

INTERNATIONAL TRADE

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Production Possibility Frontiers (PPF)

- Let's study the economic model called the model of **production possibility frontiers**.
- Assumptions:
 - The economy produces two goods/products only.
 - All the factors of productions are fully used (full employment).
 - The best technology available is used in the production of the two goods/products.

What is a production possibility frontier?

- A PPF indicates the maximum combination of two goods/products that can be produced by an economy using all its available resources as well as the best technology available.
- Let's use an example to have a better understanding of this new concept.
- Let's suppose that an economy produces only 2 goods: tables and chairs.

What is a production possibility frontier? (2)

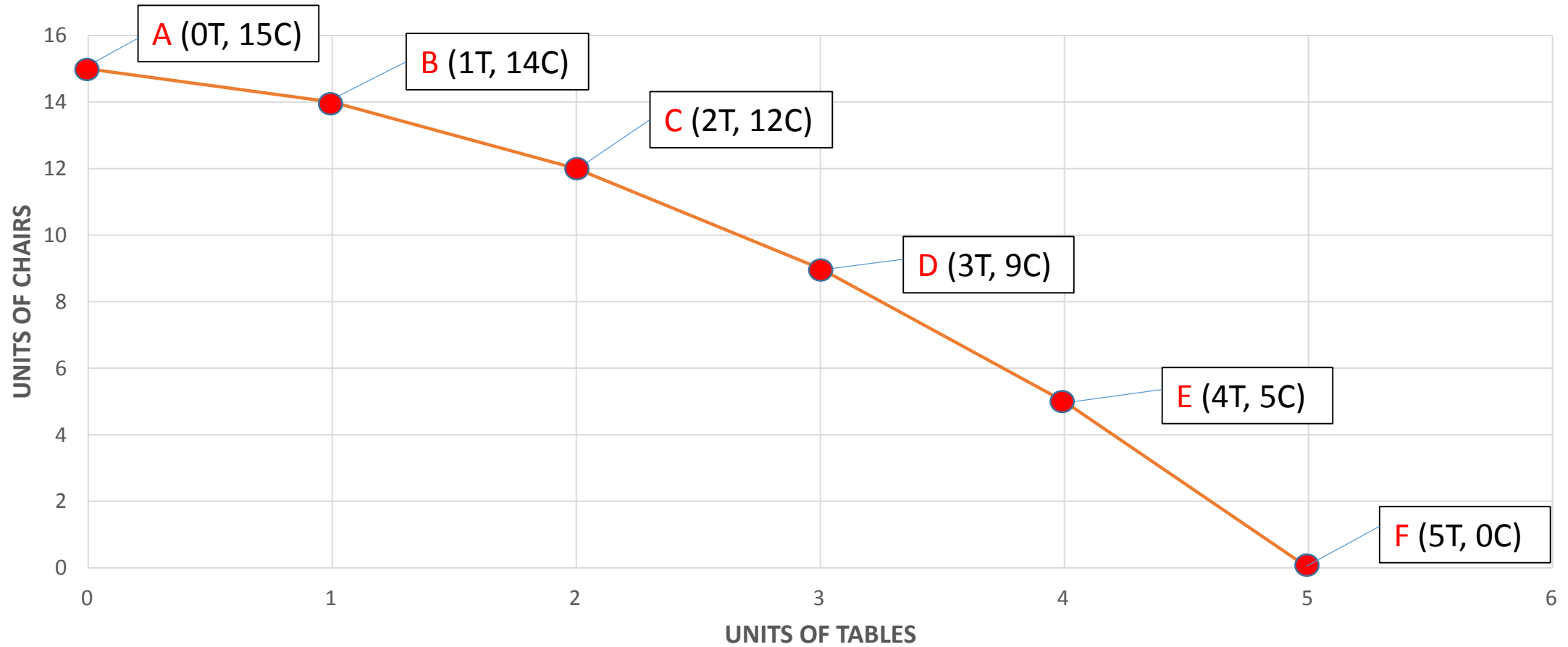
- The only resource the economy has for the production of both goods is wood (in limited quantity) and all of it is used: *scarcity*.
- So the wood is either used for the production of tables or chairs: *choice*.
- Producing *more* tables means that we will have to produce *less* chairs: *opportunity cost*.

A hypothetical production possibility for an economy

Resource endowment: 1000 pounds of wood.

