



# International Trade

L3

# Comparative advantage

- Given: Labor productivity table
- US has absolute advantage in producing both goods
- Trade ?
- Comparative advantage (CA): If difference in Opportunity Cost (OC) , then trade mutually beneficial

	U.S.	U.K.
Wheat (bushels/hour)	6	1
Cloth (yards/hour)	4	2

# Example

- Labor productivity table
- Check for lower OC for identifying CA

Producers	Wheat bushels per 1 hour	Cloth yards per 1 hour	Opportunity cost (Cloth)	Opportunity cost (Wheat)
US	6	4	3/2 unit of wheat	2/3 unit of cloth
UK	1	2	1/2 unit of wheat	2 cloth
Lower OC ?			UK has lower OC in producing cloth in terms of wheat	US has lower OC in producing wheat in terms of cloth

# Theory of comparative advantage

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- UK has low OC in producing cloth in terms of wheat
- Similarly, US has low OC in producing wheat (in terms of cloth) relative to UK.
- **Lower OC implies higher labor productivity and thus has comparative advantage in producing that product**
- The comparative advantage theory states that countries (with or without absolute advantage) should specialize in those products in which they have comparative advantage and then both countries could gain from trade.
- CA: mutually beneficial trade can take place even if one nation is less efficient than the other in the production of both commodities.



# Comparative advantage

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Exchange rate: 6 bushels of wheat for 6 yards of cloth

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With other exchange rates too mutually beneficial trade can take place.

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Domestic exchange rate for US: 1 hour=6W=4C

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Hence US would gain if it could exchange 6W for more than 4C from UK (as in domestic market it will get only 4C for 6W)

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For UK, domestic exchange rate : 1 hour= 1W=2C. Hence 6W=12C

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Anything less than 12 C if UK is giving up for trade with 6W, then it is beneficial for UK (In UK domestic market for exchange of 12C one can get 6W).

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That means UK traders will give up 12C only if they get more than 6W. In other words, they will buy 6W from US only if they have to give less than 12C.

# Comparative advantage

- Domestic exchange rate for US: 1 hour=6W=4C
- Hence US would gain if it could exchange 6W for more than 4C from UK.
- For UK, domestic exchange rate : 1 hour= 1W=2C. Hence 6W=12C
- Anything less than 12 C if UK is giving up for 6W from trade, then it is beneficial for UK
- Thus, **range for mutually advantageous trade is:  $4C < 6W < 12C$**
- The spread =  $12C - 4C = 8C$  is the total gains from trade available to be shared by the two nations by trading 6W

# Comparative advantage

- Thus, range for mutually advantageous trade is:  $4C < 6W < 12C$
- **The closer the rate of exchange is to  $4C (=6W)$ , the smaller is the share of gain going to US and larger share is for UK**
- **The closer the rate of exchange is to  $6W=12C$ , larger share of the gain for US and smaller for UK**
- Then if the trade is at exchange rate  $6W=10C$ . What is the gain for both countries?
- The rate of exchange will also determine how the total gains from trade are actually shared by the trading nations
- CA: mutually beneficial trade can take place even if one nation is less efficient than the other in the production of both commodities.



# Case of No Comparative Advantage

- There is one (not very common) case where there is *no comparative advantage*. This occurs when the absolute disadvantage that one nation has with respect to another nation is the *same* in both commodities.
  - For Ex: UK 1 hour = 3W = 2C
  - US 1 hour = 6W = 4C
  - UK is exactly half productive as US
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# Example for **No** comparative advantage

Producers	Wheat	Cloth	Opportunity cost (Cloth)	Opportunity cost (Wheat)
US	6	4	3/2 unit of wheat	2/3 unit of cloth
UK	3	2	3/2 unit of wheat	2/3 cloth
Lower OC ?			Both country same OC	Both same OC

# Case of No Comparative Advantage

- There is one (not very common) case where there is *no comparative advantage*. This occurs when the absolute disadvantage that one nation has with respect to another nation is the *same* in both commodities.
- For Ex: UK 1 hour = 3W = 2C
- US 1 hour = 6W = 4C
- UK is exactly half productive as US
- Opp. Cost same for both countries .
- US will only exchange 6W if it can get more than 4C from trade
- And UK is not willing to give up 4C for 6W (as 2h it can produce 4C or 6W). It needs more than 6W to engage in trade with US.



