Thematic Area 2:

Comparative Advantage and the Gains from International Trade

MSc in ISFM

Reasons countries trade goods with each other:

- **Differences in the technology** used in each country (i.e., differences in each country's ability to manufacture products)
- Differences in the total amount of **resources** (including labor, capital, and land) found in each country
- **Offshoring / Outsourcing,** i.e., production of various parts of a good in different countries and then assembling it in a final location
- The **proximity** of countries to each other (i.e., how close they are to one another)

An Introduction to International Trade: The Ricardian Trade Theory

A first attempt to understand:

- **Why countries trade:** The **absolute** and **comparative advantage**

- **Autarky (no-trade equilibrium):** Production Possibilities, Consumption of a country, Prices and wages in a country

- **International trade equilibrium:**

❖ **Terms of Trade (t.o.t)**

❖ **Exports and Imports**

❖ **Welfare gains:** international trade vs. autarky

Why do countries trade?:

Differences in production technology across them

This explanation is referred to as the

Ricardian Theory of International Trade: It explains how the level of a country's production technology affects productivity and wages and, in turn, explains how **trade patterns** (exports and imports) are shaped

As such, the pattern of trade is based and explained on the concept of **absolute / comparative advantage**

ABSOLUTE vs. COMPARATIVE Advantage

- **Absolute Advantage:** a country, relative to its trading partners, **is "absolutely" more productive** in producing a commodity (-ies). Exhibits an absolute advantage in the production of that good(s). **THEN**, …. Export this good(s) and Import the "other" good(s) – (with absolute disadvantage)

- Often,…… **Absolute Advantage** may not always accurately capture a country's pattern of trade. Alternatively, ….

- **Comparative Advantage:** a country, relative to its trading partners, is **"relatively/comparatively"** more productive in producing a commodity (-ies). Exhibits the **lowest opportunity cost.** Exhibits a comparative advantage in the production of that good(s). **THEN**, …. Export this good(s) and Import the "other" good(s) – (with comparative disadvantage)

An Introduction to International Trade: The Ricardian Trade Theory- Absolute and Comparative Advantage

- A world of two countries, Home and Foreign, and two traded commodities, Wheat and Cloth
- Labor alone produces the two commodities in both countries
- **Labor Productivity is the driving force of trade**
- ….Ignore, for now, the role of other productive factors, e.g., land and capital

The Home Country: Autarky

The **marginal product of labor (MPL)** is the extra output obtained by using one more unit of labor. For example …..

Let one worker produce 4 bushels of wheat, so $MPL_W = 4$, or produce 2 yards of cloth, so $MPL_C = 2$

…. **Alternatively …. Labor input per unit of output….**

$1/MPL_W = 1/4$ and $1/MPL_C = 1/2$ denote the amount of labor input per bushel of wheat and per yard of cloth.

….. from this ……

Home Production Possibilities Frontier

Using the marginal products (or **the unit labor input**) for producing wheat and cloth, we portray a country's Production Possibilities

Production Possibilities Frontier (PPF - line) : Captures

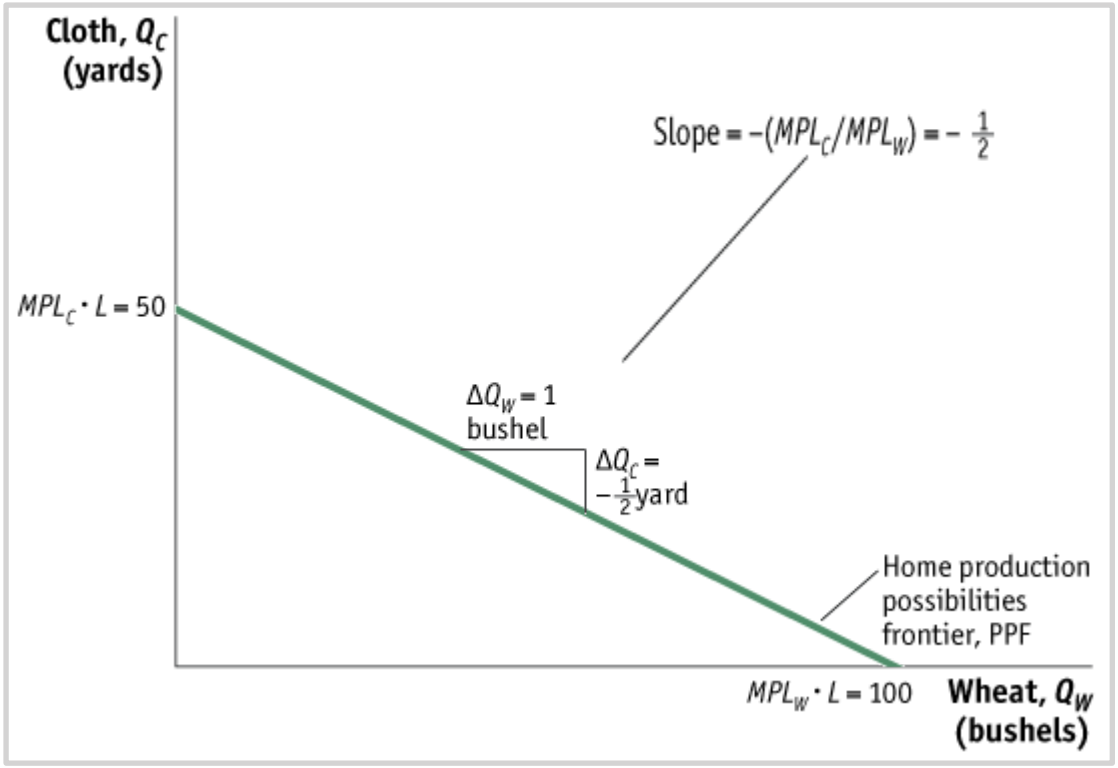
- **Levels of outputs produced**
- **Opportunity cost of one commodity in terms of the other**

