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International Economics
International Trade
(Comparative advantage I)

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Comparative Advantage

- This is a principle that is at the base of the theory of International Trade.
- This is a first simplified explanation of why nations trade.
- It demonstrates that if two nations trade, both gain. Trade is not a zero-sum game.



The precursor: Adam Smith

- In 1776, Adam Smith published the first modern book of economics, *An Inquiry into the Nature and Causes of the Wealth of Nations*
 - He attacked **mercantilism**—the economic system that dominated economic thought in the 1700s, characterised by international trade.
 - Smith proved wrong the belief that trade was a **zero sum game**—that the gain of one nation from trade was the loss of the other
 - He argued that voluntary exchange (trade) is a *positive sum game* —both nations gain.



Smith's arguments

- Definition: **autarky** = only domestic market, no international trade.
- Whereas in autarky every producer is limited by the size of the domestic market, international trade expands the market (more potential buyers).
- This enables firms to specialize and to increase their productivity.
- Exports enable the country to import, and thus to obtain goods that it cannot make itself or can make only at very high costs.



The Ricardian Model

- A basic model, often referred to as the Ricardian model (in 1817), named after economist David Ricardo.
- It clearly shows the gains from international trade.
- Also known as the “law of comparative advantage”.
- This is not immediately intuitive, but it is simple.



Some definitions

- **Productivity:** The amount of output obtained from a unit of input (in physical units)
- **Labor productivity:** The amount of output obtained from a unit of *labor* (eg working hour, worker). Example:
 - If two loaves of bread can be produced in 1 hour, then:
productivity = (2 loaves) / (1 hour) = quantity per hour.
- **Absolute productivity advantage of a country:** The advantage held by a country that produces more of a certain good per hour worked than another country.



Assumptions of the Ricardian Trade Model

Labor

- The only input
 - Cannot migrate across borders
 - Is completely mobile between sectors
 - Fully employed
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Markets

- Two outputs
 - Perfect competition
 - No transportation or trade costs
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Technology

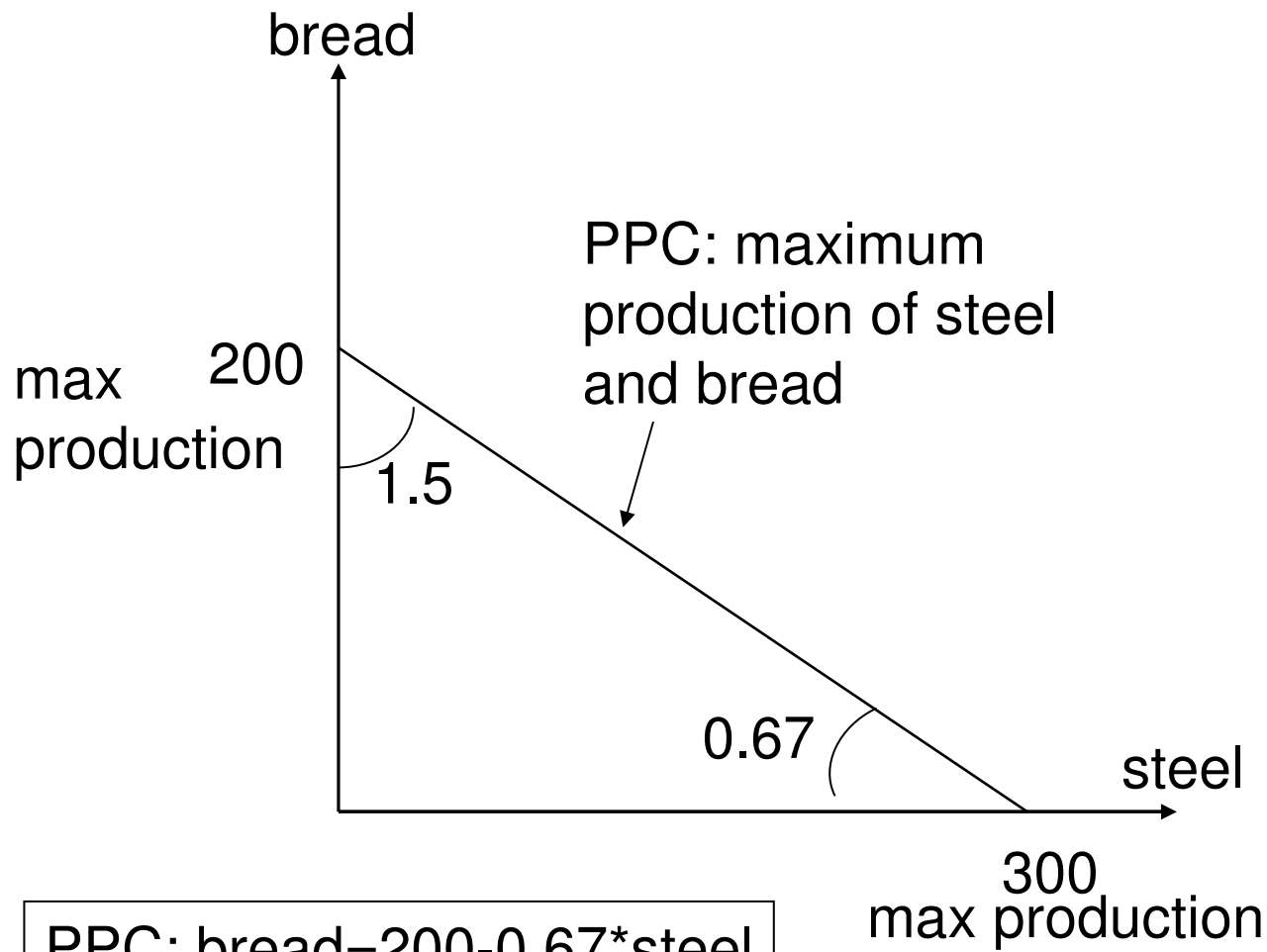
- Constant returns to scale
 - No changes in technology or skills
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Example of absolute productivity advantage

