

Chapter 2

Ricardian Model

What is the role of technology in explaining trade patterns?

▪ Reasons for Trade:

Rank	Country	Value of Imports 2005 (\$ millions)	Value of Imports 2009 (\$ millions)	Quantity of Snowboards 2009 (thousands)	Average Price 2009 (\$/board)
1	China	18.15	21.30	365.0	58
2	Austria	17.77	11.04	104.0	106
3	Canada	9.11	3.94	51.8	76
4	Mexico	4.96	0.00	0.0	na
5	Spain	2.17	0.57	6.6	85
6	Poland	1.90	0.04	0.5	71
7	Tunisia	1.29	0.15	4.3	34
8	France	1.12	0.07	0.6	127
9	Germany	1.00	0.02	0.1	227
10	Taiwan	0.49	1.14	37.4	31
11	Bulgaria	0.30	0.00	0.0	na
12	Switzerland	0.18	0.08	0.7	113
13-20	All other countries	0.29	0.18	1.49	123
	Total	58.76	38.51	572	67

Why does the US purchase snowboards from these countries when it has the resources and technology to produce them domestically?

So, the big question is: Why countries trade goods with each other?

1. Differences in **technology** used
2. Differences in amount of **resources** (labor, capital, land) used
3. Difference in the **cost of outsourcing**
4. **Proximity** (geographical distance) of countries to each other

▪ Key Concepts

Absolute Advantage

- ⇒ Absolute difference in technology
- ⇒ If a country has the best technology to produce the good, then the country has absolute advantage in that good.

Comparative Advantage

⇒ A country has a comparative advantage in producing a good if the **opportunity cost of producing that good is lower** in that country compared to the other countries.

▪ Historical Background:

Mercantilism:

The dominant school of economic thought in Europe from the 15th to the 18th century.

Beliefs: Exporting is good because it generates gold and silver for the national treasury

Importing is bad because it drains gold and silver from the national treasury

Ricardian Model

▪ Setup:

2:2:1

2 Countries: Home (H), Foreign (F)

2 Goods: Wheat (W), Clothes (C)

1 Factor: Labor (L)

▪ Assumptions:

1. L is the only scarce factor of production
2. All L is homogeneous and all occupations pay the same wage
3. No diminishing returns to labor

⇒ MPL is constant

⇒ Real cost per unit remains constant

Recall: Marginal Product of Labor (MPL) is the extra output produced by using one more unit of labor, i.e., if one more unit of labor is used MPL units of output is produced.

4. L is perfectly mobile between sectors
5. Full employment
⇒ No worker will be unemployed in the economy
6. Perfect Competition

Consider the example:

In Home (H) economy,

- $MPL_C^H = 2$

⇒ 1 worker produces 2 units of C

- $MPL_W^H = 4$

⇒ 1 worker produces 4 units of W

- $L^{\text{Total}} = 25 = \text{Total workers at H}$

- If all workers at H are employed in production of W, then they will produce

$$Q_W = \text{MPL}_W^H \cdot L^{\text{Total}} = 4 \cdot 25 = 100$$

⇒ This is the maximum amount of W that H can produce

- Similarly, if all workers are employed in production of C, then they will produce

$$Q_C = \text{MPL}_C^H \cdot L^{\text{Total}} = 2 \cdot 25 = 50$$

⇒ This is the maximum amount of C that H can produce

Home PPF (Production Possibility Frontier)

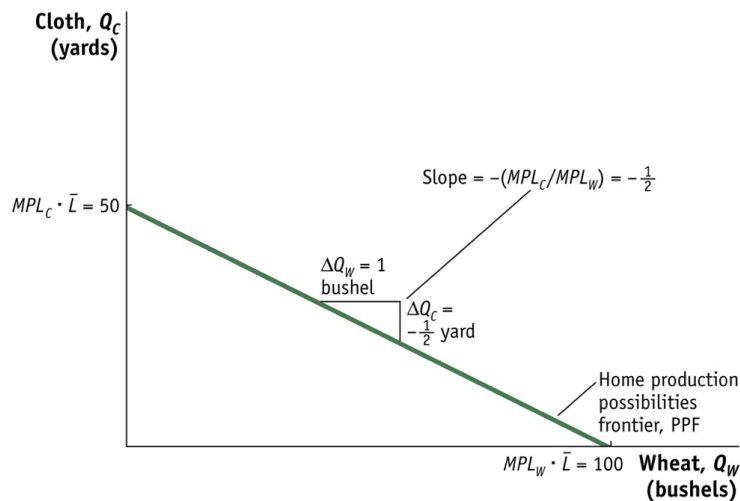
⇒ Slope = $-\text{MPL}_C^H \cdot L^{\text{Total}} / \text{MPL}_W^H \cdot L^{\text{Total}}$