Opportunity Cost of Wheat: The amount of cloth that must be given up to obtain one more unit of wheat.

Opportunity Cost of Cloth: The amount of wheat that must be given up to obtain one more unit of cloth

- **To show ….**
- **Working Assumption:** Let there be 25 workers in the country (Home)
- If all the workers were employed in wheat, the country produces 100 bushels. If they were all employed in cloth the country produces 50 yards
- **The PPF connects these two points**

Home Production Possibilities Frontier



$$\text{Slope of PPF} = -\frac{50}{100} = -\frac{MPL_C \cdot \bar{L}}{MPL_W \cdot \bar{L}} = -\frac{MPL_C}{MPL_W} = -\frac{1}{2}$$

The Home PPF is a straight line between 50 yards of cloth and 100 bushels of wheat

The slope of the PPF equals the negative of the opportunity cost of wheat

The magnitude of the slope can also be expressed as the ratio of the marginal products of labor for the two goods

Autarky (No Trade): Opportunity Cost and Commodity Prices

Under perfect competition the opportunity cost of a commodity reflects its Relative Price

the opportunity cost of wheat equals the relative price of wheat. ITS PRICE IN UNITS OF CLOTH

the opportunity cost of cloth equals the relative price of cloth. ITS PRICE IN UNITS OF WHEAT

……. HOW SO ????.....

Autarky: Absolute (nominal) Prices and Wages

- In competitive markets, firms hire workers up to the point where the hourly **wage (ω) equals the value of one more hour of production**, i.e., **value of workers' marginal product**

- The value of one more hour of labor equals the amount of goods produced in that hour (MPL) times the price of the good. **The value of marginal product of labor, i.e., *P • MPL***

- **Labor is hired up to the point where wage (ω) equals the factors value of marginal product *(P • MPL)* in each sector,**

- $\omega_W = P_W MPL_W$ **and** $\omega_C = P_C MPL_C$

Prices and Wages

Wage equality across industries **($W_W = W = W_C$)** gives the following equation:

$$P_W MPL_W = \omega = P_C MPL_C$$

Rearranging terms, we have

$$P_W / P_C = MPL_C / MPL_W = \left[\left(1/MPL_W\right) / \left(1/MPL_C\right) \right] = 2/4 = 1/2$$

The right-hand side of this equality is the slope of the production possibilities frontier (the **opportunity cost** **of obtaining one more bushel of wheat is 1/2C**)

The left-hand side of the equality is the **relative price** **of obtaining one more bushel of wheat is 1/2C**

Prices and Wages (..con'ed)

Since : $P_W / P_C = MPL_C / MPL_W = (1/2)$

…. Then,

$$P_C / P_W = MPL_W / MPL_C = (2)$$

The right-hand side is the opportunity cost of obtaining one more yard of cloth, i.e., 2W

The left-hand side is the relative price of obtaining one more yard of cloth, i.e., 2W

Nominal vs. Real Wages

- **Nominal Wage (s)** …. As shown:

$$P_W \bullet MPL_W = \omega = P_C \bullet MPL_C$$

- **Real Wage (s)**: Captures the purchasing power of the nominal wage (W) in terms of products Wheat and Cloth

