

ECO101 - Introduction to Microeconomics

Department of Economics and Social Science (ESS), Brac University

Production Possibility Frontier (PPF), Comparative & Absolute Advantage

Lecture 1

Reading

- Economics by Michael Parkin, 10th edition
 - Chapter: 1 and 2
- Principles of Economics by Mankiw, 6th Edition
 - Chapter: 1, 2 and 3

Production Possibilities Frontier (PPF)

- Production Possibilities Frontier (PPF) is a graph that shows the various combinations of output that the economy can possibly produce given the available factors of production and the available production technology that firms use to turn these factors into output
- The economy can produce any combination on or inside the frontier

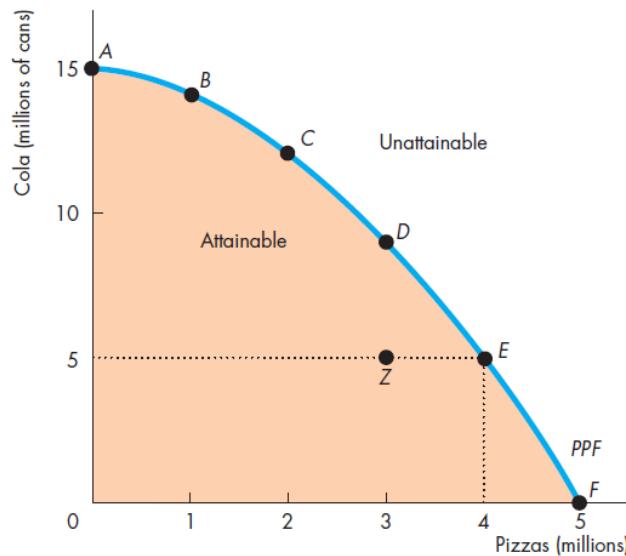
Limited Resources

- Land
- Labour
- Capital
- Entrepreneurship

By using available technologies, resources can be employed to produce good and services

Production Possibilities Frontier (PPF)

FIGURE 2.1 Production Possibilities Frontier

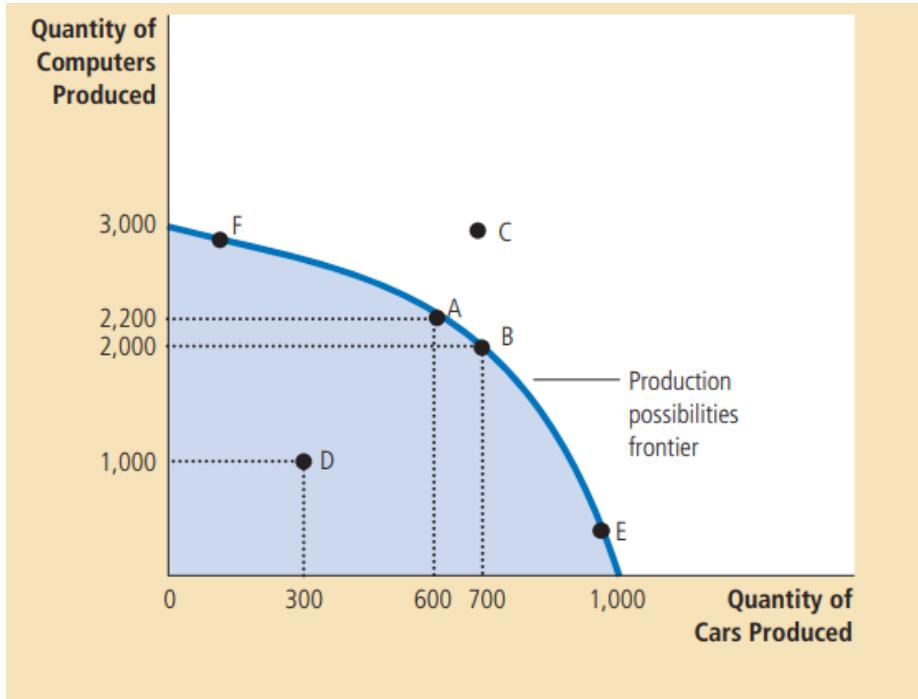


- Points outside the frontier are not feasible given the economy's resources (unattainable)
- We achieve **production efficiency** if we cannot produce more of one good without producing less of some other good
- In other words, an outcome is said to be efficient if the economy is getting all it can from the scarce resources it has available
- Production is said to be inefficient if there are some unused and/or misallocated resources

Production Possibilities Frontier & Opportunity Cost

- The quantities of goods and services that can be produced are limited both by available resources and by technology, which results in trade-off
- Once an economy has reached production efficiency, the only way of producing more of one good is to produce less of the other
- This trade-off  Opportunity Cost
- Opportunity cost of an action is the highest-valued alternative forgone