Combinations	Units of chairs	Units of tables
A	15	0
B	14	1
C	12	2
D	9	3
E	5	4
F	0	5

A production possibility frontier



A production possibility frontier (2)

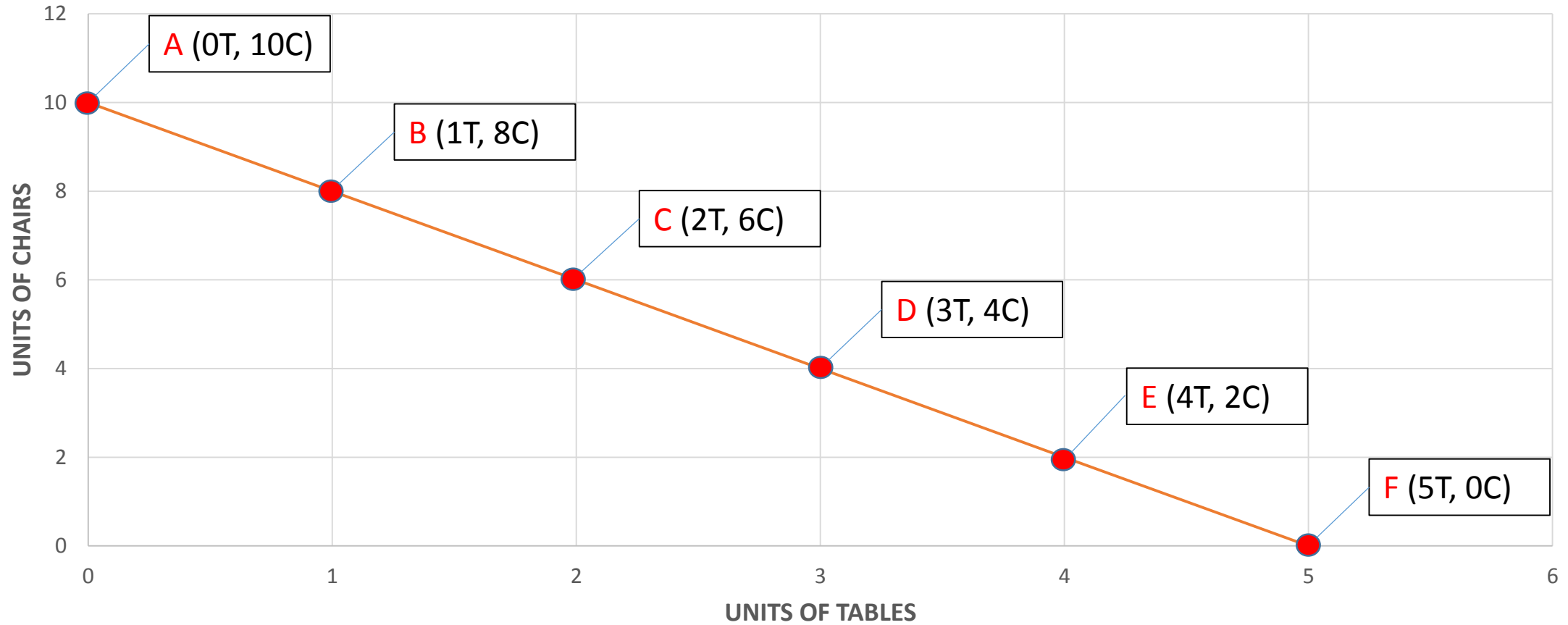
- The economy is able to produce:
 - At point A: 0 table and 15 chairs
 - At point B: 1 table and 14 chairs
 - At point C: 2 tables and 12 chairs
 - At point D: 3 tables and 9 chairs
 - At point E: 4 tables and 5 chairs
 - At point F: 5 tables and 0 chairs

Measuring the opportunity cost

Movement	Opportunity cost
A to B	1 table = 1 chair
B to C	1 table = 2 chairs
C to D	1 table = 3 chairs
D to E	1 table = 4 chairs
E to F	1 table = 5 chairs

As we move along the production possibility curve from point A to point F, we can see that the *opportunity cost increases*.

Another production possibility frontier



Another production possibility frontier (2)

