

# International Economic Cooperation

## Lecture II



# Comparative Advantage Theory

- In 1817, Ricardo published his *Principles of Political Economy and Taxation*, in which he presented the law of comparative advantage.
- According to the law of comparative advantage, even if one nation is less efficient than (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.
- The first nation should specialize in the production and export of the commodity in which its absolute disadvantage is smaller (this is the commodity of its *comparative advantage*) and import the commodity in which its absolute disadvantage is greater (this is the commodity of its *comparative disadvantage*).

## EXAMPLES OF COMPARATIVE ADVANTAGES IN INTERNATIONAL TRADE

Country	Product
Canada	Lumber
Israel	Citrus fruit
Italy	Wine
Jamaica	Aluminum ore
Mexico	Tomatoes
Saudi Arabia	Oil
China	Textiles
Japan	Automobiles
South Korea	Steel, ships
Switzerland	Watches
United Kingdom	Financial services

# Assumptions

1. The world consists of two nations, each using a single input to produce two commodities.
2. In each nation, labor is the only input. Each nation has a fixed endowment of labor, and labor is fully employed and homogeneous.
3. Labor can move freely among industries within a nation but is incapable of moving between nations.
4. The level of technology is fixed for both nations. Different nations may use different technologies, but all firms within each nation utilize a common production method for each commodity.
5. Costs do not vary with the level of production and are proportional to the amount of labor used.
6. Perfect competition prevails in all markets. Because no single producer or consumer is large enough to influence the market, all are price takers. Product quality does not vary among nations, implying that all units of each product are identical.

# Contd..

7. Free trade occurs between nations; that is, no government barriers to trade exist.
8. Transportation costs are zero. Consumers will thus be indifferent between domestically produced and imported versions of a product if the domestic prices of the two products are identical.
9. Firms make production decisions in an attempt to maximize profits, whereas consumers maximize satisfaction through their consumption decisions.
10. There is no money illusion; that is, when consumers make their consumption choices and firms make their production decisions, they take into account the behavior of all prices.
11. Trade is balanced (exports must pay for imports), thus ruling out flows of money between nations.

# Statement of the Law

- the United Kingdom now has an absolute disadvantage in the production of *both* wheat and cloth with respect to the United States

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

- In case of United States, absolute advantage is greater in wheat (6:1) than in cloth (4:2), *the United States has a comparative advantage in wheat.*
- Similarly, the United Kingdom's absolute disadvantage is smaller in cloth, so its comparative advantage lies in cloth.
- According to the law of comparative advantage, both nations can gain if the United States specializes in the production of wheat and exports some of it in exchange for British cloth.

# Production Possibilities Schedules



Ricardo's law of comparative advantage depended on the restrictive assumption of the labor theory of value, in which labor was assumed to be the only factor input. However, in practice, labor is only one of several factor inputs.



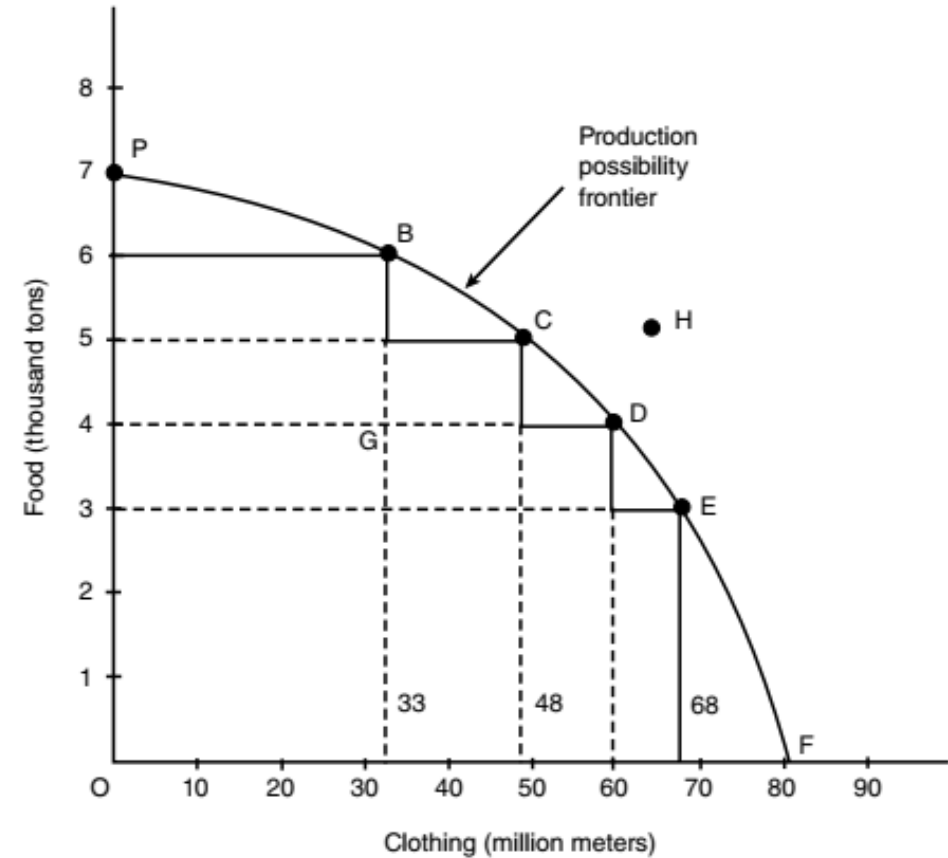
Recognizing the shortcomings of the labor theory of value, modern trade theory provides a more generalized theory of comparative advantage. It explains the theory using a production possibilities schedule, also called a transformation schedule.