# Comparative advantage

- Even if one nation has an **absolute disadvantage** with respect to the other nation in the **production of both** commodities, there is **still a basis for mutually beneficial trade**, *unless the absolute disadvantage (that one nation has with respect to the other nation) is in the same proportion for the two commodities.*
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# Comparative advantage

- Even if one nation has an **absolute disadvantage** with respect to the other nation in the **production of both** commodities, there is **still a basis for mutually beneficial trade**, *unless the absolute disadvantage (that one nation has with respect to the other nation) is in the same proportion for the two commodities.*
  - How?
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# Comparative advantage trade

- How?
- The answer is that **wages** in the United Kingdom will be **sufficiently lower** than wages in the United States so as to make the price of cloth (the commodity in which the United Kingdom has a comparative advantage) lower in the United Kingdom, and the price of wheat lower in the United States *when both commodities are expressed in terms of the currency of either nation.*



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U.S.

U.K.

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Wheat (bushels/hour)

6

1

Cloth (yards/hour)

4

2

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# Comparative advantage

- Suppose **wage rate in US is 6\$ per hour**.
- US: 1 hour produces 6W or 4C
- Price of a bushel of wheat is  $P_w = \text{wage per hour} / \text{product per hour}$   
=\$

Price of a yard of cloth is  $P_c = \$$

- UK **wage rate is £1 per hour**
- UK: 1 hour produces 1W or 2C
- Price of a bushel of wheat is  $P_w = \text{wage per hour} / \text{product per hour}$   
= £

Price of a yard of cloth is  $P_c = £$



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- US: 1 hour produces 6W or 4C
- Price of a bushel of wheat is  $P_w = \text{wage per hour} / \text{product per hour}$   
 $= \$1 \text{ (6/6)}$

Price of a yard of cloth is  $P_c = \$$

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 $= \$1 \text{ (6/6)}$

Price of a yard of cloth is  $P_c = \$1.5 \text{ (6/4)}$

- UK **wage rate is £1 per hour**
- UK: 1 hour produces 1W or 2C
- Price of a bushel of wheat is  $P_w = \text{wage per hour} / \text{product per hour}$   
 $= £1 \text{ (1/1)}$


Price of a yard of cloth is  $P_c = £0.5 \text{ (1/2)}$

# Price in Dollar terms


- If exchange rate b/w pound and dollar is  $\text{£}1 = \$2$
- Then  $P_W = \text{£} 1 = \$2$  and
- $P_C = \text{£} 0.5 = \$1$
- in the United Kingdom.

■ **TABLE 2.3.** Dollar Price of Wheat and Cloth in the United States and United Kingdom at  $\text{£}1 = \$2$

	U.S.	U.K.
Price of one bushel of wheat	\$1.00	\$2.00
Price of one yard of cloth	1.50	1.00



Producers Exchange rate is £1=\$2	Wheat dollar price	Cloth Dollar price
US	\$1	\$1.5
UK	\$2	\$1
Lower dollar price	US	UK



# Comparative advantage- lower wage

- we can see that **the dollar price of wheat** (the commodity in which the United States has a comparative advantage) is **lower in the United States than in the United Kingdom**. On the other hand, the **dollar price of cloth** (the commodity in which the United Kingdom has a comparative advantage) is **lower in the United Kingdom**. The result would be the same if the price of both commodities had been expressed in pounds.
- Hence traders would buy wheat from US and sell it in the United Kingdom, where they would buy cloth to sell in the United States.
- Wage rate in UK in terms of dollar price per 1 hour  $\text{£}1=\text{\$}2$ , which is **one- third of US** wage  $\text{\$}6$  per hour. This is the reason why cloth in which UK has a CA is cheaper in UK and vice versa.
- Thus , the **inefficiency of U.K. labor relative to U.S. labor in cloth production is more than compensated for by the lower wages in the United Kingdom**. As a result, the dollar price of cloth is less in the United Kingdom, so the United Kingdom can export cloth to the United States.