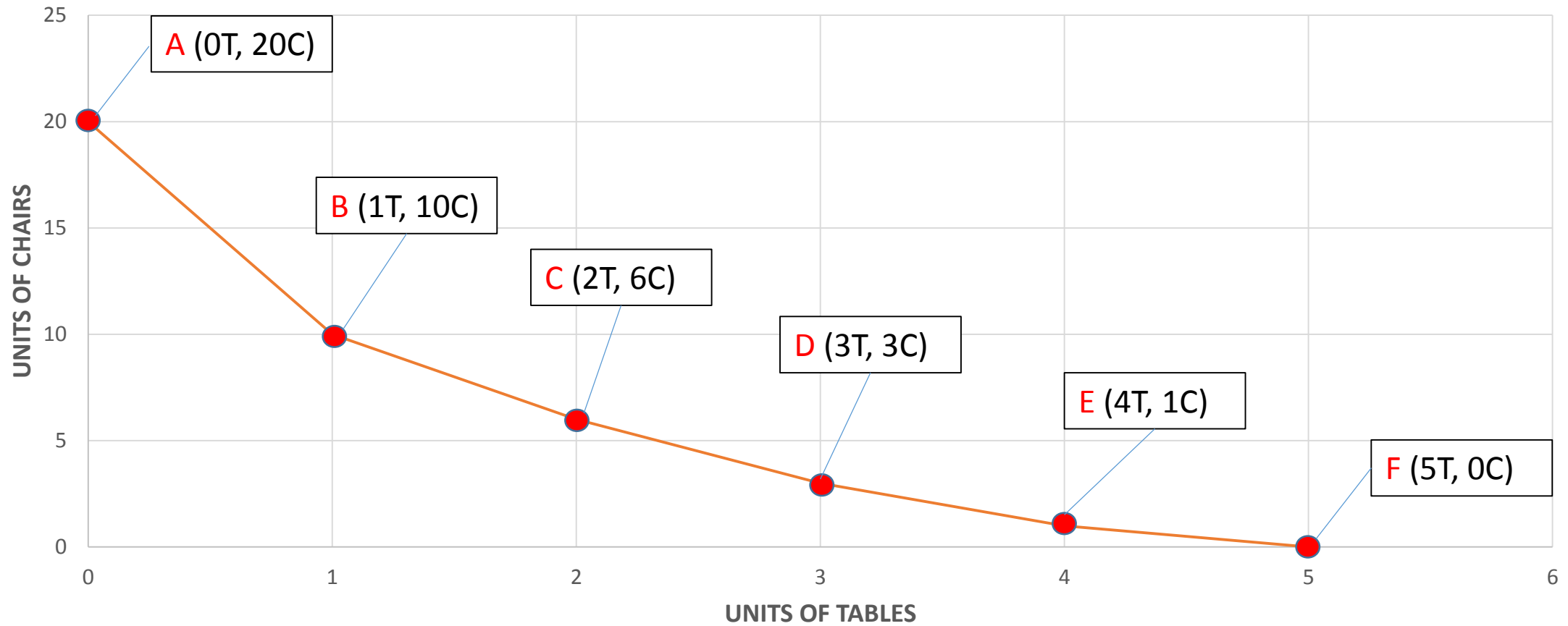
- The economy is able to produce:
 - At point A: 0 table and 10 chairs
 - At point B: 1 table and 8 chairs
 - At point C: 2 tables and 6 chairs
 - At point D: 3 tables and 4 chairs
 - At point E: 4 tables and 2 chairs
 - At point F: 5 tables and 0 chairs

Measuring the opportunity cost

Movement	Opportunity cost
A to B	1 table = 2 chairs
B to C	1 table = 2 chairs
C to D	1 table = 2 chairs
D to E	1 table = 2 chairs
E to F	1 table = 2 chairs

As we move along the production possibility curve from point A to point F, we can see that the *opportunity cost remains constant*.

Yet another production possibility frontier



Yet another production possibility frontier (2)

- The economy is able to produce:
 - At point A: 0 table and 20 chairs
 - At point B: 1 table and 10 chairs
 - At point C: 2 tables and 6 chairs
 - At point D: 3 tables and 3 chairs
 - At point E: 4 tables and 1 chairs
 - At point F: 5 tables and 0 chairs

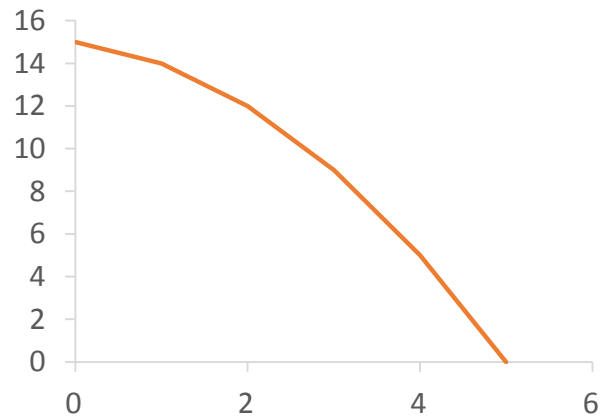
Measuring the opportunity cost

Movement	Opportunity cost
A to B	1 table = 10 chairs
B to C	1 table = 4 chairs
C to D	1 table = 3 chairs
D to E	1 table = 2 chairs
E to F	1 table = 1 chair

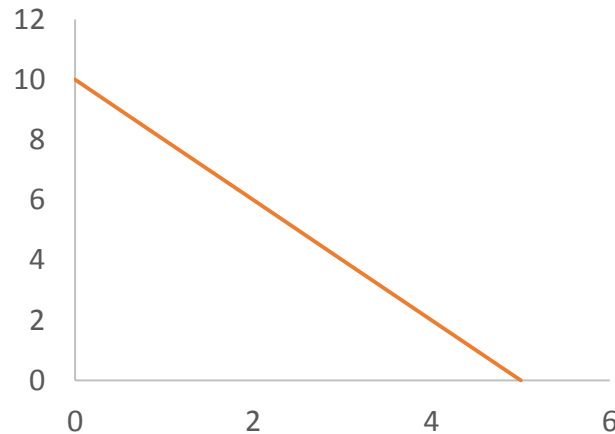
As we move along the production possibility curve from point A to point F, we can see that the *opportunity cost decreases*.