This schedule shows various alternative combinations of two goods that a nation can produce when *all* of its factor inputs (land, labor, capital, entrepreneurship) are used in their most efficient manner.

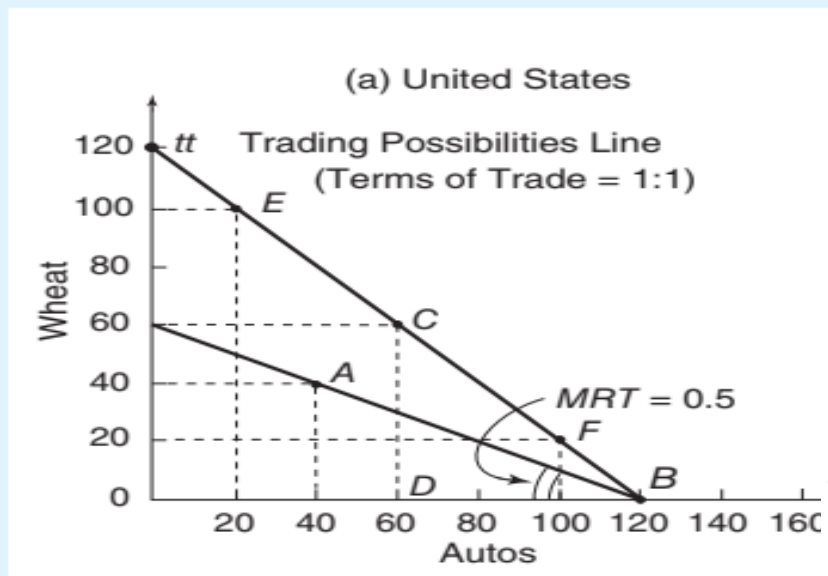
# Alternative Production Possibilities

Point of Goods Combination	Food (thousand tons)	Clothing (Million Meters)
A	7	0
B	6	33
C	5	48
D	4	60
E	3	68
F	0	80

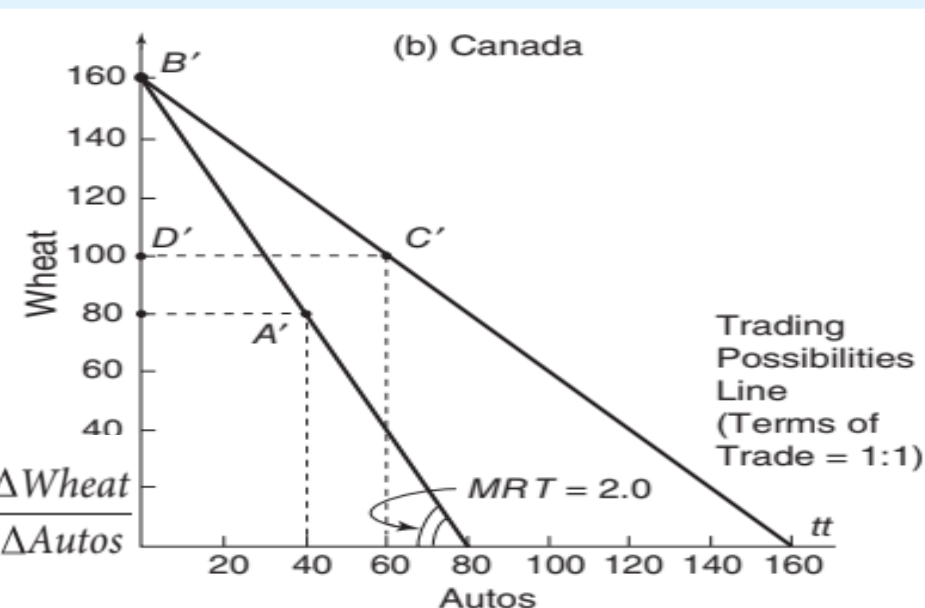




## TRADING UNDER CONSTANT OPPORTUNITY COSTS



$$MRT = \frac{\Delta \text{Wheat}}{\Delta \text{Autos}}$$



- The slope of the production possibilities schedule, which is referred to as the **marginal rate of transformation (MRT)** shows the amount of one product a nation must sacrifice to get one additional unit of the other product:

$$MRT = \frac{\Delta \text{Wheat}}{\Delta \text{Autos}}$$

# Comparison: MRT

- **In case of The United States:**
- Movement along the Production Possibilities Schedule (PPS):
  - 120 additional autos produced.
  - 60 bushels of wheat sacrificed.
- MRT Calculation:
  - $\text{MRT} = \text{Wheat Sacrificed} / \text{Autos Produced}$ .
  - $\text{MRT} = 60 / 120 = 0.5$  bushels of wheat per auto.