	United States	Canada
Bread	2 loaves	3 loaves
Steel	3 tons	1 ton

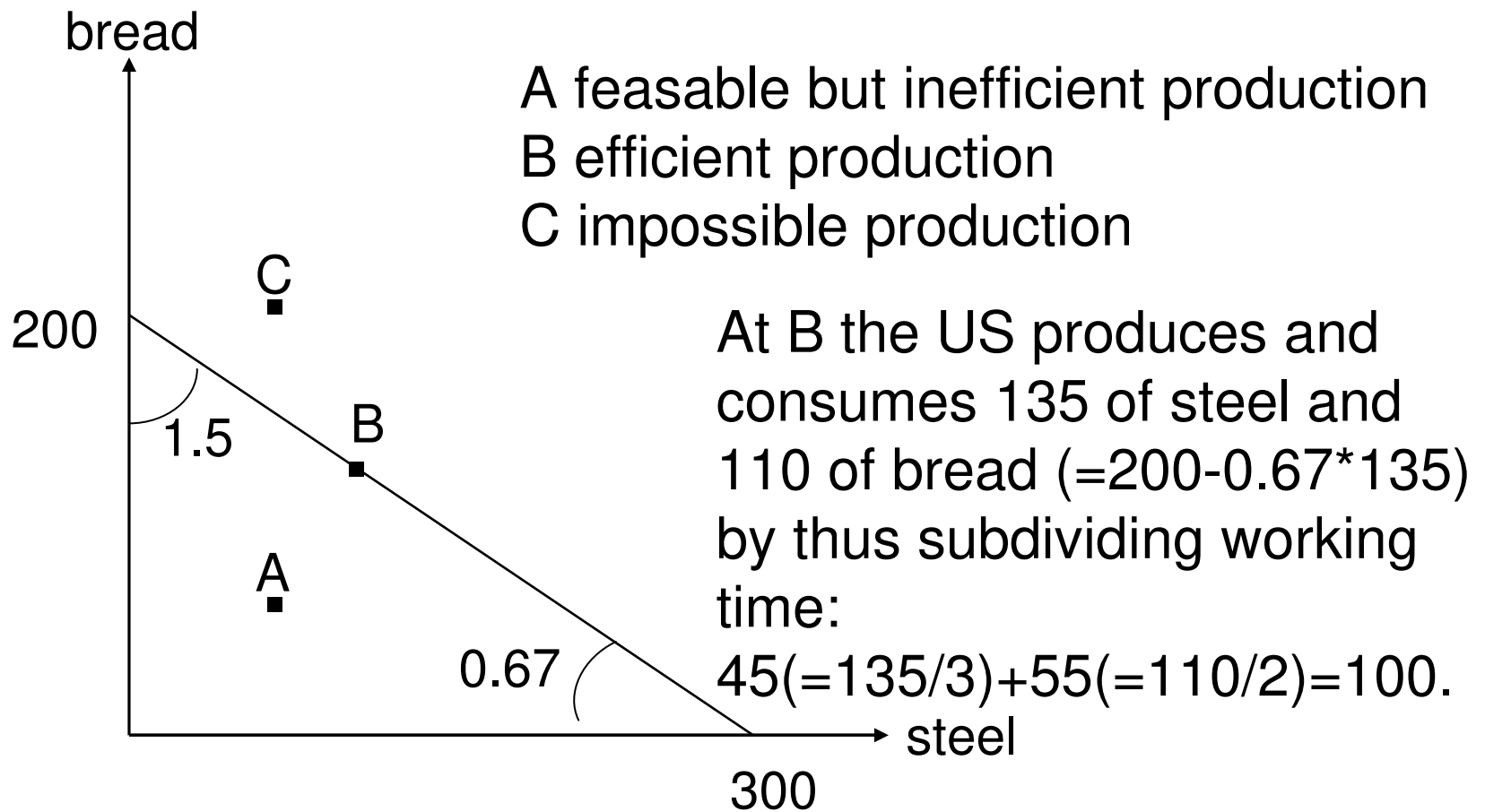
- Productivity of Bread:
2 loaves per hour (US) < 3 loaves per hour (C)
- Productivity of Steel:
3 tons per hour (US) > 1 ton per hour (C)
- Why productivity in the two countries for the same good differs is not important.
→ The US has an **absolute advantage** in producing Steel, and Canada in producing Bread.

Production Possibility Curve for the US



Assumptions
US Resources
100 hours
US productivity
Bread 2 // hour
Steel 3 t / hour

Production Possibilities Curve in Autarky (US)





Production Possibilities Curve

- A **production possibilities curve (PPC)** represents the maximum amount of production of different baskets of goods for given primary resources (eg labor) and given technology (eg labor productivity).
- It shows the tradeoffs a country faces when choosing to produce different proportions of goods.

Definition of 'Opportunity Cost'

- On the PPC, 1 hour of labor devoted to produce 3 tons more of steel implies to give up the production of 2 loaves of bread.