We can observe that...

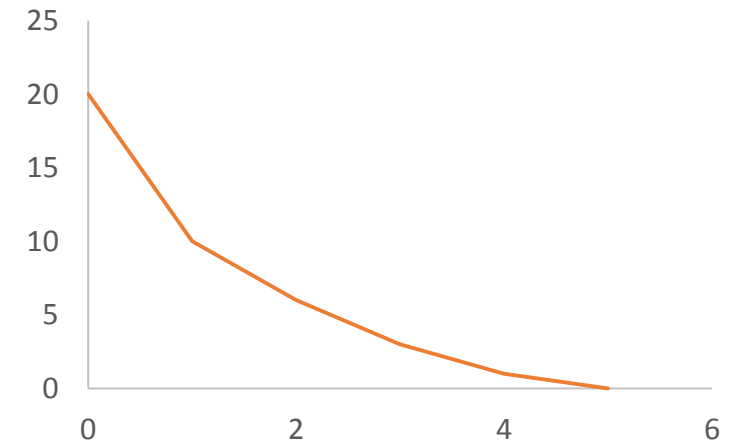
- The shape of the production possibility frontier determines how the opportunity cost changes.



A bowed out (concave) PPF illustrates an **increasing opportunity cost**.



A straight PPF illustrates a **constant opportunity cost**.

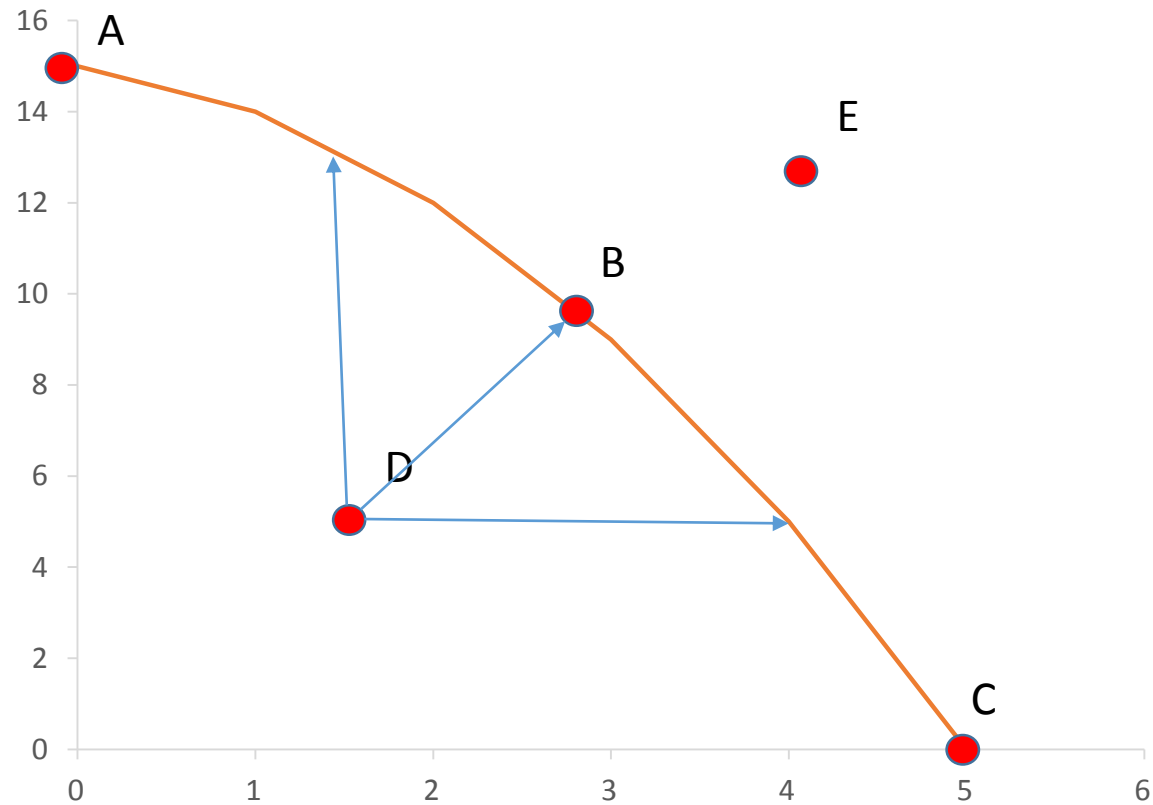


A bowed inward (convex) PPF illustrates a **decreasing opportunity cost**.