- **In case of Canada:**
- Movement along its Production Possibilities Schedule:
  - Relative cost of each auto produced = 2 bushels of wheat sacrificed.
- MRT Calculation:
  - $\text{MRT} = \text{Wheat Sacrificed} / \text{Autos Produced}$ .
  - $\text{MRT} = 2.0$ .

# Conclusion

1

The United States has a lower Marginal Rate of Transformation (0.5) than Canada (2.0).

2

The United States sacrifices less wheat per auto, indicating a comparative advantage in auto production.

3

Canada sacrifices more wheat per auto, reflecting a comparative advantage in wheat production.

# Trading Under Constant-Cost Conditions

First, what are the basis for trade and the direction of trade?

Second, what are the potential gains from trade, for a single nation and for the world as a whole?

# Reasons for constant costs



The factors of production are perfect substitutes for each other.

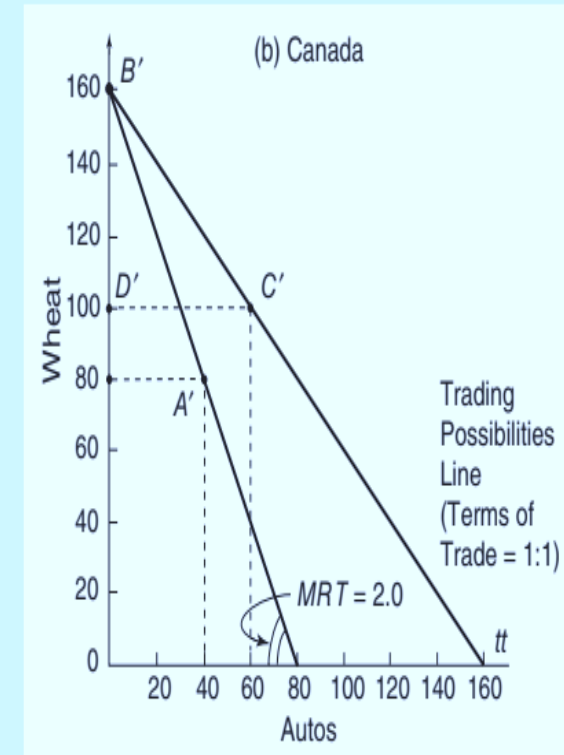
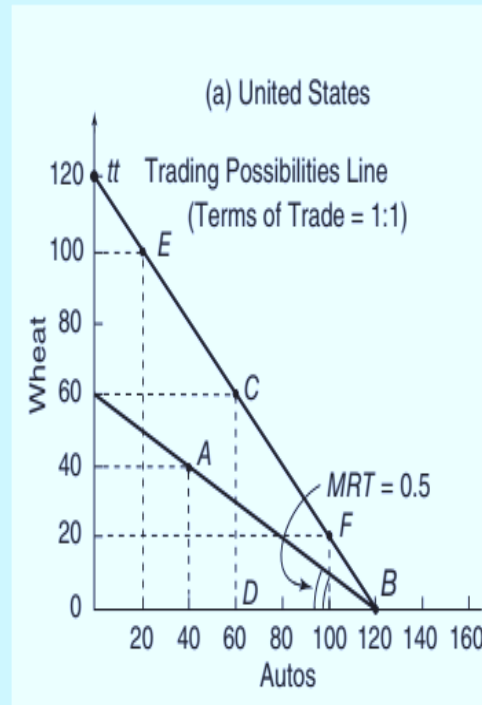


All units of a given factor are of the same quality.

# Basis for Trade and Direction of Trade

- Assume a situation of **autarky** (the absence of trade).
- Both countries produce and consume at their production possibilities without trade.
- United States (Point A): 40 Autos 40 Bushels of Wheat
- Canada (Point A): 40 Autos 80 Bushels of Wheat

## TRADING UNDER CONSTANT OPPORTUNITY COSTS



# Relative Costs of Production

**United States:**  
Cost of 1 Auto = 0.5  
Bushels of Wheat

**Canada:**  
Cost of 1 Auto = 2  
Bushels of Wheat

**Conclusion:**

The U.S. has a  
**lower opportunity  
cost** of producing  
autos.

Canada has a  
**higher opportunity  
cost** of producing  
autos.