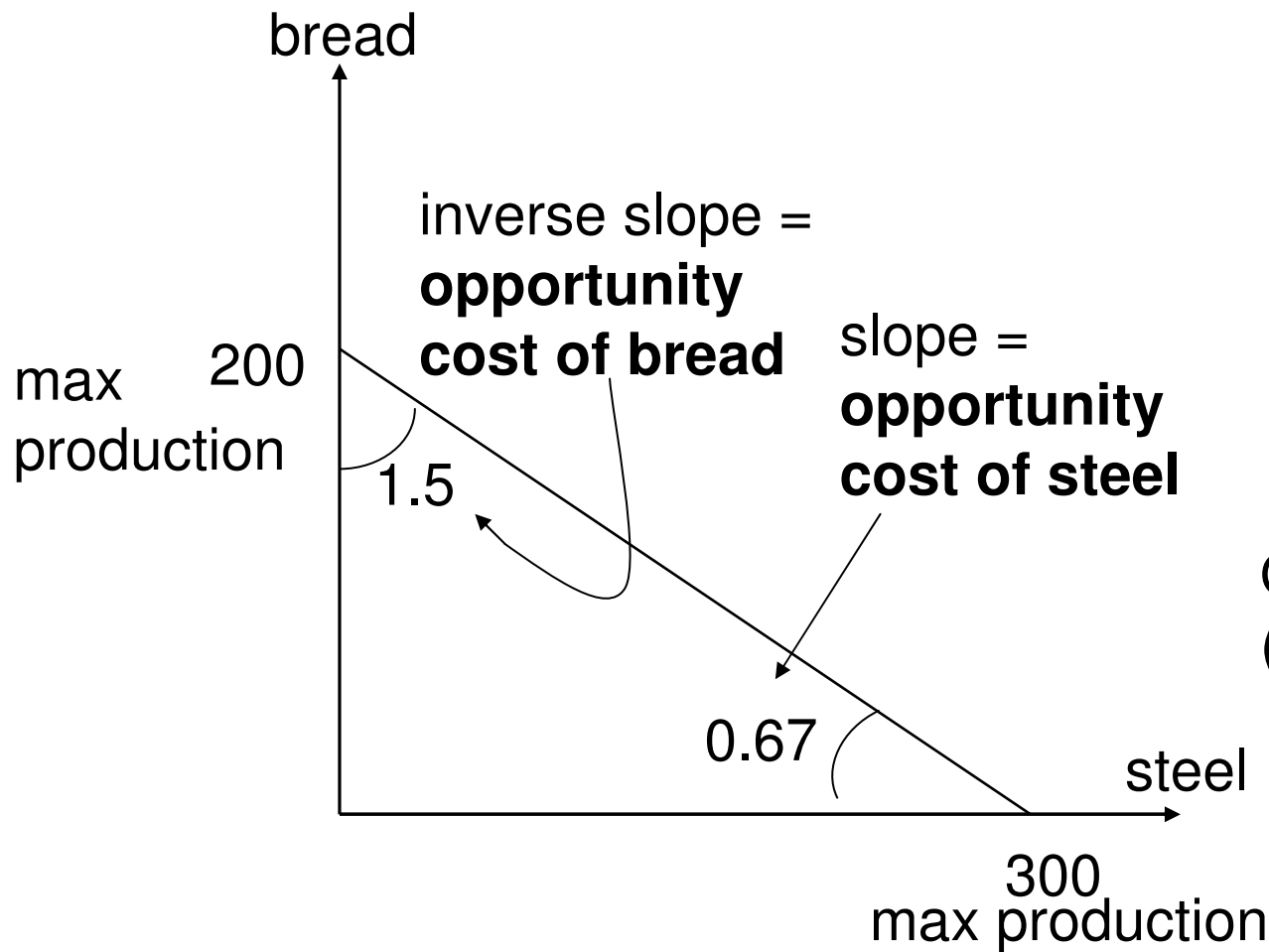
- I can define the OC or the price of steel (in terms of bread):

$$P_{US}^s = 0.67 \frac{\text{loaves}}{\text{tons}}$$

- Analogously, I can define the OC or the price of bread (in terms of steel):

$$P_{US}^b = \frac{3\text{tons}}{2\text{loaves}} = 1.5 \frac{\text{tons}}{\text{loaves}}$$