❖ **Real wage in units of (W):** $\dfrac{\omega}{P_W} = MPL_W$

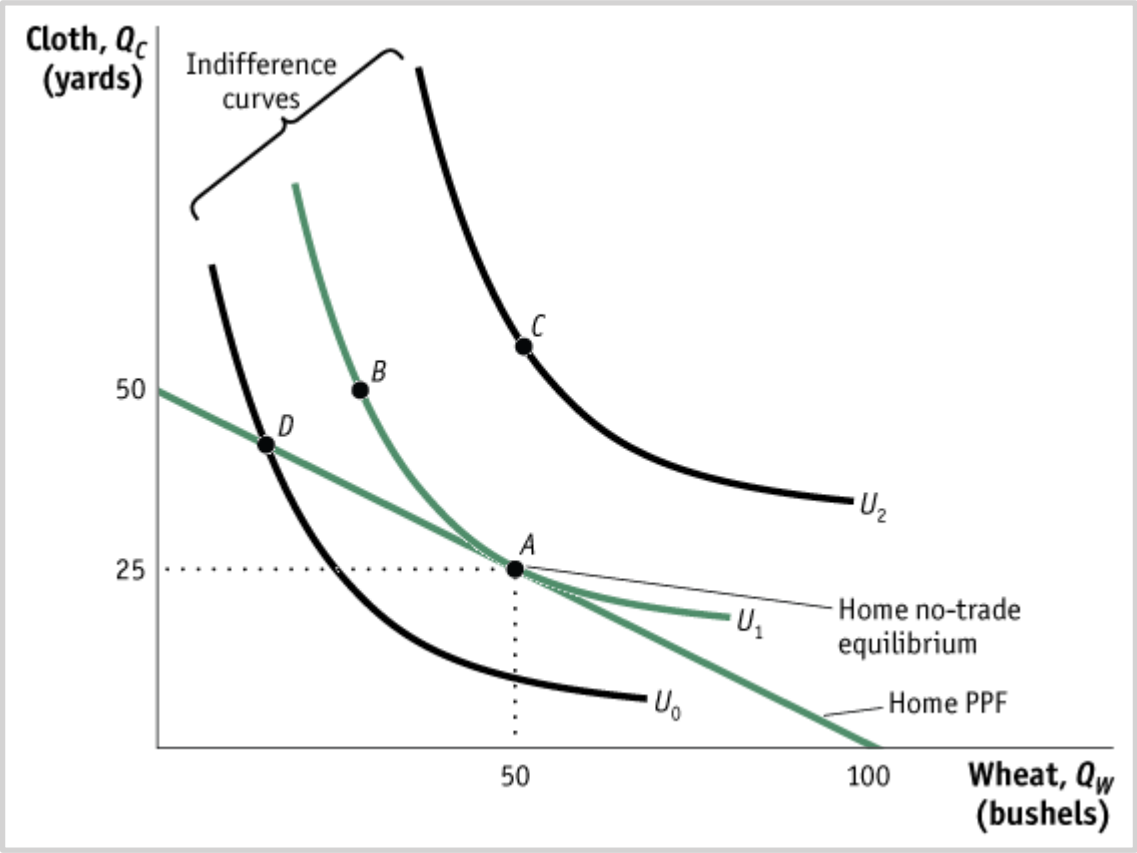
❖ **Real wage in units of (C):** $\dfrac{\omega}{P_C} = MPL_C$

The Home Country Demand

There are several ways to illustrate demand conditions in an economy. We use **Indifference Curves**

- Indifference curves are often used to show the preferences of an individual/economy
- All points on an indifference curve represent the same level of utility (welfare/satisfaction)
- Points on higher indifference curves represent higher utility
- An indifference curve shows the combinations of the two commodities a person/ economy consumes and derives the same level of utility/satisfaction

Home Indifference Curve: Autarky



Points *A* and *B* lie on the same indifference curve and give the Home consumers the level of utility U_1

The highest level of Home utility on the PPF is obtained at **point *A***, which is the no-trade equilibrium

Point *D* is also on the PPF but would give lower utility

Point *C* represents a higher utility level but is off of the PPF, so it is not attainable in the absence of international trade