# Comparative Advantage Principle

- Comparative advantage exists when a country can produce a good at a lower opportunity cost.
- United States: Comparative Advantage in Autos.
- Canada: Comparative Advantage in Wheat.
- **Direction of trade:**
  - United States → Produces and exports **Autos**
  - Canada → Produces and exports **Wheat**
- **Mutual Benefit:**

Both countries can consume beyond their production possibilities with trade.



# Key Benefits of Trade

Specialization  
increases overall  
output.

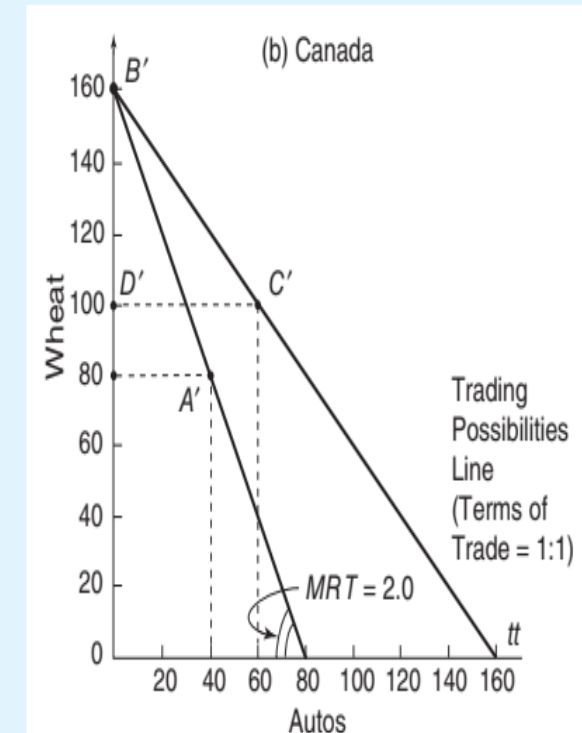
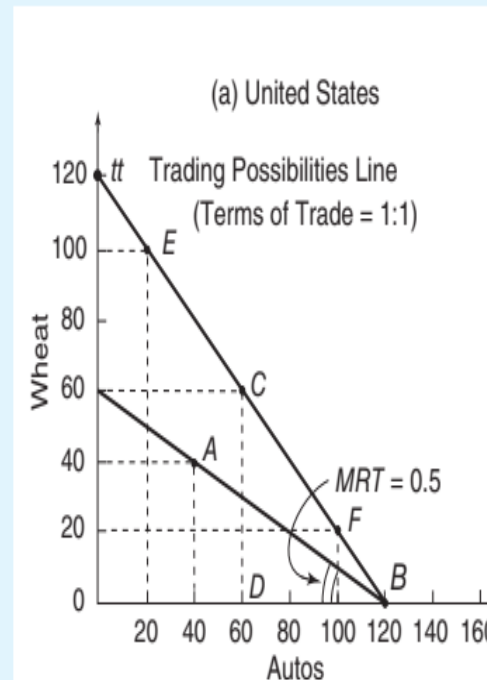
Trade allows  
countries to  
consume more  
than in autarky.

Comparative  
advantage  
ensures mutual  
gains.

# Production Gains from Specialization

- The United States moves from production point *A* to production point *B*, totally specializing in auto production. Canada totally specializes in wheat production by moving from production point *A* to production point *B* in the figure.
- Taking advantage of specialization can result in **production gains** for both countries.

TRADING UNDER CONSTANT OPPORTUNITY COSTS



## GAINS FROM SPECIALIZATION AND TRADE: CONSTANT OPPORTUNITY COSTS

### (a) Production Gains from Specialization

	BEFORE SPECIALIZATION		AFTER SPECIALIZATION		NET GAIN (LOSS)	
	Autos	Wheat	Autos	Wheat	Autos	Wheat
United States	40	40	120	0	80	-40
Canada	40	80	0	160	-40	80
World	80	120	120	160	40	40

### (b) Consumption Gains from Trade

	BEFORE TRADE		AFTER TRADE		NET GAIN (LOSS)	
	Autos	Wheat	Autos	Wheat	Autos	Wheat
United States	40	40	60	60	20	20
Canada	40	80	60	100	20	20
World	80	120	120	160	40	40

## Terms of Trade

### International Trade and Consumption Gains

**Terms of Trade:** 1 auto = 1 bushel of wheat (1:1 ratio).

**Trading Possibilities Line (tt):** Represents international terms of trade with a slope of  $-1$

- The set of post-trade consumption points that a nation can achieve is determined by the rate at which its export product is traded for the other country's export product. This rate is known as the **terms of trade**.
- The **terms of trade** define the **relative prices** at which two products trade in the marketplace.