Opportunity Costs for the US



Assumptions

US Resources

100 hours

US productivity

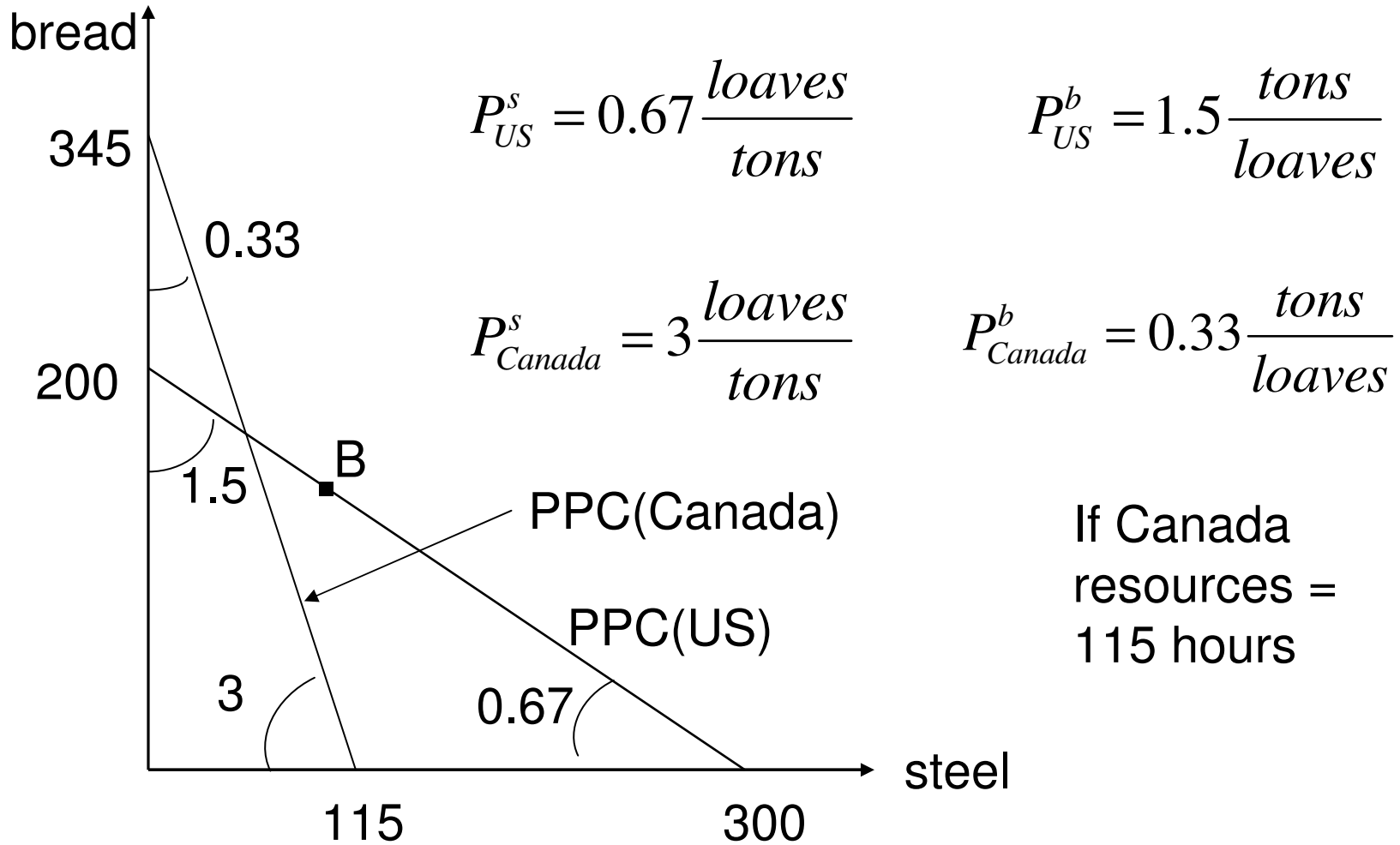
Bread 2 // hour

Steel 3 t / hour

$$\text{OC(US) of steel} = (100 \cdot 2) / (100 \cdot 3) = 0.67$$

$$\text{OC(US) of bread} = 3/2 = 1.5$$

Prices for the US and for Canada



$$\text{PPC(C): bread} = 345 - 3 * \text{steel}$$

$$\text{PPC(US): bread} = 200 - 0.67 * \text{steel}$$

Gains from trade

- For the US, it is convenient to buy bread in Canada because its price is lower:

$$P_{Canada}^b = 0.33 \frac{\text{tons}}{\text{loaves}} \qquad P_{US}^b = 1.5 \frac{\text{tons}}{\text{loaves}}$$

- For Canada, it is convenient to buy steel in the US because its price is lower:

$$P_{US}^s = 0.67 \frac{\text{loaves}}{\text{tons}} \qquad P_{Canada}^s = 3 \frac{\text{loaves}}{\text{tons}}$$

- Therefore, for both countries it is convenient to exchange steel for bread. Both **gain from trade**.

At what price the US trade with Canada?

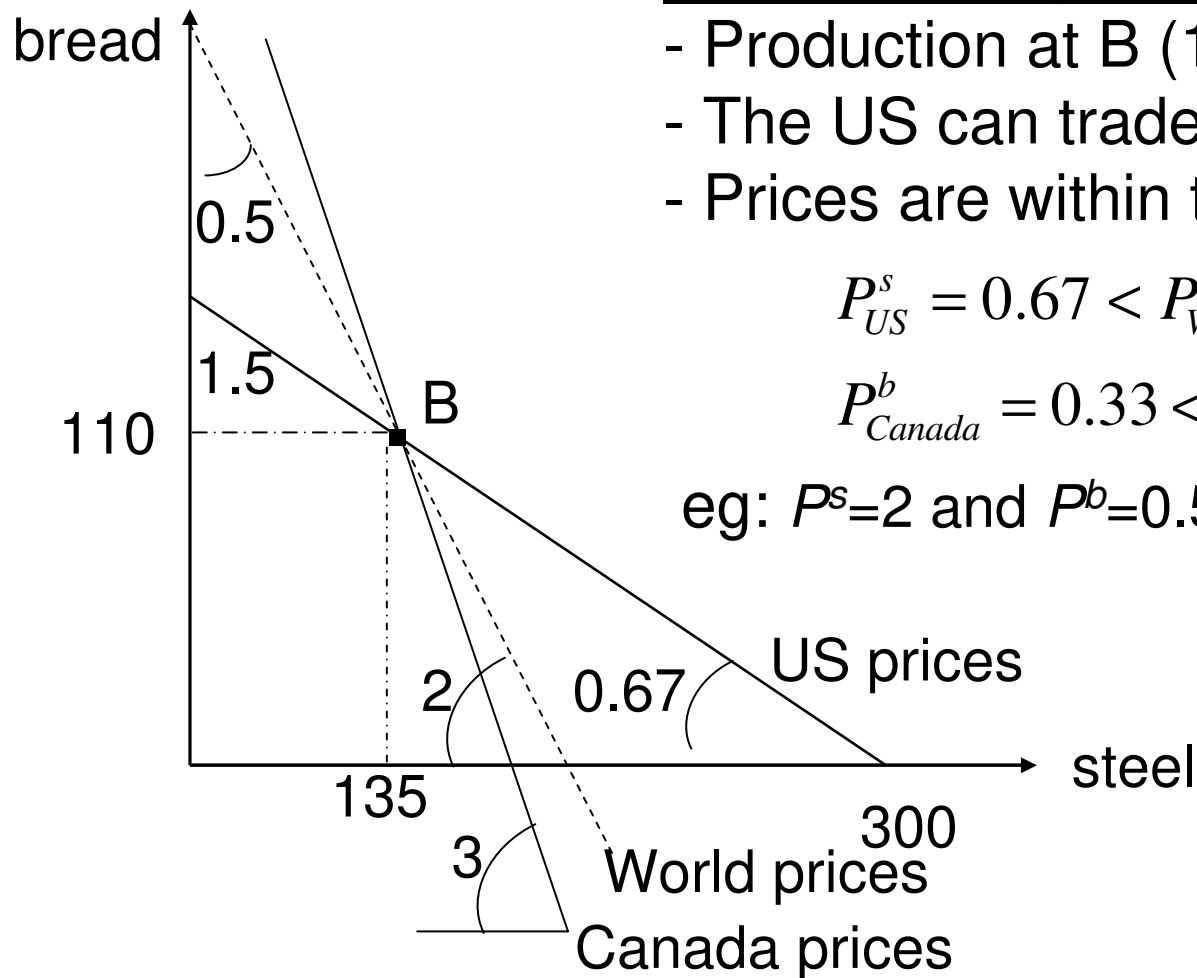
Initial assumptions

- Production at B (135, 110)
- The US can trade with Canada.
- Prices are within the ranges:

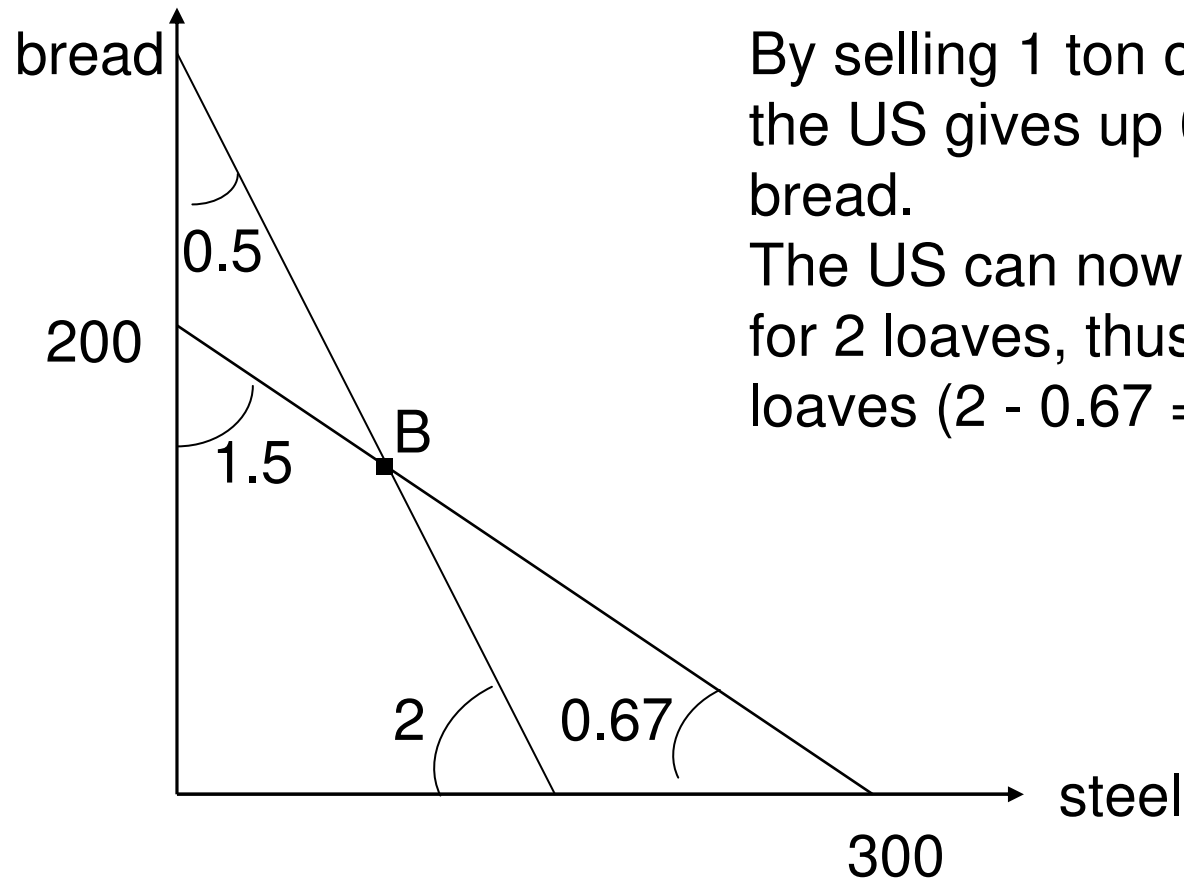
$$P_{US}^s = 0.67 < P_W^s < P_{Canada}^s = 3$$

$$P_{Canada}^b = 0.33 < P_W^b < P_{US}^b = 1.5$$

eg: $P^s=2$ and $P^b=0.5$.

