

Heckscher-Ohlin Models

Trade based on resource availability

Comparative Advantage

- Trade based on comparative advantage – based on differences in opportunity cost
- Opportunity costs – based on technology differences

However, most trade in the world is “North-North” trade – trade between northern hemisphere countries

There is not much of a technology difference between these countries

Comparative Advantage

- Comparative Advantage theories – suggest that complete specialization takes place - this fails to explain why countries do not completely specialize

These theories also fail to examine why productivity differences between countries exists – it just assumes that these differences do exist

Finally, only one factor of production is assumed – labor. We know that both labor and capital are used in production.

Heckscher-Ohlin (H-O)

- Early part of the 20th Century – departure from the theory of comparative advantage

H-O model based on two assumptions:

- 1) Countries no longer differ by level of technology, but by the factors of production for which they are endowed
- 2) Goods differ by the factors of production they require

H-O Trade

- Technology – assumed to be the same across countries – simulates North-North trade – now we are concerned with differences in labor, capital abundances

Countries are either capital abundant or labor abundant depending upon their **relative capital labor ratios** as compared to their trading partner.

H-O Model Predictions

- Therefore, countries differ in the levels of K and L and goods differ in their required combinations of K and L needed to produce them.

H-O Theory:

A country will produce at a lower cost those products whose production requires relatively large amounts of the factors of production with which that country is relatively well endowed.

So countries will have the comparative advantage in producing goods that use that country's abundant factor of production

In what factors is the US relatively abundant?

H-O Theory Benefits

- What are the benefits of the H-O theory as compared to the theory of comparative advantage?

- 1) Better ability to explain observed trade patterns.
- 2) Able to develop implications about how trade affects wages and returns on capital
- 3) Shows the impact of economic growth on trade.
- 4) Explains the effects of political groups on trade.

Production Intensities

- Goods use both K and L in production
- Goods are now considered “labor-intensive” or “capital-intensive” depending upon the capital and labor required to produce a unit of the good
- So each good has an associated “K/L” ratio.

How does this theory work

A country’s capital-labor ratio is: **K/L**

Example: Suppose we are concerned with trade between the US and Canada

The US has 50 machines and 150 workers
Canada has 5 machines and 10 workers

Which country will be considered “Kapital abundant”?
“Labor Abundant”?

$$K_{US}/L_{US} = 1/3 \quad K_C/L_C = 1/2$$

Canada is considered “kapital abundant” in this example.

H-O Model in Detail

- Basic Assumptions

- 1) 2 factors of production (K/L)
 - Each factor has a return
 - » Capital (Rent)
 - » Labor (Wages)
- 2) Technology available to each country is identical – this rules out the Ricardian theory of trade (comparative advantage)
- 3) Similar goods produced across countries will be of the same production intensities (goods are always either K-intensive or L-intensive)
- 4) Countries are considered labor(capital) abundant according to their relative K/L ratios

Returns to the Factors of Production

- From assumption (4), if country A is relatively capital abundant as compared to country B, we know that:

$$K_A/L_A > K_B/L_B$$

From this, we expect that the relative “Wage payments to returns to capital” will be higher in A than B

$$R_A/W_A < R_B/R_B$$

If K is relatively abundant in A as compared to B, rental returns should be competed downward in A as compared to the relatively scarce factor (labor)

Thus, we should see autarky product price differentials across countries.

Example of H-O trade

- Recall our example of the US and Canada

US: 50 machines and 150 workers $K_{US}/L_{US} = 1/3$

Canada: 5 machines and 10 workers $K_C/L_C = 1/2$

Canada is the capital abundant country; the US is the labor abundant country.

In Canada, capital is relatively abundant, so capital rental will be relatively cheap – labor will be relatively more expensive

In the US, capital is relatively scarce, so capital rental will be relatively expensive – labor will be relatively cheap

Production in H-O model

- How do these abundances translate to production? Who produces what?

Canada has the lower production cost (comp. adv.) in goods that are capital-intensive

The US has the lower production cost (comp. adv.) in goods that are labor-intensive

H-O Theory

- **Definition** Countries have a comparative advantage in goods with production requirements that intensively use the relative abundant factor of production.