#### U.S. Trade Scenario:

- **Exports:** United States exports 60 autos to Canada.
- **Imports:** Receives 60 bushels of wheat in return.
- **Post-Trade Consumption (Point C):**
  - Compared to pre-trade (Point A):
  - **Consumption Gains:** 20 additional autos and 20 additional bushels of wheat.
  - **Trade Triangle (BCD):** Illustrates U.S. exports, imports, and terms of trade.

#### Canada's Trade Scenario:

- **Exports:** Canada exports 60 bushels of wheat to the United States.
- **Imports:** Receives 60 autos in return.
- **Post-Trade Consumption (Point C):**
  - Compared to pre-trade (Point A):
  - **Consumption Gains:** 20 additional autos and 20 additional bushels of wheat.
  - **Trade Triangle (B'C'D')**: Same as the U.S., reflecting balanced trade.

## Static Gains

- Production gains arising from the reallocation of existing resources according to comparative advantage when the economy open to international trade.

### ❑ Example: Japan's Opening to Trade

- In 1859, Japan ended 200 years of economic isolation and opened its ports to international trade responding to pressure from the United States.
- Leveraged comparative advantage, exporting tea and silk while importing woolen and cotton goods.
- Achieved static gains from specialization, increasing GDP by 8-9%.
- Long-run gains included improved productivity and technology adoption.

## Static Losses

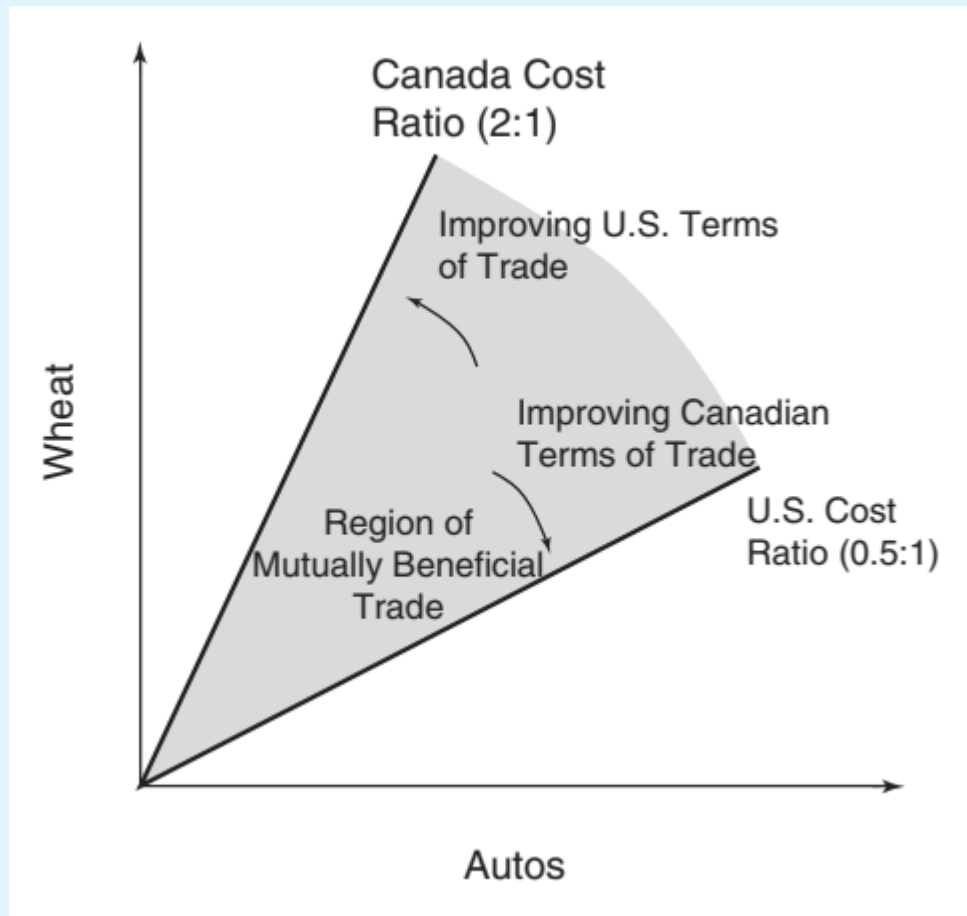
- Loss incur by the country when it initially opens to trade, and later, trade is eliminated and replace the allocation of resources to produce the imported commodities

### ❑ Example: U.S. Embargo of 1807

- To counter British and French harassment, the U.S. closed its ports to international trade.
- Shifted production from exported agricultural goods (comparative advantage) to import-replacement manufactured goods (comparative disadvantage).
- Resulted in inefficient resource utilization and a loss of 8% of gross national product.
- The unpopular embargo was terminated in 1809.