$$= -\text{MPL}_C^H / \text{MPL}_W^H$$

$$= -(1/2)$$

= Opportunity cost of W

⇒ (1/2) units of C must be given up to obtain 1 more unit of W



⇒ Mechanism:

To produce MPL_W^H unit more of W, we need 1 unit of labor

To produce 1 unit more of W, we need $1 / \text{MPL}_W^H$ unit of labor

Now, since amount of labor available in the economy is fixed, we need to move

$1 / \text{MPL}_W^H$ unit labor from sector C to sector W.

1 unit of L produces MPL_C^H units of C

$1 / \text{MPL}_W^H$ unit labor produce $\text{MPL}_C^H / \text{MPL}_W^H$ units of C

Thus, $\text{MPL}_C^H / \text{MPL}_W^H$ units of C has to be given up in order to increase production of

W by 1 unit

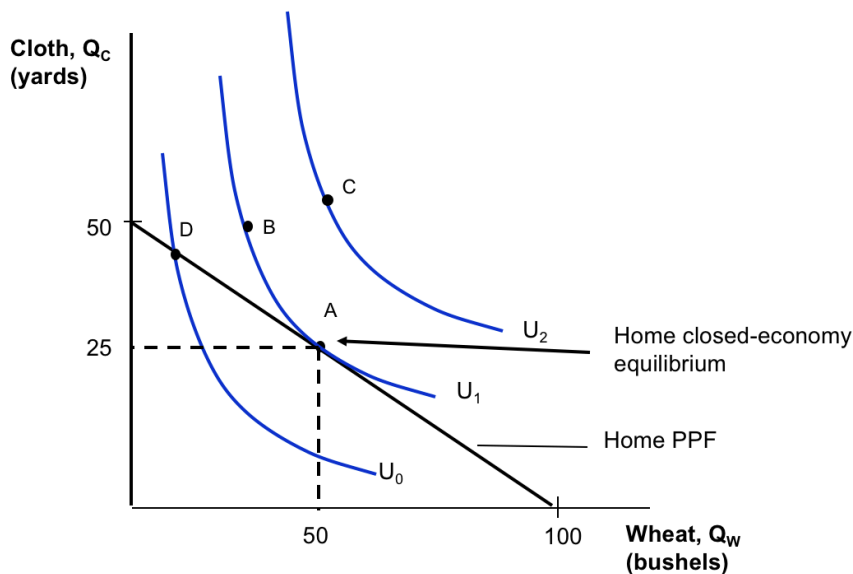
⇒ Home PPF is a straight line between 50 units of C and 100 units of W.

Home Indifference Curve

⇒ Preference of home demands for two goods

⇒ Higher IC means higher utility

Home No Trade/ Pre-Trade/Autarky Equilibrium



Autarky : situation in which the country does not engage in trade

- Under perfect competition, at the no-trade equilibrium, the opportunity cost and relative price of wheat (on horizontal axis) are equal.

$$\Rightarrow \text{MPL}_C^H / \text{MPL}_W^H = P_w / P_c$$

How do we get this result?

The assumption that labor is perfectly mobile between the two industries implies wages must be equal across sectors

$$\Rightarrow W_c = W_w$$

Under perfect competition, firms will hire labor up to the point where wage in an industry equals the price of the good times the marginal product of labor in the sector producing the good.