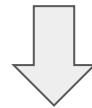
Production Possibilities Frontier & Opportunity Cost



- The production possibilities frontier shows the opportunity cost of one good as measured in terms of the other good
- When society moves from point A to point B, it gives up 200 computers to get 100 additional cars. That is, at point A, the opportunity cost of 100 cars is 200 computers

Opportunity Cost & Shape of PPF

The opportunity cost of a car in terms of the number of computers is not constant in this economy but depends on how many cars and computers the economy is producing (because resources are not all equally productive in all activities) and this is why the the production possibilities frontier is bowed outward



Opportunity cost of a car increases as the quantity of cars produced increases

Opportunity Cost

Calculating opportunity cost:

- We can do that by calculating the gradient/slope between two points along the PPF

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{\text{first } y\text{-coordinate} - \text{second } y\text{-coordinate}}{\text{first } x\text{-coordinate} - \text{second } x\text{-coordinate}}$$

Opportunity Cost

For example:

Consider that we are to produce additional 100 cars and we move from point A to B

So the opportunity cost of producing car is 2 computers

Now conversely, if we are to increase production of computers by decreasing production of cars, moving from point B to A, the opportunity cost of producing computer is $\frac{1}{2}$ of a car (because opportunity cost is a ratio and hence, opportunity cost of producing an additional computer is equal to the inverse of the opportunity cost of producing an additional car)

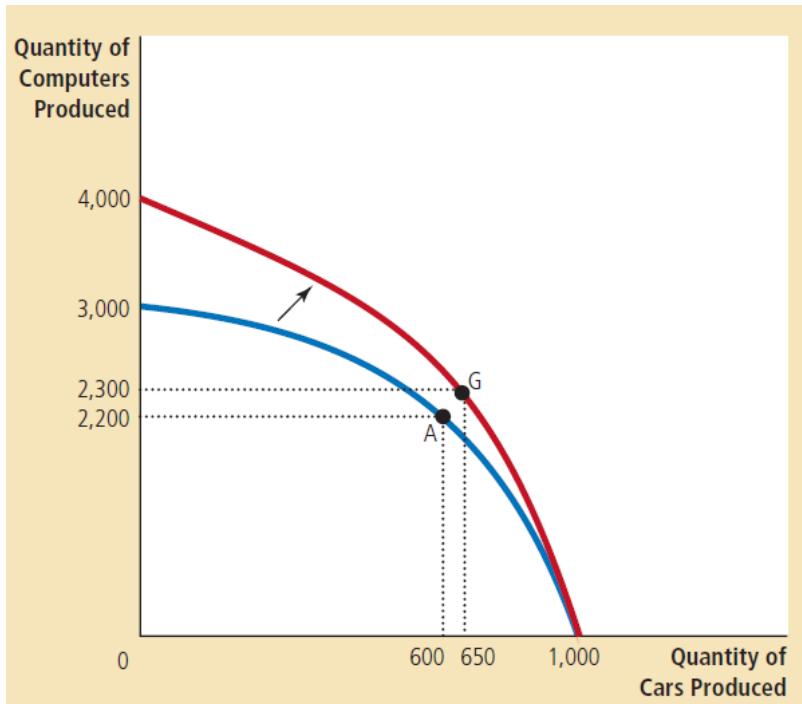
PPF and Economic Growth

- The production possibilities frontier shows the tradeoff between the outputs of different goods at a given time, but the trade-off can change over time
- For instance, this may be due to technological change and capital accumulation
- Technological change is the development of new goods and of better ways of producing goods and services
- Capital accumulation is the growth of capital resources, including human capital
- Technological change and capital accumulation drive economic growth