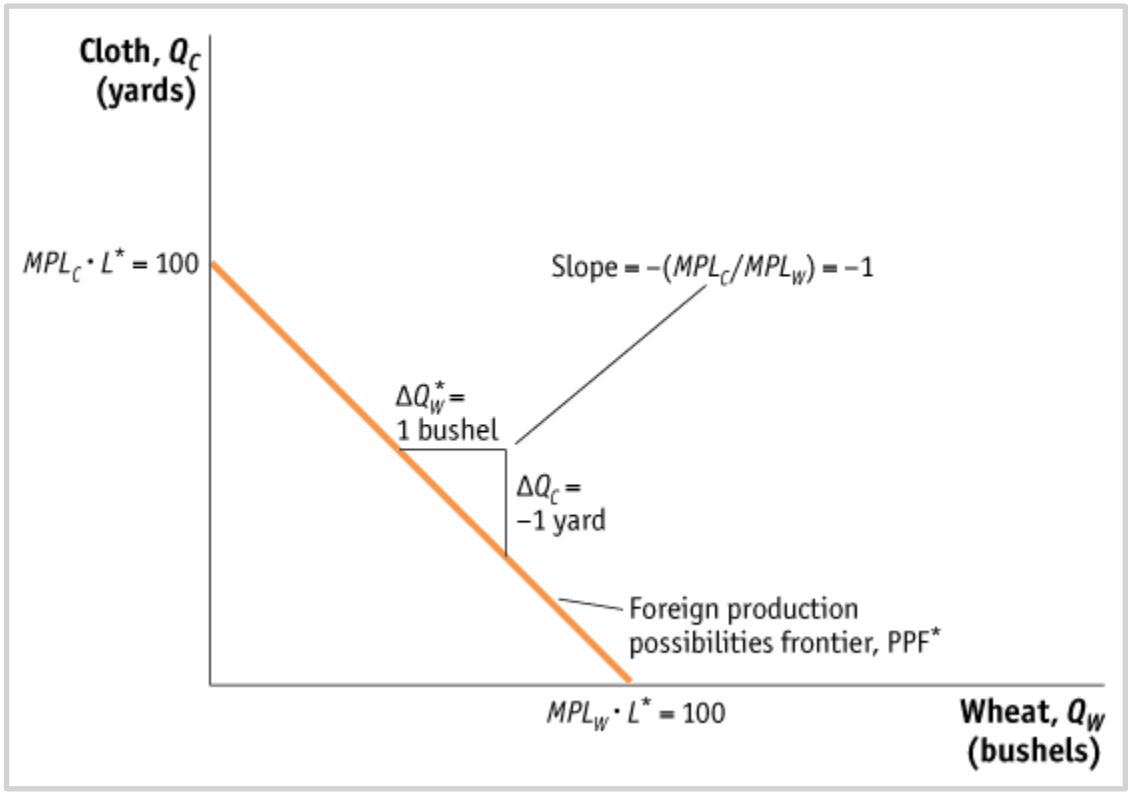
The Foreign Country: Autarky

- **Assume a Foreign worker produces either one bushel of wheat or one yard of cloth**

$$MPL^*_W = 1, \quad MPL^*_C = 1$$

- **Assume there are 100 workers available in Foreign**
- If all workers were employed in Wheat they produce 100 bushels.
- If all workers were employed in Cloth they produce 100 yards

Foreign Production Possibilities Frontier

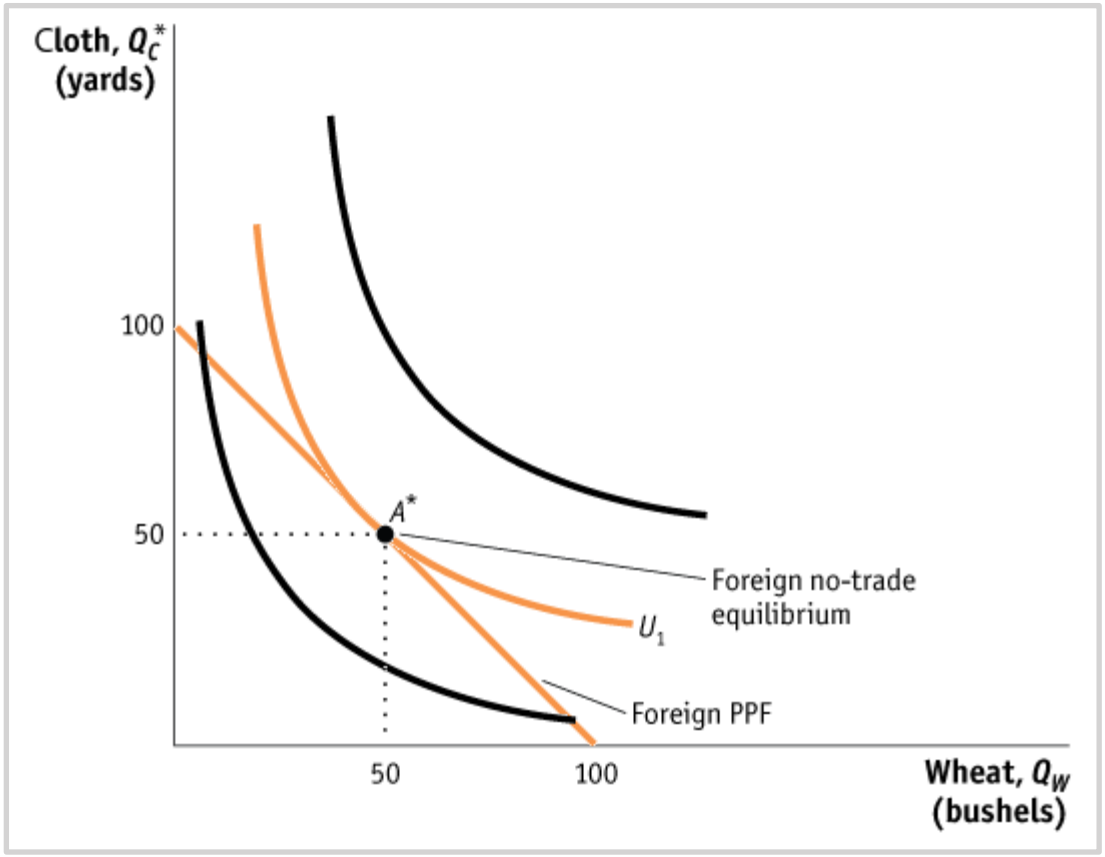


The Foreign PPF is a straight line between 100 yards of cloth and 100 bushels of wheat

The slope of the PPF equals the negative of the opportunity cost of wheat, that is, the amount of cloth that must be given up (1 yard) to obtain 1 more bushel of wheat

$P^*_W/P^*_C = MPL^*_C/MPL^*_W = 1$

Foreign' s Autarky Equilibrium



Foreign Equilibrium with No Trade **The highest level of Foreign utility on the PPF is obtained at point A^*, which is the no-trade equilibrium**

Prices and Wages

Wage equality across industries $(W^*_W = W^* = W^*_C)$ gives the following equation:

$$P^*_W \bullet MPL^*_W = \omega^* = P^*_C \bullet MPL^*_C$$

Rearranging terms, we have

$$P^*_W / P^*_C = MPL^*_C / MPL^*_W \ (=1)$$

The right-hand side is the slope of the production possibilities frontier (the **opportunity cost** of obtaining one more bushel of wheat)