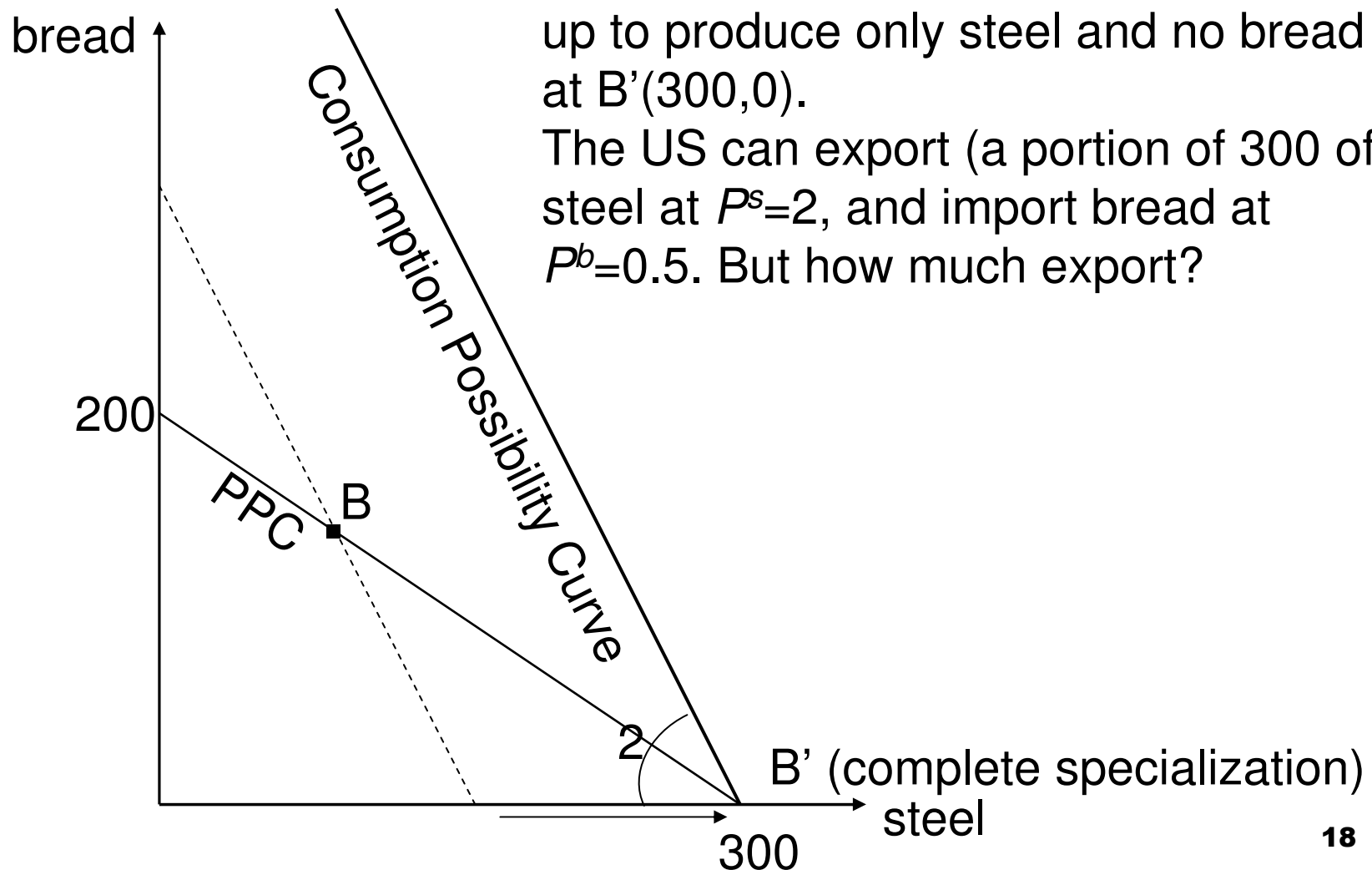


Quantifying gains from trade



By selling 1 ton of steel to Canada, the US gives up 0.67 loaves of bread. The US can now trade 1 ton of steel for 2 loaves, thus (net) gaining 1.33 loaves ($2 - 0.67 = 1.33$).