# Distributing the Gains from Trade

## EQUILIBRIUM TERMS-OF-TRADE LIMITS



- Figure illustrates these domestic cost conditions for the two countries.
- U.S. Cost Ratio Line (0.5:1): This line shows the domestic production trade-off in the U.S.: producing 1 auto costs 0.5 bushels of wheat.
- Any terms of trade worse than this (below the line) would make the U.S. worse off with trade.
- Canada Cost Ratio Line (2:1): This line shows the domestic production trade-off in Canada: producing 1 auto costs 2 bushels of wheat.
- Any terms of trade worse than this (above the line) would make Canada worse off with trade.

# Distributing the Gains from Trade

- **Region of Mutually Beneficial Trade (Gray Area):**

- This shaded area represents the range of terms of trade that are acceptable to both countries.
- For trade to benefit both:
  - The U.S. should receive more than **0.5 bushels of wheat per auto**.
  - Canada should pay less than **2 bushels of wheat per auto**.

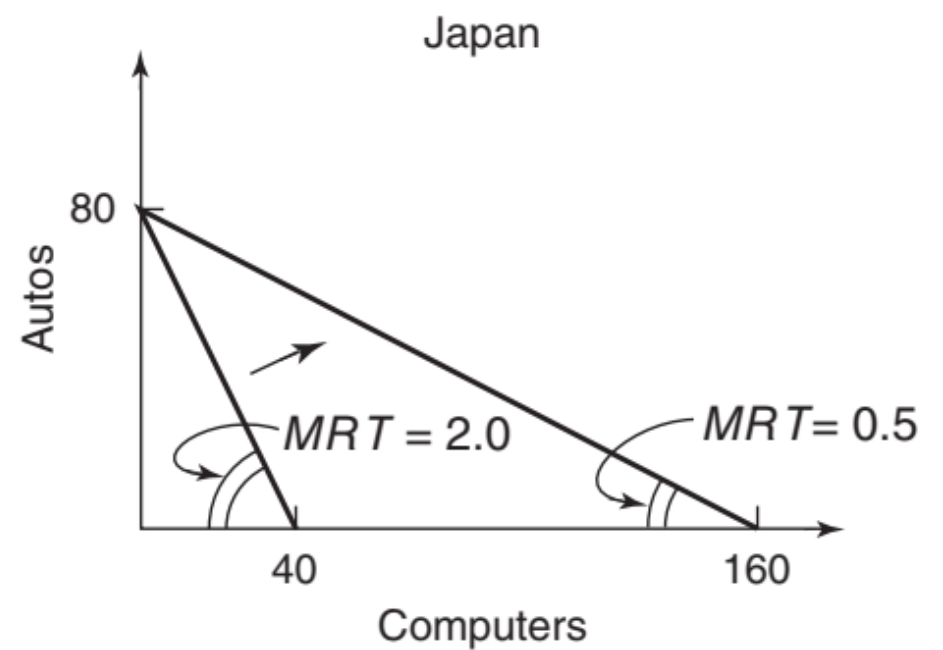
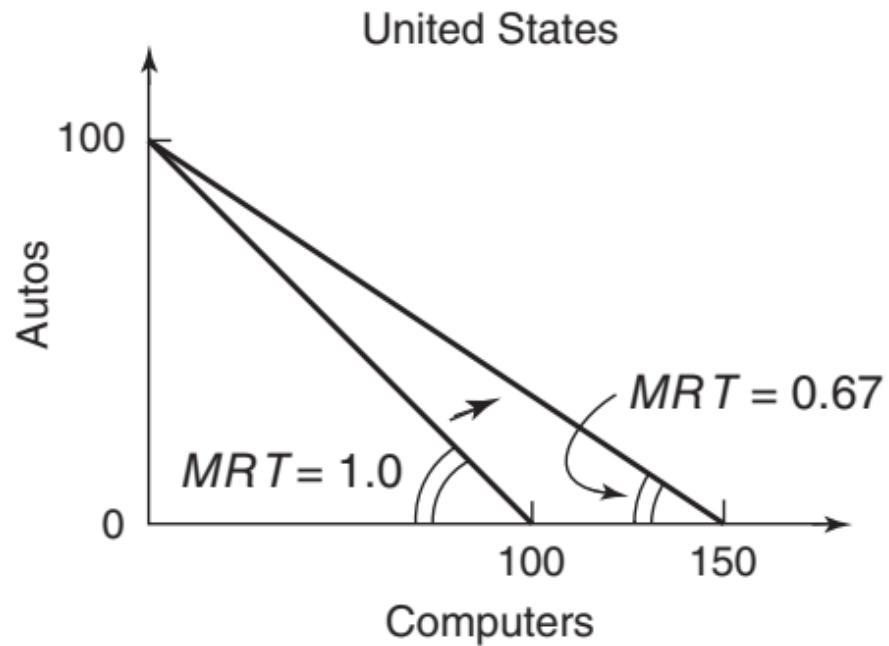
- **Improving Terms of Trade:**

- **Improving U.S. Terms of Trade (Arrow Leftward):**

- The closer the terms of trade are to Canada's domestic cost ratio (2:1), the more favorable it is for the U.S. because it gets more wheat for each auto.