Productive efficiency

- *Productive efficiency* is attained when the maximum amount of goods possible is produced given all the available resources.
- It is achieved when it is not possible to produce one more unit of a good without decreasing the level of production of another (the other) good.

Productive efficiency

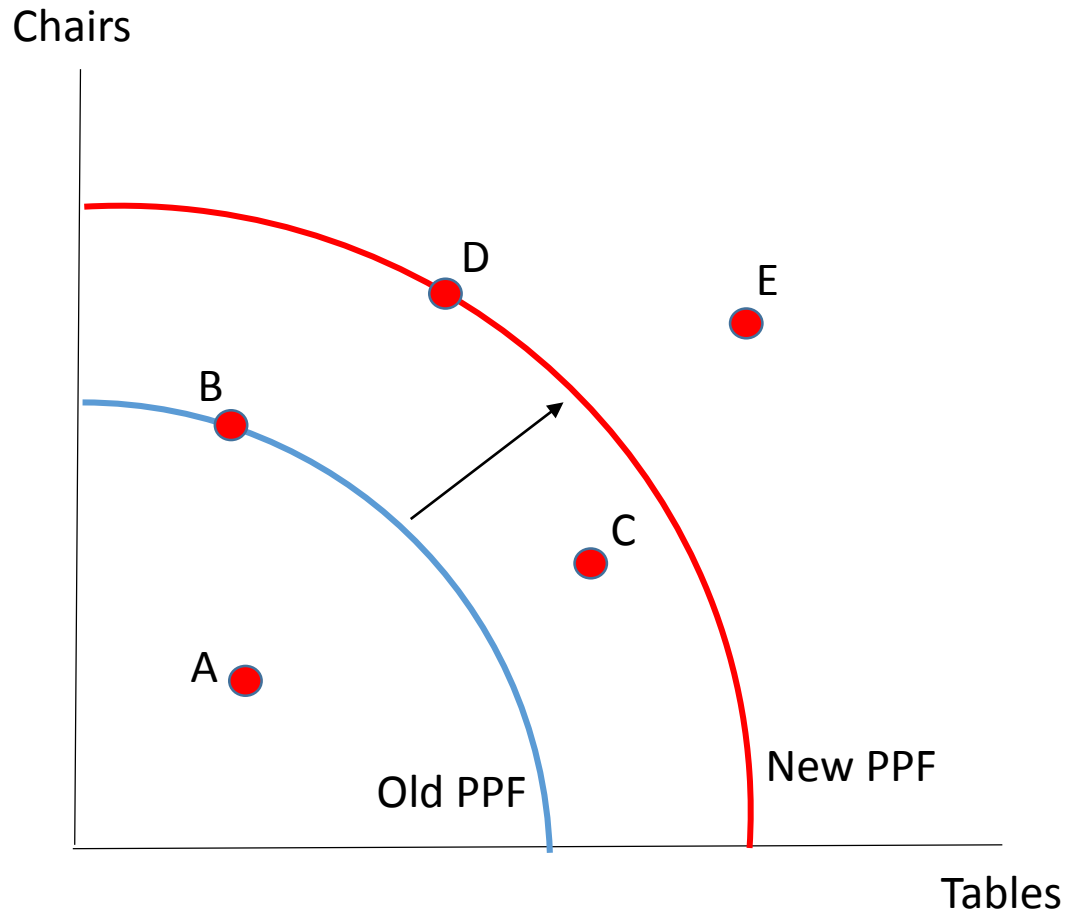


- At points A, B and C, it is impossible to produce more of a good without decreasing the production of the other good. *Productive efficiency* is attained at these points.
- At point D, it is possible to produce more of either chairs or tables or both goods.
- It is not possible to produce at point E.

Shifts in the production possibility frontier

- If there is an improvement in the production technology used in the economy or an increase in the economy's resource base, then it is possible to produce more of both goods (i.e. chairs and tables).
- It is graphically illustrated by an **outward (rightward) shift in the production possibility frontier.**

Shifts in the production possibility frontier (2)

