat and Potatoes

<table>
<thead>
<tr>
<th>Hours Needed to Make 1 lb of:</th>
<th>Amount Produced in 40 Hours</th>
<th>Opportunity Cost of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>Potatoes</td>
<td>1 lb of Meat</td>
</tr>
<tr>
<td>Farmer</td>
<td>20 hours/lb</td>
<td>2 lbs.</td>
</tr>
<tr>
<td>Rancher</td>
<td>1 hour/lb</td>
<td>8 lbs.</td>
</tr>
</tbody>
</table>

- What is the opportunity cost of producing one pound of potatoes for the rancher?
- What is the opportunity cost of producing one pound of potatoes for the farmer?

Comparative Advantage

- The Rancher’s opportunity cost of a pound of potatoes is 8 pounds of meat, whereas the Farmer’s opportunity cost of a pound of potatoes is 1/2 pound of meat.
- The Rancher’s opportunity cost of a pound of meat is only 1/8 pound of potatoes, while the Farmer’s opportunity cost of a pound of meat is 2 pounds of potatoes...

Trade Example

- From our example earlier, the trade was that the farmer received 3 lbs of meat and the rancher received 1 lb of potatoes. Does this seem fair?

<table>
<thead>
<tr>
<th>Opportunity Cost of:</th>
<th>1 lb of Meat</th>
<th>1 lb of Potatoes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer</td>
<td>2 lb potatoes</td>
<td>½ lb meat</td>
</tr>
<tr>
<td>Rancher</td>
<td>1/8 lb potatoes</td>
<td>8 lb meat</td>
</tr>
</tbody>
</table>

- The above opportunity cost table is a summary of the opportunity costs for both of the individuals.

Comparative Advantage - Continued

- The farmer is trading potatoes. He needs to receive more than ½ lb of meat for a pound of potatoes to benefit from trade.
- The rancher is trading meat. He needs to receive more than 1/8 lb of potatoes for each pound of meat. Therefore, he needs to receive at least 3*1/8 or 3/8 lb of potatoes for 3 lbs of meat to benefit from trade.
The Principle of Comparative Advantage

- Comparative advantage and differences in opportunity costs are the basis for specialized production and trade.
- It is impossible for the same person to have a comparative advantage in both goods.
  
  Why?

Benefits of Trade

Trade can benefit everyone in a society because it allows people to specialize in activities in which they have a comparative advantage.

Adam Smith and Trade

In his 1776 book *An Inquiry into the Nature and Causes of the Wealth of Nations*, Adam Smith performed a detailed analysis of trade and economic interdependence, which economists still adhere to today.

David Ricardo and Trade

In his 1816 book *Principles of Political Economy and Taxation*, David Ricardo developed the principle of comparative advantage as we know it today.

Summary

- Interdependence and trade allow people to enjoy a greater quantity and variety of goods and services.

Summary

- The person who can produce a good with a smaller quantity of inputs has an absolute advantage.
- The person with a smaller opportunity cost has a comparative advantage.
Summary

♦ The gains from trade are based on comparative advantage, not absolute advantage.
♦ Comparative advantage applies to countries as well as to people.

Class Exercise

<table>
<thead>
<tr>
<th></th>
<th>Computers</th>
<th>Grain (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Poland</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

1. Create an opportunity cost table.
2. Which country has an absolute advantage in producing computers? Grain?
3. Which country has a comparative advantage in producing computers? Grain?
4. What is the range of prices for computers and grain for which both countries would benefit?

Class Exercise – Continued

<table>
<thead>
<tr>
<th>Germany</th>
<th>Poland</th>
</tr>
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<tr>
<td></td>
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