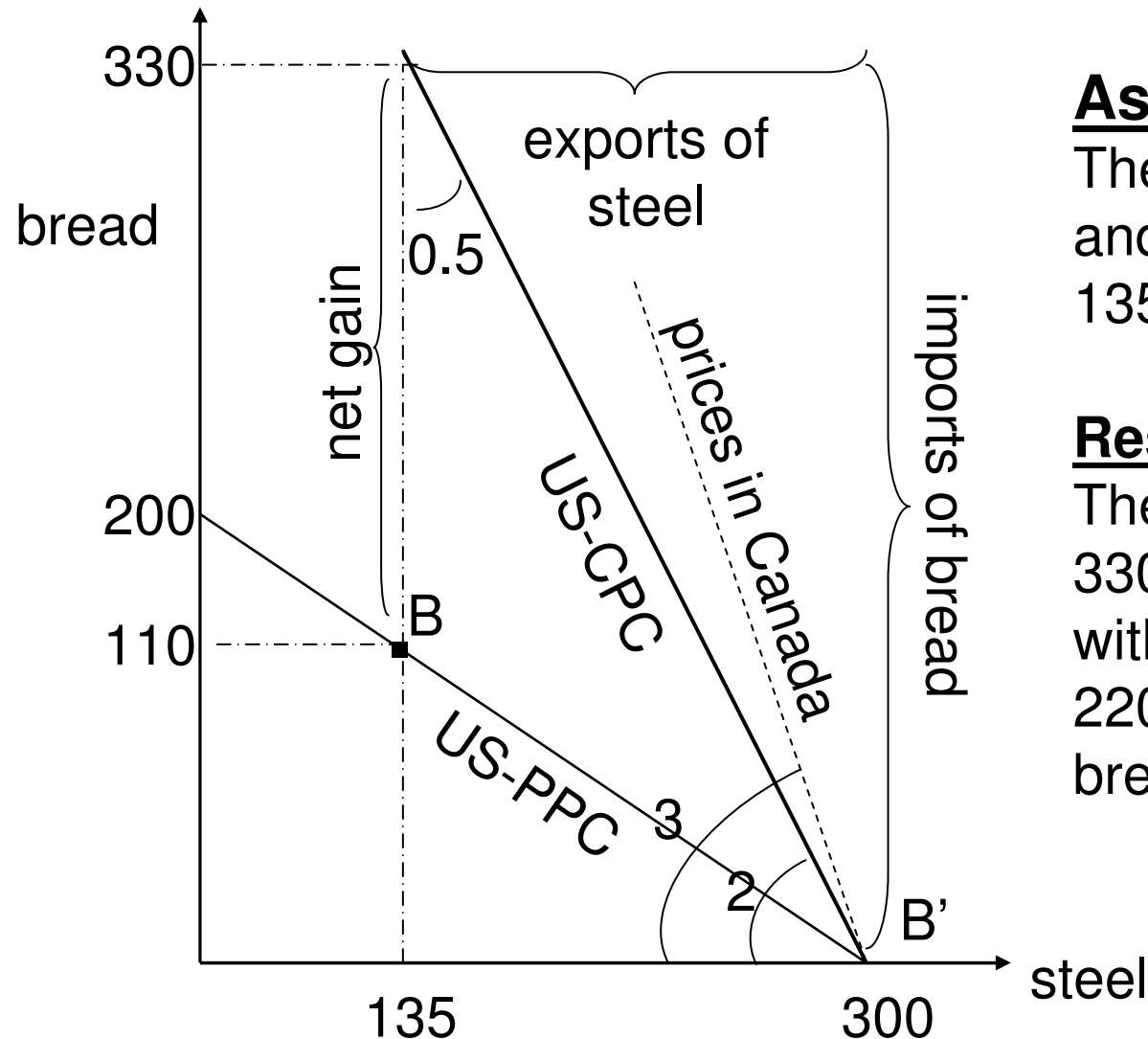
Towards specialization



It is convenient to trade steel for bread, up to produce only steel and no bread at B'(300,0).

The US can export (a portion of 300 of) steel at $P^s=2$, and import bread at $P^b=0.5$. But how much export?

Trade of the US with Canada



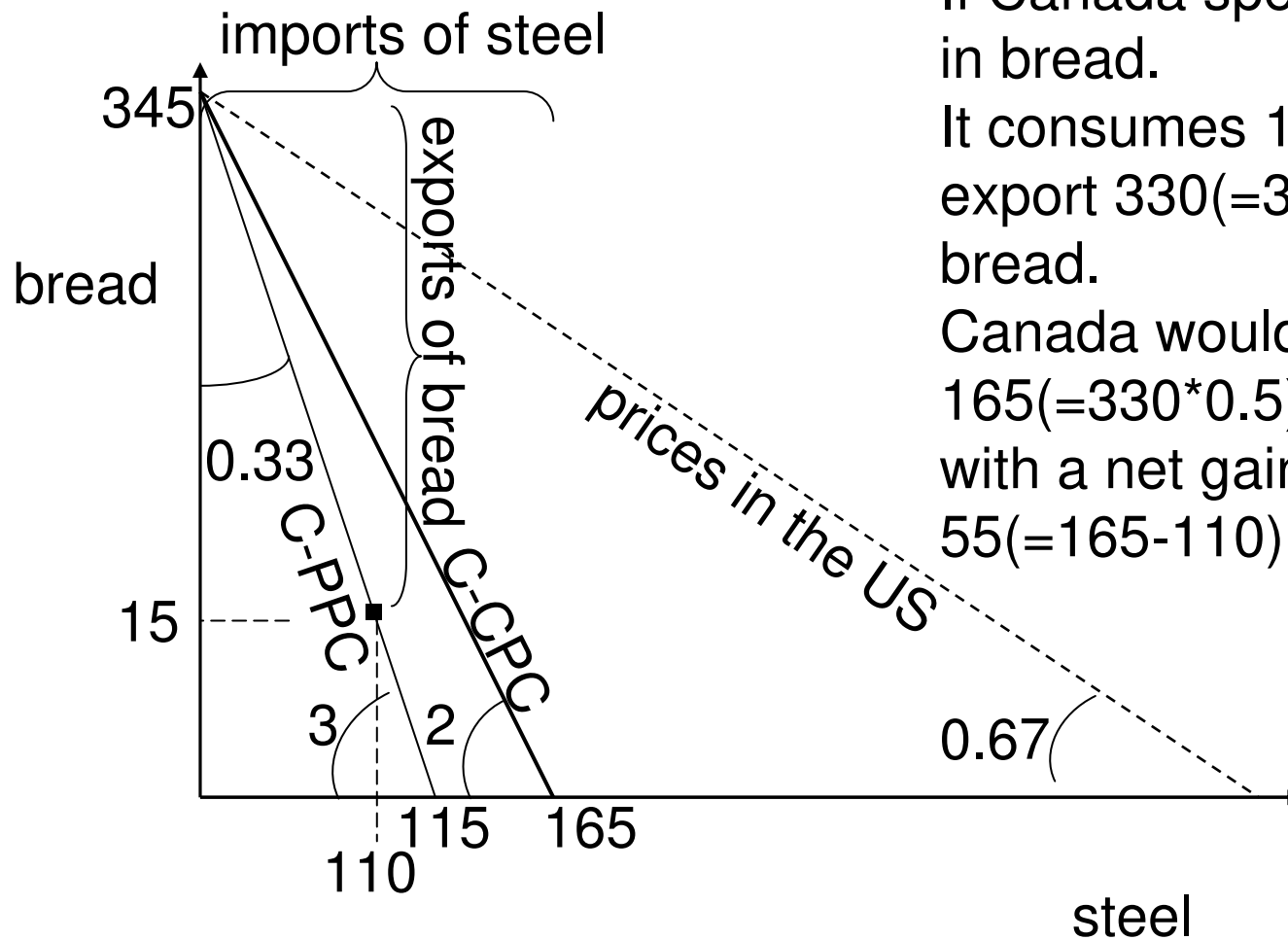
Assumption

The US consume 135 and export 165(=300-135) of steel.

Result

The US would import 330(=165*2) of bread with a net gain of 220(=330-110) of bread.

Trade of Canada with the US



If Canada specializes in bread.
 It consumes 15 and export 330(=345-15) of bread.
 Canada would import 165(=330*0.5) of steel with a net gain of 55(=165-110) of steel.



How world prices are determined?

World demand for steel relative to bread determines World price of steel (in terms of bread) within the range:

$$P_{US}^s = 0.67 < P_W^s < P_{Canada}^s = 3$$

The greater the demand for steel, the closer World price to 3 (and the greater the US gain from trade).