Ex. In what factors of production does the US have a relative Abundance?

What types of goods do we export? Import?

Implications of H-O model

1) H-O model explains why countries of similar technologies can still trade (esp. “North-North” trade – no longer is technology differences a necessary condition for trade

- 2) H-O model also tells us something about:
- How trade affects the distribution of wealth in an economy
 - How growth in an economy affects trade

Factor Price Equalization

- How is the distribution of wealth affected by trade in an H-O context?

In autarky, we know that differences in wages(W) and rental rates (R) exist between countries – differences in W/R are present

The opening up of trade in a country will change the production mix in a country – countries will export the goods for which they have a comparative advantage

Thus, in the short run, countries will need more of the the abundant factor – the factor that is used intensively in the export sector

Factor Price Equalization

- As the need for the abundant factor rises, where will the country be able to acquire more of that factor?

A: From the other (non-export) sector. However, there is relatively Little of the abundant factor used in the production of this product.

This creates a scarcity for the abundant factor, and competes up the return to this factor

This also forces the return to the scarce factor to fall, since we begin to produce less of the good that used this factor intensively – we no longer need a lot of the scarce factor.

Example of FPE

- Canada (in our example) is K-abundant, so it will export K-intensive goods (agriculture). The US is L-abundant, so it will export L-intensive goods (autos)
- What happens when the US and Canada trade?

Note that, in autarky, $W_{US}/R_{US} < W_C/R_C$

In Canada, more land is needed for agriculture, so land must be taken from auto production – however, not much land is used in auto production, so land becomes scarce – rent on land rises.

Even though Canada is producing more crops, the extra workers needed to produce these crops is less than what is being laid-off from the auto sector – unemployment rises – wages fall

Thus, W_C/R_C in Canada **falls**

Example of FPE II

- At the same time, in the US, we are producing more autos – we need more labor, but the amount of labor needed is greater than what agriculture has to offer - labor shortage wages rise. The shifting of production to autos frees up a lot of land that will not be used in auto production – rent falls

Thus, in the US, W_{US}/R_{US} rises

As a result of trade:

W_C Falls and W_{US} rises – converge toward each other

R_C rises and R_{US} falls – converge toward each other

This is called **Factor Price Equalization**

Note: No trade in factors required for FPE – just trade in goods.

Another FPE Example

- 2 countries: Mexico, Japan
- 2 goods: cloth, steel
- Japan – K-abundant, Mexico – L-abundant
- Steel- K-intensive, Cloth – L-intensive

Therefore, P_S lower in Japan than Mexico; P_C lower in Mexico than in Japan

What happens when trade opens up between Japan and Mexico?
What happens to W_M and W_J ? R_M and R_J ?

Stolpher-Samuelson Rule

- Related to FPE
- Analyzes income distribution

Assume that Perfect Competition exists in the markets ($P=MC$)
Therefore, P =cost of inputs

If product prices change → change in the input prices

Look at the Japan/Mexico Case

In Japan, P_S rises to the world price because of trade

In Mexico, P_C rises to the world price because of trade

W_J falls, R_J rises; W_M rises, R_M falls

Stolpher-Samuelson

- However, in Japan, if the decrease in $W_J =$ rise in R_J , then there would be no overall change in input prices.

Thus, there would be no price changes. But we said that P_S rises.

Therefore, the change in W_J and R_J cannot be equal.

Given that P_S rose, the rise in $R_J >$ fall in W_J .

This effect is called the magnification effect.

Magnification Effect

- **Definition** The percent change of the intensively used factor changes by more than the percent change in the price of the good that uses that factor.

So, in Japan, $\% \Delta R_J > \% \Delta P_S$

In Mexico, $\% \Delta W_M > \% \Delta P_C$

Therefore, with trade, income moves toward the owners of the abundant factor

Stolpher-Samuelson Rule

- **Definition:** The increase in the price of the abundant factor and the fall in the price of the scarce factor imply that the owners of the abundant factor will find their incomes rising and the owners of the scarce resource will find their real incomes fall.

This acknowledges that some sectors of the economy will be "pro-trade" and some sectors will be "anti-trade."