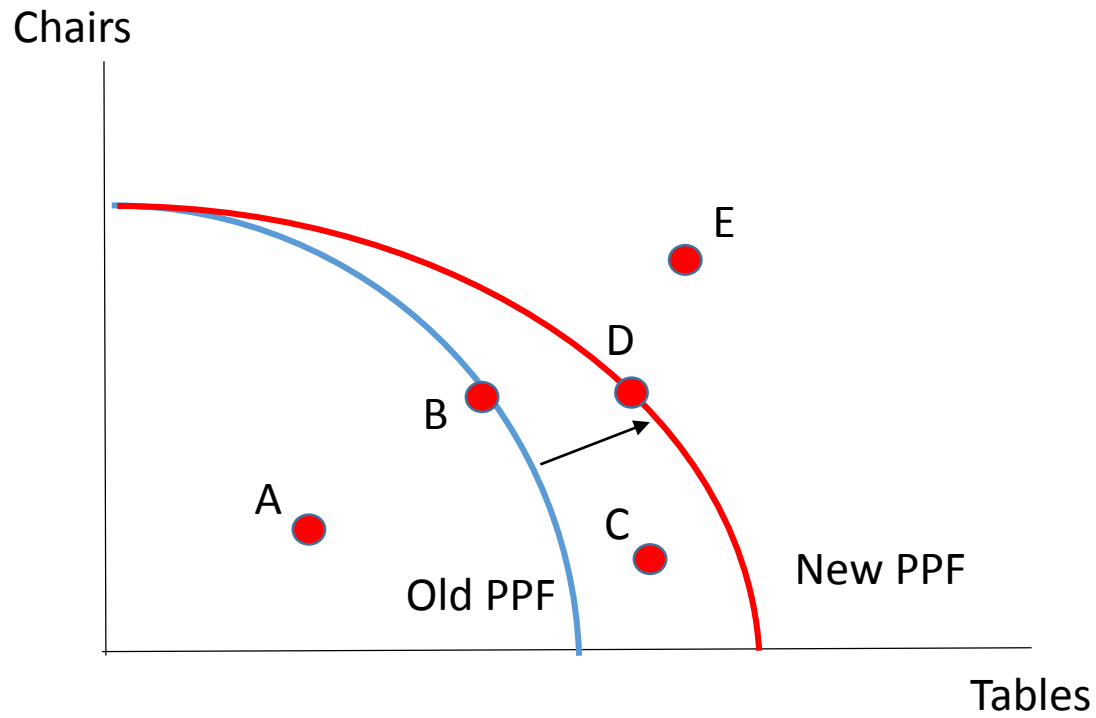


- The PPF shifts outward, which means that the economy can now produce more output.
- For example, before the shift, points C and D were unattainable. But after the shift, they are now attainable.
- However, point E is still unattainable.

Shifts in the production possibility frontier (continued)

- Let's now suppose that the improvement in technology or the increase in the resource base only benefits the production of one of the two goods and not both.
- Then, only more of one good can be produced

Shifts in the production possibility frontier (2)



- The PPF shifts outward, but only so as to depict a bigger production possibility for tables.
- After the shift, even if all the resources are used for the production of chairs only, the same level of production would be attained just as before the shift.
- Nevertheless, the economy is better off because previously unattainable points can now be attained.

Absolute/Comparative Advantage

- 2 countries are engaged in international trade: Japan and the US.
- Let's assume that they produce only two goods: cars and movies.
- The following tables show their level of production of both goods.

Country	Cars	Movies
Japan	100	20
USA	120	40

- The US is a much bigger economy than Japan as shown by the following statistics:

	Japan	USA
Population	127.6 million (2012)	313.9 million (2012)
Area	145,925 sq. miles	3.794 million sq miles

Absolute/Comparative Advantage (2)

- This means that in terms of production size, the US is capable of producing much more goods and services than Japan.
- The table shows that the US produces more cars and movies than Japan.
- The US is said to have *the absolute advantage* in the production of cars and movies.

Absolute/Comparative Advantage (3)

- Let's take another look at the production table:

Country	Cars	Movies
Japan	100	20
USA	120	40

- Japan:
 - 1 movie produced is equivalent to 5 cars.
- The US
 - 1 movie produced is equivalent to 3 cars.

Absolute/Comparative Advantage (4)