- **Improving Canadian Terms of Trade (Arrow Rightward):** The closer the terms of trade are to the U.S. domestic cost ratio (0.5:1), the more favorable it is for Canada because it gets more autos for each bushel of wheat.
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# Changing in Comparative Advantage

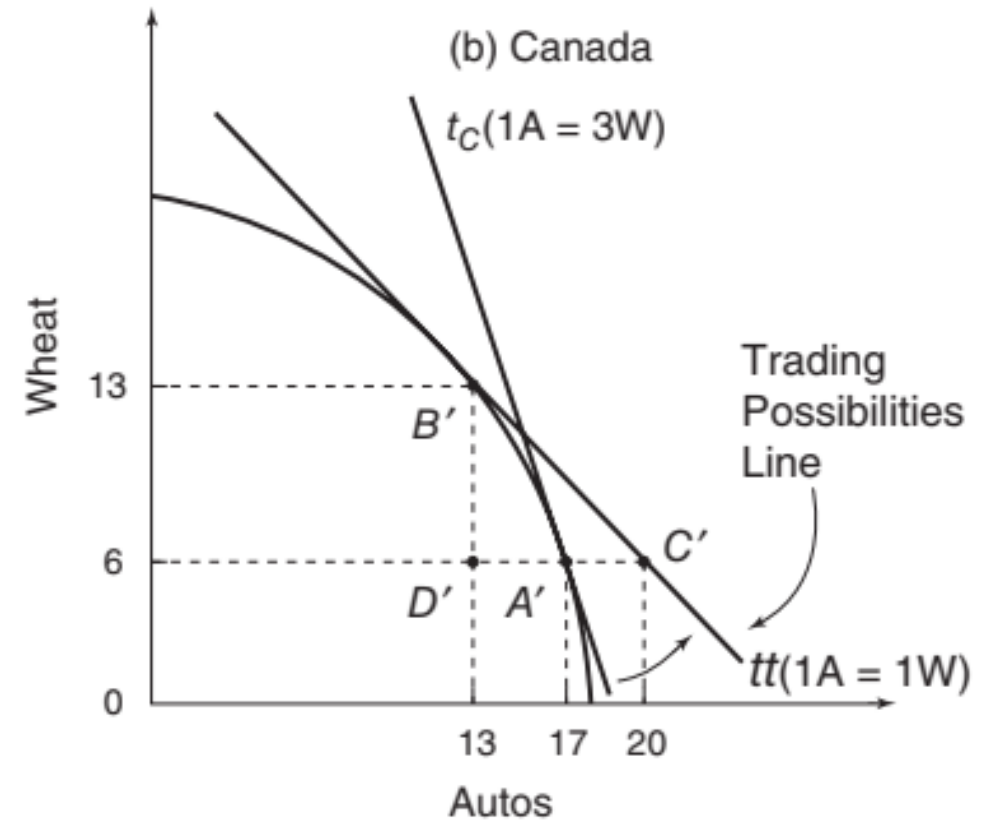
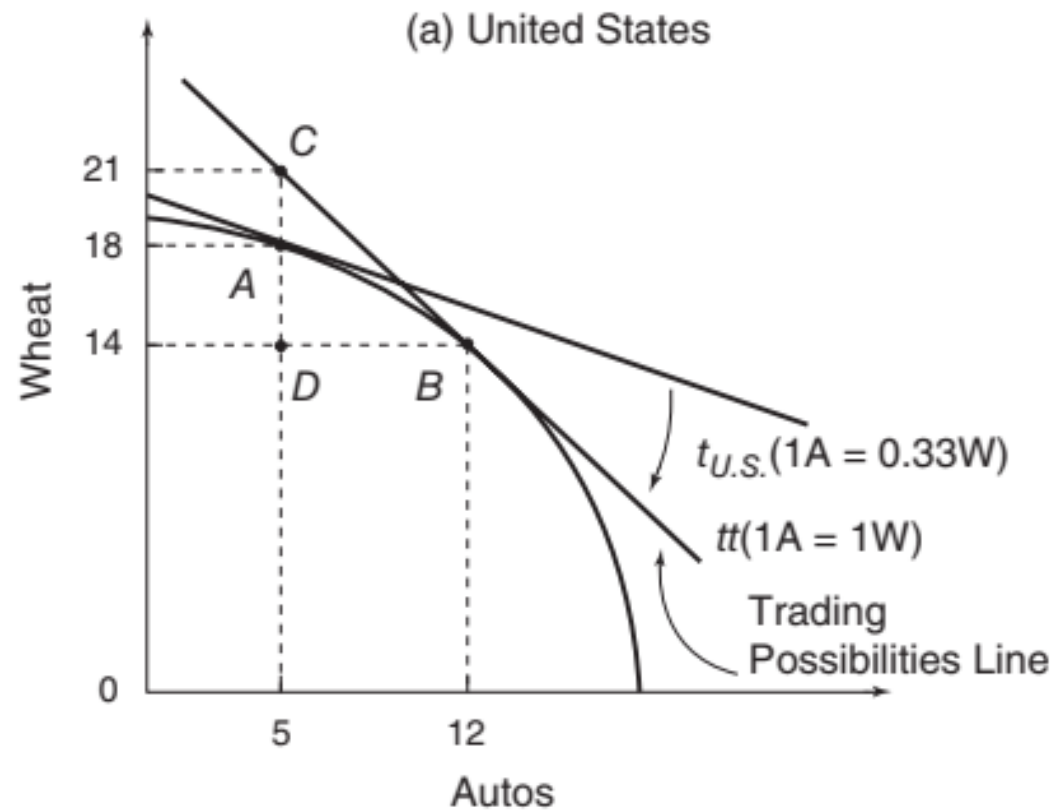