Reverse reasoning for the price of bread (in terms of steel), being within the range: $P_{Canada}^b = 0.33 < P_W^b < P_{US}^b = 1.5$



On the range of world prices

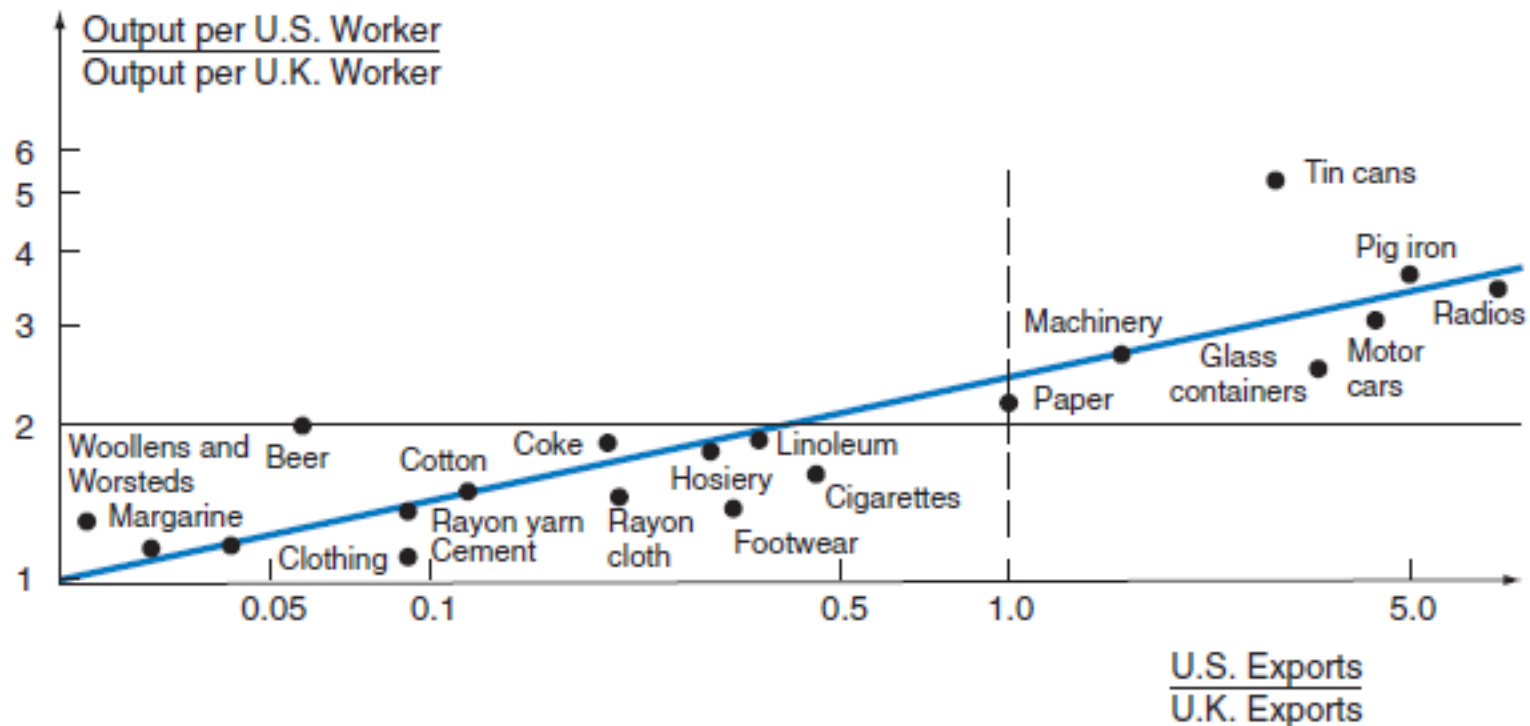
- How do we make sure that the trade price settles

within $P_{US}^s = 0.67 < P_W^s < P_{Canada}^s = 3$

- If the trade price was 4 loaves of bread, both countries would specialize in steel. However, the consequent bread shortage and steel glut would increase the price of bread and decrease the price of steel; once the price of bread fell to less than 3.0, Canadian producers would switch back to bread
- If trade price is closer to 0.67, gains are larger for Canada; if it is closer to 3.0, gains are larger for the US.

Example of Ricardian Comparative Advantage

Relative labor productivities and comparative advantage



Source: Adapted from G. D. A. MacDougall, "British and American Exports: A Study Suggested by the Theory of Comparative Costs," *Economic Journal*, December 1951, p. 703.



The terms of trade

- Definition: the ratio of the price of country's export commodity to the price of its import commodity.
- Since in a two-nation world, the exports of a nation are the imports of its trade partner, the terms of trade of the latter are equal to the inverse of the terms of trade of the former.
- This ratio is usually multiplied by 100 in order to express the terms of trade in %. A year is chosen as base year.
- An improvement in a nation's terms of trade is beneficial to the nation in the sense that the prices that the nation receives for its exports rise relative to the prices that it pays for imports.



Terms of Trade of Advanced and Developing Countries

Export Unit Value/Import Unit Value; 2000=100

	1972	1974	1980	1985	1990	1995	2000	2005	2010
Industrial countries	110	97	89	87	100	105	100	101	98
Developing countries	61	86	107	101	103	102	100	99	102
Africa	85	118	117	115	100	103	100	108	—
Asia	101	101	101	98	103	107	100	92	104
Europe	112	101	69	64	69	106	100	102	95
Middle East	94	75	90	80	109	68	100	140	167 [*]
Western Hemisphere	39	110	194	189	130	107	100	104	92

^{*} refers to 2007

Source: International Monetary Fund, *International Financial Statistics* (Washington, D.C.: IMF, various issues).



Comments on the table

- There is no uniform trends.
- The dynamics of the terms of trade much depends on the fluctuations of commodities.