The left-hand side is the **relative price** of wheat

Prices and Wages (..con'ed)

Since : $P^*_W / P^*_C = MPL^*_C / MPL^*_W (=1)$

…. Then,

$$P^*_C / P^*_W = MPL^*_W / MPL^*_C (=1)$$

The right-hand side is the **opportunity cost** of obtaining one more yard of cloth **(1W)**

The left-hand side is the **relative price** of obtaining one more yard of **cloth (1W)**

Nominal vs. Real Wages

- **Nominal Wage (s)** …. As shown:

$$P^*_W \bullet MPL^*_W = \omega^* = P^*_C \bullet MPL^*_C$$

- **Real Wage (s)**: Captures the purchasing power of the nominal wage (W) in terms of products Wheat and Cloth

❖ **Real wage in units of (W):** $\dfrac{\omega^*}{P^*_W} = MPL^*_W$

❖ **Real wage in units of (C):** $\dfrac{\omega^*}{P^*_C} = MPL^*_C$

The Pattern of International Trade

International Trade Equilibrium

What happens when goods are traded between Home and Foreign?

Each country's no-trade relative price (opportunity cost) determines which product it exports and which one it imports

The pattern of exports and imports is determined by the opportunity costs of production in each country--their comparative advantage

The Pattern of International Trade

- ***….. (from the beginning….)***

- ***HOME:*** $MPL_W = 4$ *and* $MPL_C = 2$
- ***FOREIGN:*** $MPL^*_W = 1$ *and* $MPL^*_C = 1$

Home more productive than Foreign in both (W) and (C)

- *HOME:* ***Absolute Advantage*** *in both (W) and (C)*
- *FOREIGN:* ***Absolute disadvantage*** *in both (W) and (C)*

- ***Can there be <u>mutually beneficial</u> International Trade between the two countries?***

The opportunity cost of cloth in wheat:

Foreign: $P^*_C / P^*_W = MPL^*_W / MPL^*_C$ =1W for every C

Home : $P_C / P_W = MPL_W / MPL_C$ =(4/2) 2W for every C

The opportunity cost of wheat in cloth:

Foreign: P^*_W / P^*_C= 1C for every W

Home: P_W / P_C = 0.5C for every W

Comparative advantage: Lower opportunity cost of production. Home in (W), Foreign in (C)

…… Therefore ….

Home exports wheat and imports cloth

Foreign exports cloth and imports wheat

Both countries export (import) the commodity in which they hold the comparative advantage (disadvantage)

International Trade Equilibrium

The two countries are in an **international trade equilibrium when the relative price of wheat (cloth) is the same across the two countries**

Two issues:

•Determining the **relative price** of wheat (or cloth) in the trade equilibrium

•Examining how the **shift from the no-trade** (autarky) **equilibrium to the trade equilibrium** affects production, consumption, and welfare in both Home and Foreign

Mutually beneficial int'l trade: The relative price of wheat, therefore of cloth, in the trade equilibrium must be between the no-trade price in the two countries

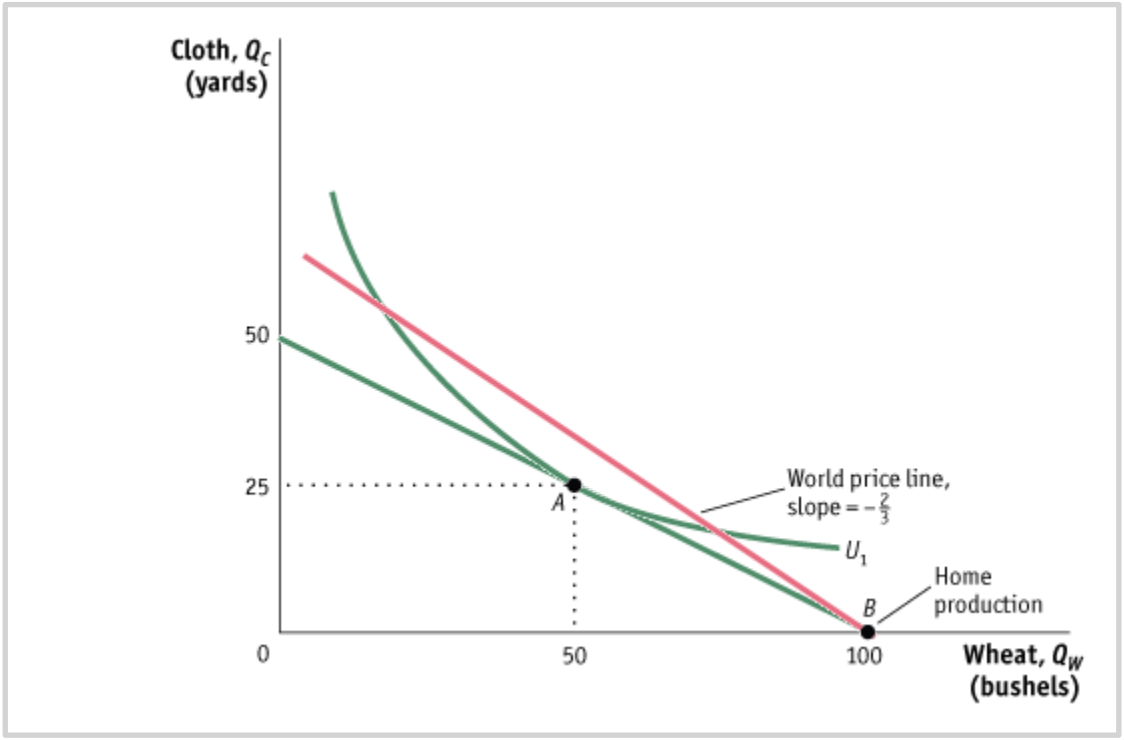
"LET" the free-trade price of W be $P_W / P_C = 2/3C$. This is between the price of **½C per 1W** in Home and **1C per 1W** in Foreign