# Trading Under Increasing- Cost Conditions

- **Increasing opportunity costs** give rise to a production possibilities schedule that appears *concave or* bowed outward from the diagram's origin.
- Increasing costs mean that the *MRT* of wheat into autos *rises* as more autos are produced.
- In the overall economy, increasing costs result when inputs are imperfect substitutes for each other.
- For a *particular product*, such as autos, increasing-cost is explained by the principle of diminishing marginal productivity.
- The addition of successive units of labor (variable input) to capital (fixed input) beyond some *point results in decreases in the marginal production of autos that is attributable to each additional unit of labor*.
- ***Unit production costs thus rise as more autos are produced.***

## TRADING UNDER INCREASING OPPORTUNITY COSTS



# GAINS FROM SPECIALIZATION AND TRADE: INCREASING OPPORTUNITY COSTS

## (a) Production Gains from Specialization

	BEFORE SPECIALIZATION		AFTER SPECIALIZATION		NET GAIN (LOSS)	
	Autos	Wheat	Autos	Wheat	Autos	Wheat
United States	5	18	12	14	7	-4
Canada	17	6	13	13	-4	7
World	22	24	25	27	3	3

## (b) Consumption Gains from Trade

	BEFORE TRADE		AFTER TRADE		NET GAIN (LOSS)	
	Autos	Wheat	Autos	Wheat	Autos	Wheat
United States	5	18	5	21	0	3
Canada	17	6	20	6	3	0
World	22	24	25	27	3	3

- In addition to considering the *supply factors* underlying the production possibilities schedule's slope, we must also take into account the demand factors (tastes and preferences), for they will determine the point along the production possibilities schedule at which a country chooses to consume.
- Figure shows the production possibilities schedules of the United States and Canada under conditions of increasing costs.
- In Figure (a), assume that in the absence of trade the United States is located at point A along its production possibilities schedule; it produces and consumes 5 autos and 18 bushels of wheat.
- In Figure (b), assume that in the absence of trade Canada is located at point A along its production possibilities schedule, producing and consuming 17 autos and 6 bushels of wheat.

❑ **Comparative Advantage: United States:** Autos are cheaper → Exports autos.

- **Canada:** Wheat is cheaper → Exports wheat.

❑ **Specialization and Production Shifts:**

- **United States:** Moves down its production possibilities schedule to Point B, increasing auto production.
- **Canada:** Moves up its production possibilities schedule to Point B, increasing wheat production.
- **Convergence:** Specialization continues until the relative costs (domestic terms of trade) equalize in both nations, represented by international terms-of-trade line  $tt$ .

# Gains from Trade

- **Production Gains from Specialization:**
- **Combined Gains:** 3 additional autos and 3 additional bushels of wheat compared to pre-specialization levels (Table (a)).
- **Consumption Gains from Trade:**
- **United States:**
  - Maintains pre-trade consumption of 5 autos.
  - Exports 7 autos for 7 bushels of wheat.
  - Post-trade consumption: 5 autos and 21 bushels of wheat (3 additional bushels of wheat).
  - Trade triangle: BCD (Figure (a)).

# Gains from Trade

- **Canada:** Maintains pre-trade consumption of 6 bushels of wheat.
- Exports 7 bushels of wheat for 7 autos.
- Post-trade consumption: 7 autos and 6 bushels of wheat (3 additional autos).
- Trade triangle: B'C'D' (Figure (b)).

# Gains from Trade

- **International Terms of Trade:**

- Line **tt** becomes the common terms-of-trade line for both nations.
- It is steeper than  $t_{U.S.}$  and flatter than  $t_C$ , ensuring mutual benefits.

- **Summary of Gains:**

- **Production Gains:** 3 autos and 3 bushels of wheat.
- **Consumption Gains:** United States gains 3 bushels of wheat; Canada gains 3 autos.
- Trade results in identical trade triangles for both nations.