$$\Rightarrow P_c * \text{MPL}_C^H = W_c$$

$$\Rightarrow P_w * \text{MPL}_W^H = W_w$$

Combining the two results:

$$P_c * \text{MPL}_C^H = P_w * \text{MPL}_W^H$$

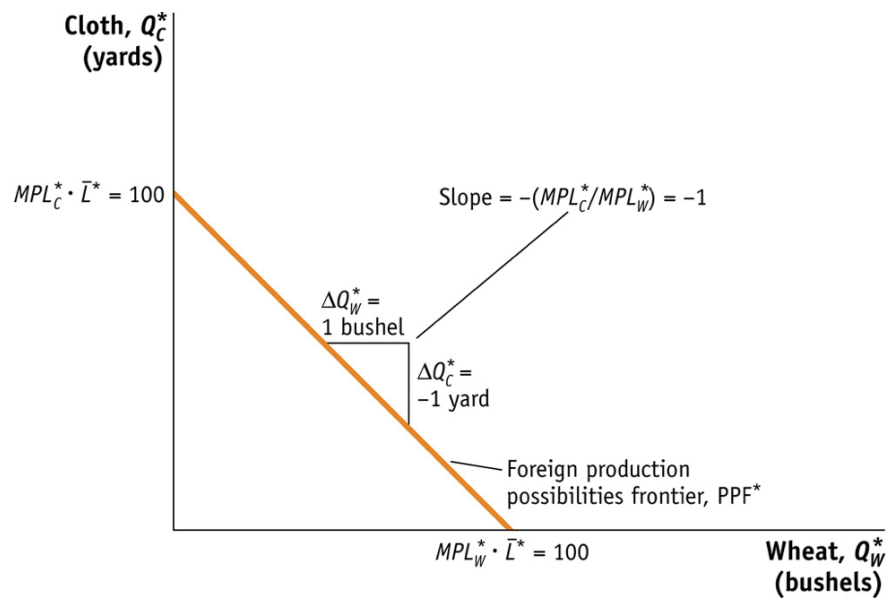
$$\Rightarrow \text{MPL}_C^H / \text{MPL}_W^H = P_w / P_c$$

Next, we introduce Foreign (F):

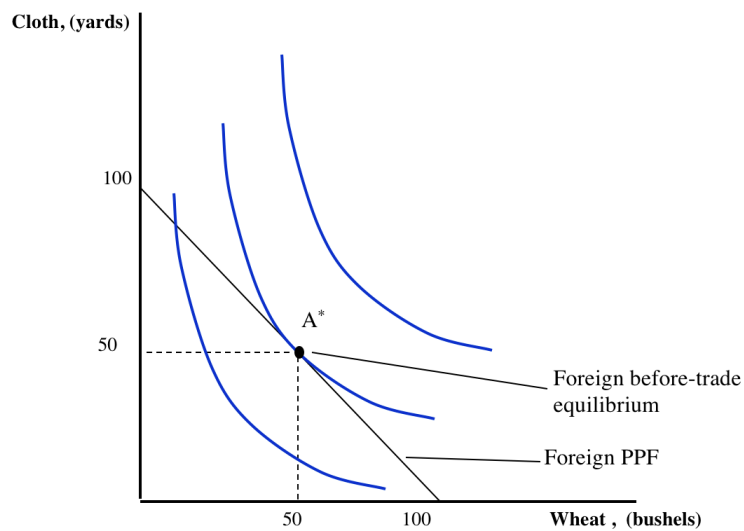
In Foreign (F) economy,

- $\text{MPL}_C^F = 1$
- $\text{MPL}_W^F = 1$
- $L^{\text{Total}} = 100 = \text{Total workers at F}$

Foreign PPF



Foreign No Trade Equilibrium



Determining Trade Pattern from Comparative Advantage Theory

	MPL, Cloth (Yard/worker)	MPL, wheat (Bushel/worker)	Labor
Home	2	4	25
Foreign	1	1	100

Comparing MPL of H and F for each sector we determine which country has absolute advantage in that sector.

- ⇒ Since in wheat sector, $4 > 1$
- ⇒ H has **absolute advantage** in production of wheat

Opportunity Costs for Goods in Home and Foreign

	Cloth (Yard)	Wheat (Bushel)
Home	2 wheat	$\frac{1}{2}$ cloth
Foreign	1 wheat	1 cloth

F has lower opportunity cost for C

- ⇒ F has comparative advantage in C
- ⇒ F will specialize in C production
- ⇒ F will export C to H

Similarly, H has lower opportunity cost for W

- ⇒ H has comparative advantage in W
- ⇒ H will specialize in W production
- ⇒ H will export W to F