It also means that **the free-trade price of C is $P_C / P_W = 3/2W$.** In between **2W per 1C** in Home and **1W per 1 C** in Foreign

…… International trade …..

International Trade Equilibrium: "Home" Production and Consumption

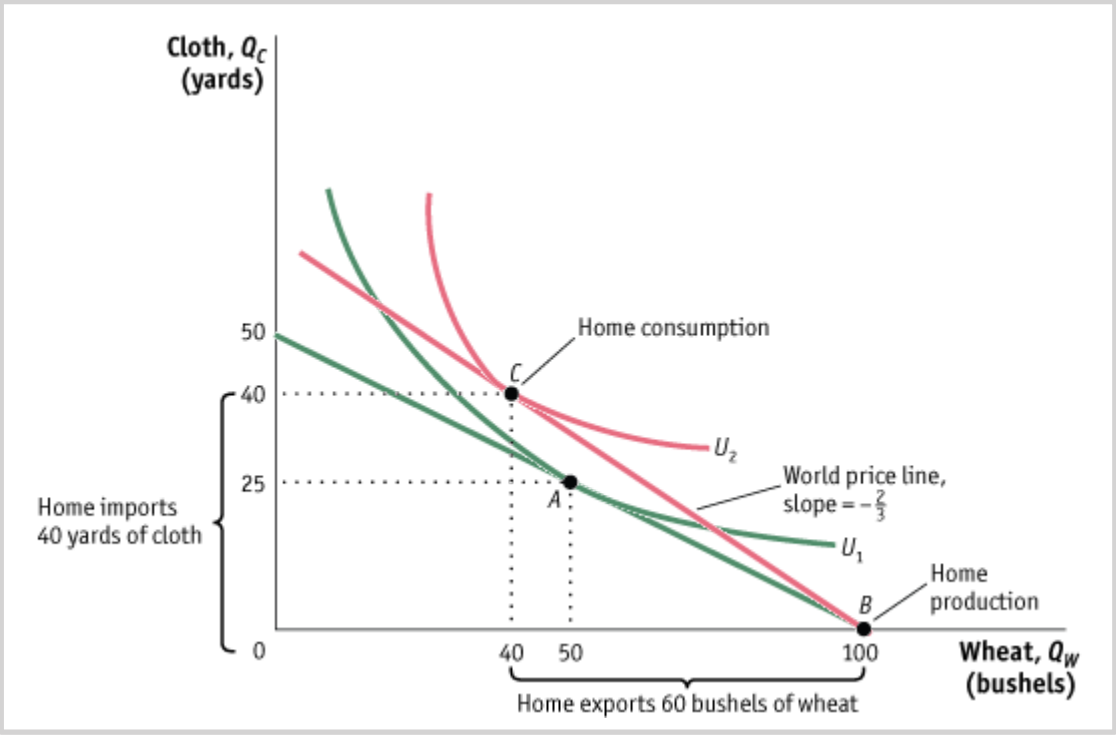
The **"world" price line, $P_W / P_C = 2/3$,** shows the range of ***consumption possibilities*** that Home achieves by specializing in, and exporting **W,** importing **C**



With a world relative price of wheat of $^2/_3$, Home production occurs at point *B*

Through international trade, Home exports each bushel of wheat it produces in exchange for $^2/_3$ yard of cloth, while it "costs" $^1/_2$ units of C to be produced

International Trade Equilibrium: Home Production and Consumption (con'ed)