# Lower bound for wage difference

- If exchange rate b/w pound and dollar is  $\text{£}1=\$1$
- i.e. Wage in UK ( $\text{£}1=\$1$ ) is **1/6** of wage in US (\$6)
- Then  $P_W = \text{£}1 = \$1$  and
- $P_C = \text{£}0.5 = \$0.5$
- in the United Kingdom.
- Then US wont export wheat to UK at this exchange rate, as US is not gaining anything from trade.
- But UK will be interested to export more cloth to US.
- Trade would be unbalanced in favour of UK

Producers Exchange rate is $\text{£}1=\$1$	US CA Wheat dollar price	UK CA Cloth Dollar price
US	\$1	\$1.5
UK	\$1	\$0.5
Lower dollar price	Both same	UK

# Upper Bound for wage difference

- If exchange rate b/w pound and dollar is  $\text{£}1 = \$3$
- i.e. Wage in UK ( $\text{£}1 = \$3$ ) is **1/2 of** wage in US (\$6)
- Then  $P_W = \text{£}1 = \$3$  and
- $P_C = \text{£}0.5 = \$1.5$
- in the United Kingdom.
- Then UK wont export cloth to US at this exchange rate, as UK is not gaining anything from trade.
- But US will be interested to export more wheat to UK.
- Trade would be unbalanced in favour of US

Producers Exchange rate is $\text{£}1 = \$1$	US CA Wheat dollar price	UK CA Cloth Dollar price
US	\$1	\$1.5
UK	\$3	\$1.5
Lower dollar price	US	Both same



# Comparative advantage

- Spread of UK wage in terms of US wage for trade to occur= between  $\frac{1}{6}$  and  $\frac{1}{2}$
  - Thus , **sufficient lower wages in comparative advantage product ensure mutual beneficial trade between countries.**
  - Disruptions: Tariffs varied from countries to countries (and from industries to industries) to offset the differences in labour productivity and gains from CA.
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# Key points

- **CA arise from differences in labor productivity**
  - CA measured in terms of opportunity cost
  - Mutually beneficial trade based on CA depends on-
    - exchange rate
    - wages
    - Prices
    - tariff policies
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# Empirical test of Ricardian Model

- If we allow for **different labor productivities** in various industries in different nations, can the Ricardian CA trade model does a reasonably good job at explaining the **pattern of trade** ?

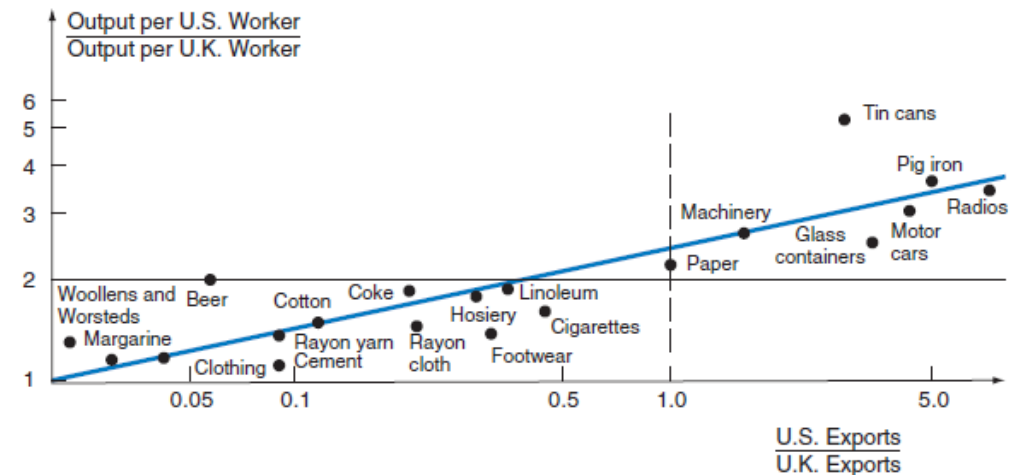
# Empirical test of Ricardian Model

- If we allow for **different labor productivities** in various industries in different nations, can the Ricardian CA trade model does a reasonably good job at explaining the **pattern of trade** ?
- The first such empirical test of the Ricardian trade model was conducted by *MacDougall* in 1951 and 1952, using labor productivity and export data for 25 industries in the United States and the United Kingdom for the year 1937.
- Since wages were twice as high in the United States as in the United Kingdom, Mac-Dougall argued that costs of production would be lower in the United States in those industries where American labor was more than twice as productive as British labor. These would be industries where US has a comparative advantage with respect to UK