Example: PPF and Economic Growth

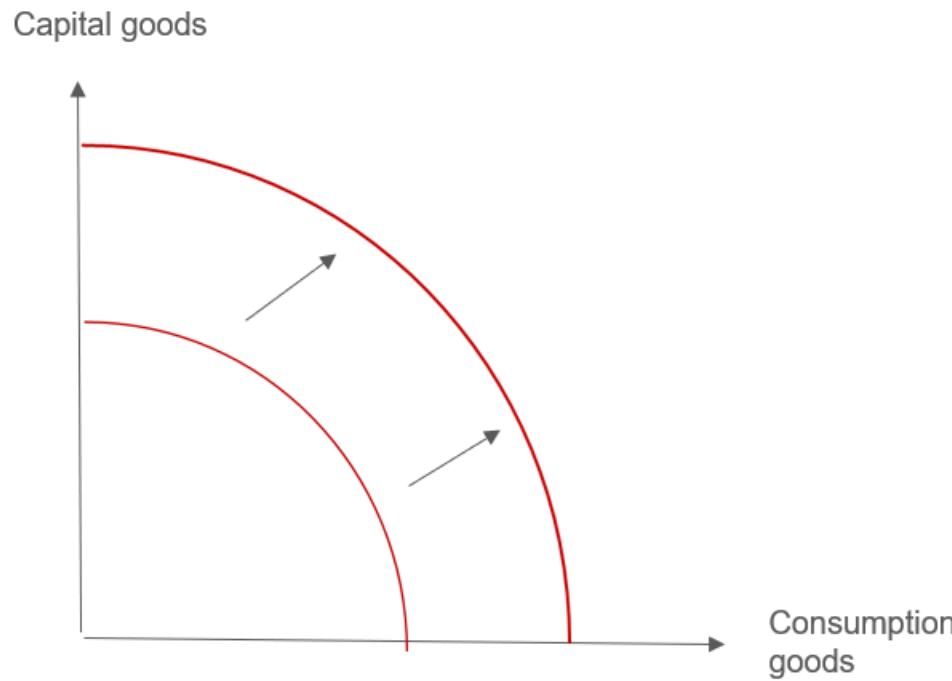
- Suppose a technological advancement in the computer industry raises the number of computers that a worker can produce per week
- So now for any given number of cars, the economy can make more computers. If the economy does not produce any computers, it can still produce 1,000 cars, so one endpoint of the frontier stays the same. But the rest of the production possibilities frontier shifts outward
- This results in economic growth

Shift in PPF

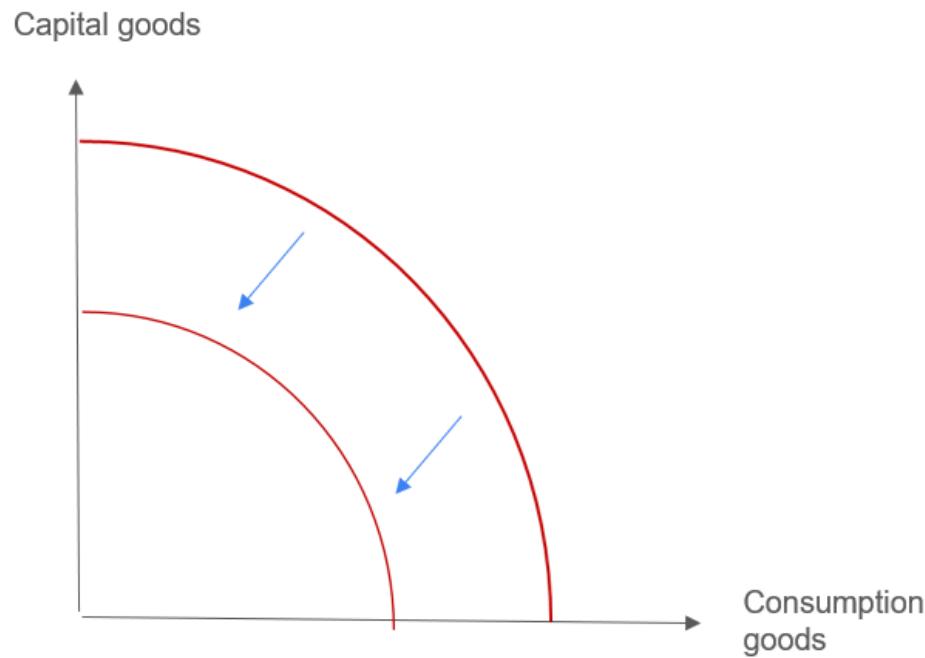


- Due to technological advance in the computer industry, the economy moves from A to G
- Production of both cars and computers increases
- Leads to economic growth

Shift in PPF



Shift in PPF



Gains from Trade

Gains from Trade

- People can produce for themselves all the goods that they consume, or they can concentrate on producing one good and then trade with others in exchange of their own goods for those of other goods
- We are going to discover how people gain by specializing in the production of the good in which they have a comparative advantage and by trading with each other

Gains from Trade

- Specialization
 - Concentrating on the production of only good or a few goods is called specialization
- Comparative advantage
 - Comparative advantage is defined as the ability to produce a good at a lower opportunity cost than another producer
- Absolute advantage
 - Absolute advantage is defined the ability to produce a good using fewer inputs than another producer
 - Used to compare the productivity of one person, firm, or nation to that of another