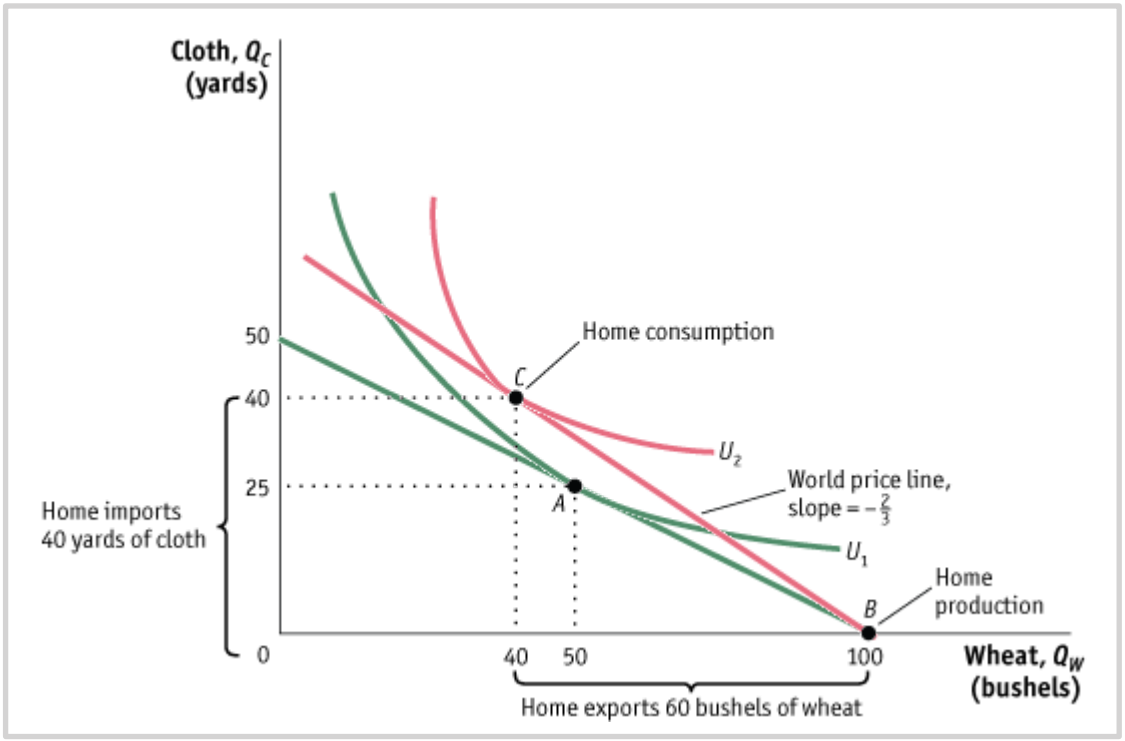
Production: B(100W, 0C)

Consumption: C(40W,40C)

Trade:

Exports: 60 bushels of wheat in exchange for Imports: 40 yards of cloth.

Home: Gains from International Trade



International Trade

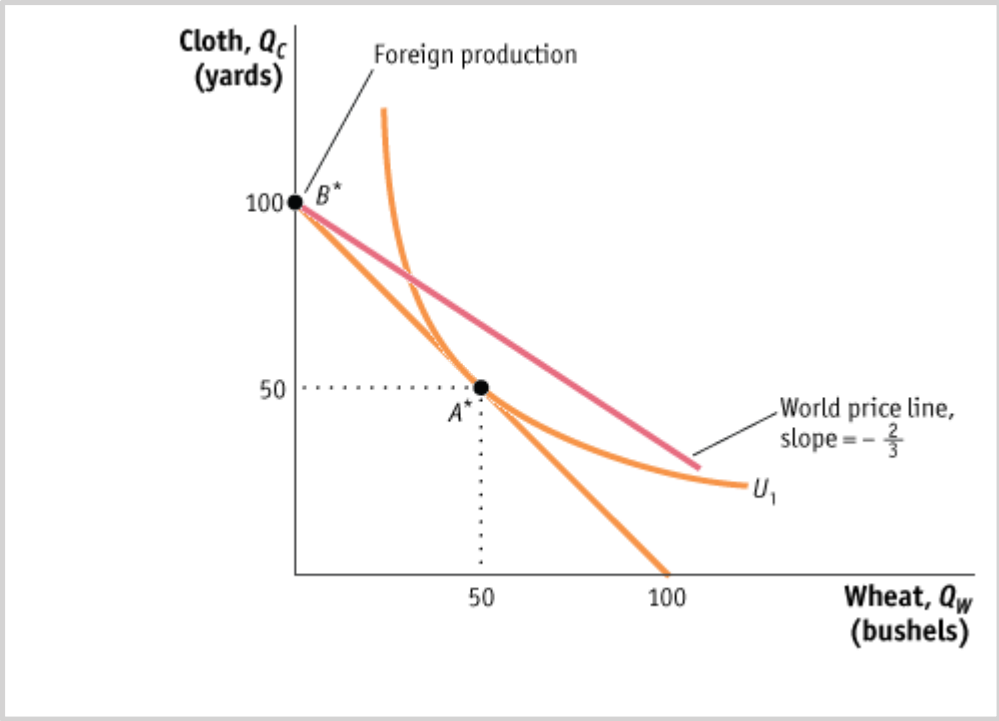
Home obtains a higher utility with international trade than in no-trade (U_2 is higher than U_1)

Home's higher utility with trade is a first indication of the **gains from trade.**

Gains from trade: the ability of a country to obtain higher utility for its residents under free trade than with no trade