# Ricardian CA Trade model

- Vertical axis: ratio of output per US worker to output per UK worker
  - Higher this ratio implies greater the relative productivity of US worker
- Horizontal axis: Ratio of US to UK exports to third markets
  - Higher this ratio implies the larger are US exports in relation to UK exports

the Law of Comparative Advantage



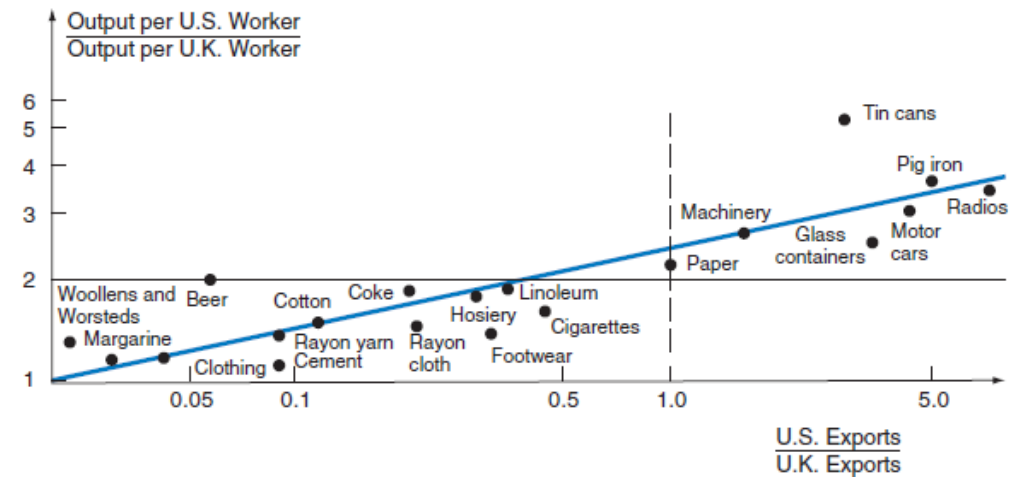
**FIGURE 2.4.** Relative Labor Productivities and Comparative Advantage—United States and United Kingdom.

The figure shows a positive relationship between labor productivity and export shares for 20 industries in the United States and the United Kingdom, thus confirming the Ricardian trade model.

# Ricardian CA Trade model

- The points in the figure exhibit a clear *positive* relationship (shown by the colored line) between labor productivity and exports.
- That is, those industries where the productivity of labor is relatively higher in the US than in the UK are the industries with the higher ratios of U.S. to U.K. exports to other countries
- This was true for the 20 industries (out of the total of 25 industries studied)

the Law of Comparative Advantage



**FIGURE 2.4.** Relative Labor Productivities and Comparative Advantage—United States and United Kingdom.

The figure shows a positive relationship between labor productivity and export shares for 20 industries in the United States and the United Kingdom, thus confirming the Ricardian trade model.

# CA: Empirical test

- The other empirical studies followed all seem to support the Ricardian theory of comparative advantage. That is, the actual **pattern of trade** seems to be **based on the different labor productivities** in different industries in the two nations.
- **Production costs other than labor costs**, demand considerations, political ties, and various obstructions to the flow of international trade **did not break the link between relative labor productivity and export shares.**



# Comparative Advantage

- Why did a country cannot capture the entire export market in which it can have CA?
- Because of **product differentiation- products are not homogeneous**
- Eg: American car is not identical to Japanese car
- Even if it is cheaper , some customers will prefer brand value
- However, if price differences grows ,then **CA country (high productivity, low wage and cheaper price)** could gain more market