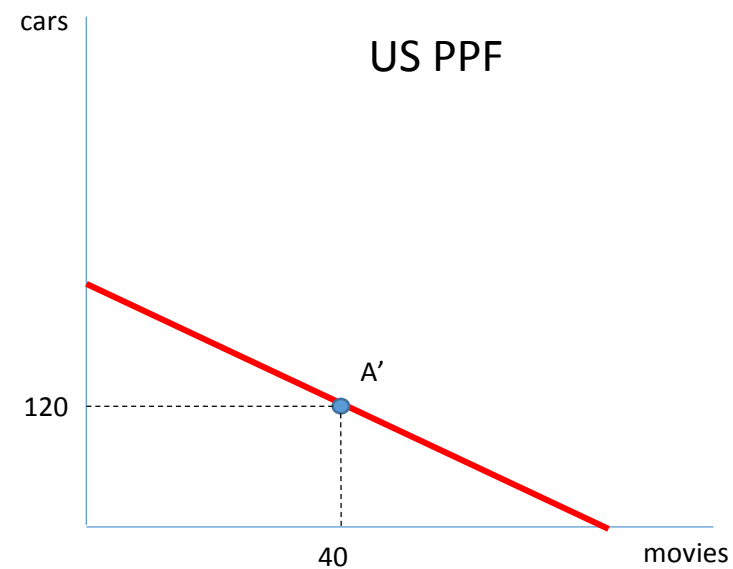
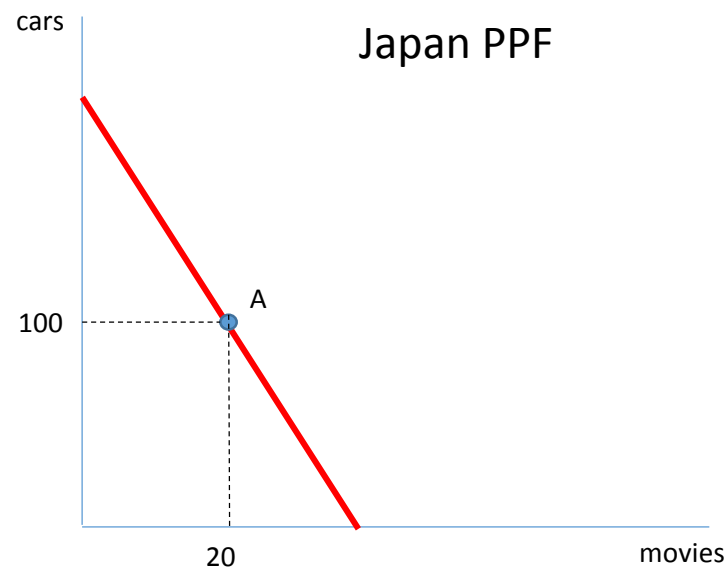
- In other words,
 - For the Japanese:
 - . the opportunity cost of producing 1 more movie is 5 cars
 - . similarly, the opportunity cost of producing 1 more car is $\frac{1}{5}$ of a movie.
 - For the Muricans :p
 - . the opportunity cost of producing 1 more movie is 3 cars
 - . similarly, the opportunity cost of producing 1 more car is $\frac{1}{3}$ of a movie.

Absolute/Comparative Advantage (5)

- The Japanese have a lower opportunity cost for producing cars
 - 1/5 of a movie compared to 1/3 of a movie for Americans.
- The Americans have a lower opportunity cost for producing movies
 - 3 cars compared to 5 cars for the Japanese
- The Japanese are said to have the **comparative advantage** in the production of cars and...
- The Americans are said to have the **comparative advantage** in the production of movies.
- *Comparative advantage means that production is done more efficiently.*

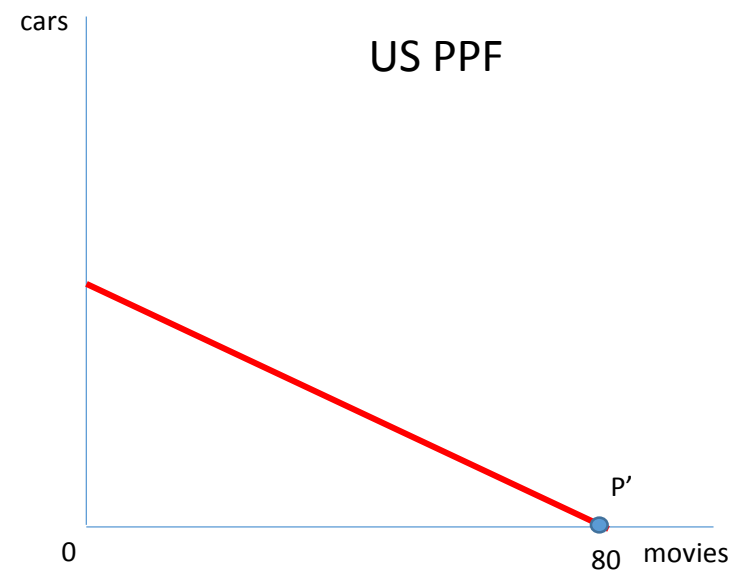
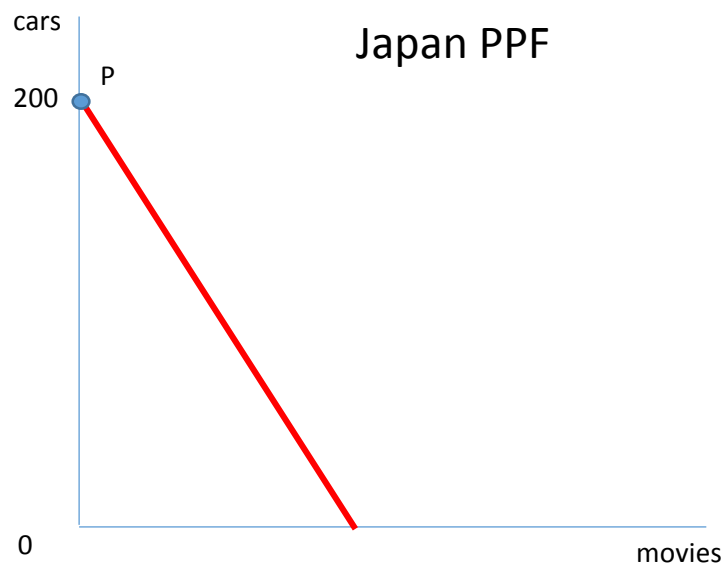
Specialization and trade