International Trade Equilibrium: Foreign

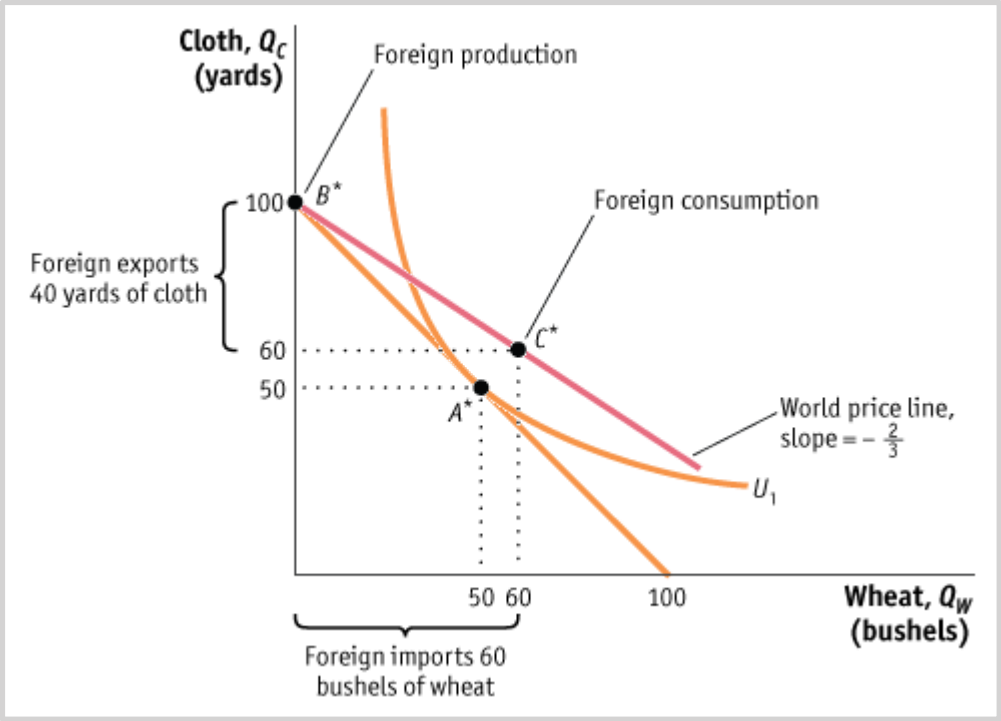
The **"world" price line, $P_W / P_C = 2/3$,** shows the range of ***consumption possibilities*** that Foreign achieves by specializing in, and exporting **C,** importing **W**



With a world relative price of wheat of $^2/_3$, Foreign production will occur at point B^*

Through international trade, Foreign exports 1 yard of cloth in exchange for 3/2 bushels of wheat, while it "costs" 1 yard of Cloth to be produced

Foreign: Trade and Gains from Int'l Trade



Production: B*(100C, 0W)
Consumption: C^* (60,60)

Trade:

<u>Exports:</u> 40 yards of cloth in exchange for <u>Imports:</u> 60 bushels of wheat

Pattern of Trade and Gains from Trade: Summary

- **The first lesson of the Ricardian model :** Each country exports the good for which it has the comparative advantage

- **The second lesson of the Ricardian model:** There are gains from trade for both countries (higher indifference curve relative to autarky)

- **Quantifying Gains form Trade:**

  (i) Real income after trade

  (ii) Wages across countries after trade

Gains from Trade (I): Real Income

- ***Home specializes in (W). Gains from trade in units of C***
- ***(100W) (2/3) = 67 C. Gains form trade 17 C*.** That is ***67C - 50C***
- ***Foreign specializes in (C). Gains from trade in units of W***
- ***(100C) (3/2) =150 W. Gains from trade 50*.** **That is 150W - 100W**

GAINS FROM TRADE

- **For each country, gains from trade are measured in units of the commodity with COMPARATIVE DISADVANTAGE (imported commodity)**

- ***With trade:***
  - **Home: Gains 17C relative to Autarky**
  - **Foreign: Gains 50W relative to Autarky**

Gains from Trade (II): Real Wages across Countries

- **Home : Comparative advantage in (W). Gains in units of C. Real wages are:**
  - $\omega/P_W = MPL_W$ = 4 bushels of W
  - $\omega/P_C = MPL_W (P_W/P_C)$ = 4 (2/3) = 8/3 yards of C
  - **Gains:** (8/3) C > 2 C

- **Foreign: Comparative advantage in C. Gains in units of W. Real wages are:**
  - $\omega^*/P^*_C = MPL^*_C$ = 1 yard of C
  - $\omega^*/P^*_W = MPL^*_C (P^*_C/P^*_W)$ = 3/2 bushels of W
  - **Gains:** (3/2) W > 1 W

- **Home's real wages higher.** Reflects Home's absolute advantage in the production of both goods

KEY POINTS

1. A country has comparative advantage in producing a good when the country's opportunity cost of producing the good is lower than the opportunity cost of producing the good in another country

2. The **pattern of trade** between countries is determined by **comparative advantage**.

3. This means that even countries with poor technologies can export the goods in which they have comparative advantage

4. In the **Ricardian** framework, **all countries experience gains from trade**. That is, the utility of each country is at least as high as it would be in the absence of international trade

5. The level of wages in each country is determined by its absolute advantage, that is, by the amount the country can produce with its labor. This result explains why countries with poor technologies are still able to export: their low wages allow them to overcome their low productivity

6. The equilibrium price of a good on the world market is determined at the point where the export supply of one country equals the import demand of the other country

7. A country's terms of trade equal the price of its export good divided by the price of its import good

8. A rise in a country's terms of trade makes it better off because it is exporting at higher prices or importing at lower prices