- Let's assume a 2 x 2 model:
 - 2 countries are engaged in trade: Japan and the US
 - 2 goods are being traded: cars and movies
- Following are the PPFs of each country and how much they produce without trade:



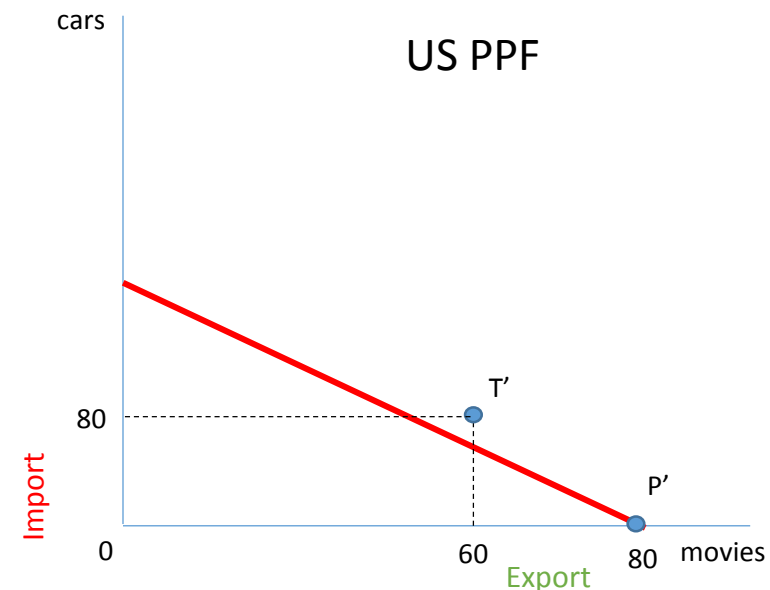
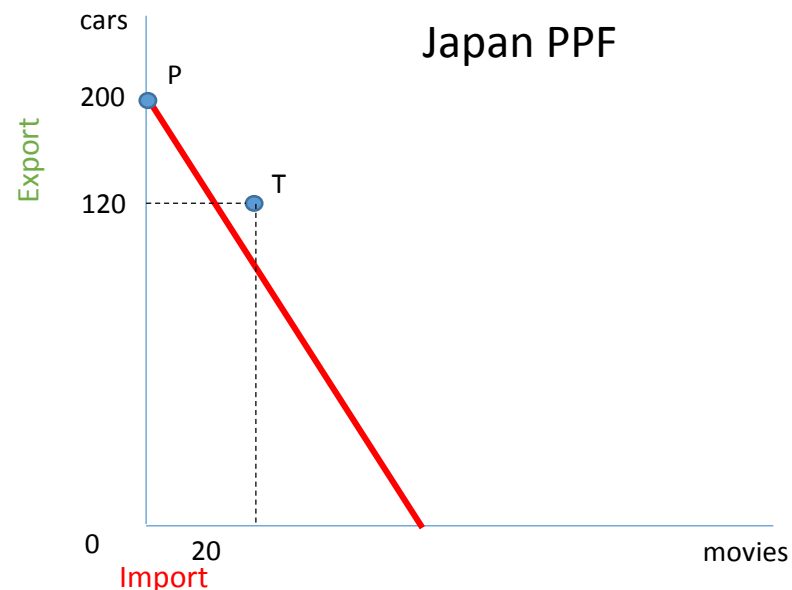
Specialization and trade (2)

- If Japan has the comparative advantage in the production of cars and the US has the comparative advantage in the production of movies, they can decide to fully specialize.
- Full specialization means that each country will exclusively produce the good in which they have the comparative advantage.
- This means that Japan will produce 200 cars and the US will produce 80 movies.



Specialization and trade (3)

- Now let's assume that they decide to trade after specialization.
- Let's assume that the *terms of trade* between Japan and the US are 1 movie for 4 cars...
- and they decide to trade 20 movies for 80 cars.



Gains from trade

- After specializing and trading:
 - Japan exports 80 cars and imports 20 movies; they consume 120 cars and 20 movies.
 - The US exports 20 movies and imports 80 cars; they consume 80 cars and 60 movies.
- Both countries end up consuming at levels higher than their PPFs (which is impossible without trade because these are unattainable levels).
- Therefore, each country benefits from trade.

You should now be able to...

- Define what a PPF is.
- Use a PPF to illustrate the concept of opportunity cost.
- Know the different shapes of a PPF depending on how the opportunity cost changes.
- Explain the concepts of absolute and comparative advantages
- Explain and illustrate how nations gain from specialization and trade with the use of the PPF model.