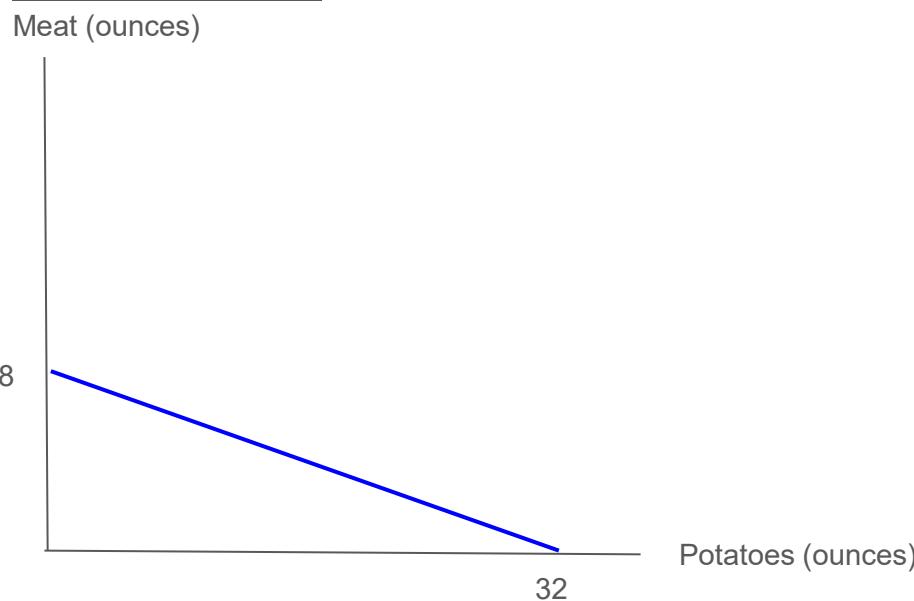
Example - Absolute Advantage

(a) Production Opportunities				
	Minutes Needed to Make 1 Ounce of:		Amount Produced in 8 Hours	
	Meat	Potatoes	Meat	Potatoes
Farmer	60 min/oz	15 min/oz	8 oz	32 oz
<u>Rancher</u>	20 min/oz	10 min/oz	24 oz	48 oz

- The rancher has an absolute advantage both in producing meat and in producing potatoes because she requires less time than the farmer to produce a unit of either good

Example - Comparative Advantage

Farmer's PPF



- OC of producing 1 oz of potatoes is $\frac{1}{4}$ oz of meat
- OC of producing 1 oz of meat is 4 oz of potatoes

Example - Comparative Advantage

Rancher's PPF



- OC of producing 1 oz of potatoes is $\frac{1}{2}$ oz of meat
- OC of producing 1 oz of meat is 2 oz of potatoes

Comparative Advantage

- Rancher has comparative advantage in producing meat
 - Because rancher has a lower opportunity cost of producing meat than farmer
- Farmer has comparative advantage in growing potatoes
 - Because farmer has a lower opportunity cost of producing potatoes than rancher

Note: It is possible to have absolute advantage in production of both goods (as in the case of rancher) but it is impossible to have comparative advantage in production of both goods

Comparative Advantage

It is impossible for one producer to have a comparative advantage in both goods - why?

- Because the opportunity cost of one good is the inverse of the opportunity cost of the other
- If a producer's opportunity cost of one good is relatively high, the opportunity cost of the other good must be relatively low
- Comparative advantage reflects the relative opportunity cost
- Unless two producers have exactly the same opportunity cost, one producer will have a comparative advantage in one good, and the other producer will have a comparative advantage in the other good
- What if the opportunity cost of producing both meat and potatoes are equal for Rancher and Farmer?

Comparative Advantage & Gains from Trade

- The gains from specialization and trade are based not on absolute advantage but on comparative advantage
- When each person specializes in producing the good for which he or she has a comparative advantage, total production in the economy rises
- This increase in the size of the economic pie can be used to make everyone better off

Exercise

Liz and Joe both own smoothie bar and their PPFs are as below

Liz's PPF

Item	Minute to produce 1 unit	Quantity per hour
Smoothies	2	30
Salad	2	30

Joe's PPF

Item	Minute to produce 1 unit	Quantity per hour
Smoothies	10	6
Salad	2	30

Exercise - Questions

- In which of the two activities does Liz have a comparative advantage?
- In which of the two activities does Joe have a comparative advantage?

Exercise - Answers

- Liz has a comparative advantage in producing smoothies
 - OC of producing 1 smoothie is 1 salad
- Joe has a comparative advantage in producing salads
 - OC of producing 1 salad is $\frac{1}{5}$ smoothie

*Workings demonstrated during the lecture

Gains from Trade

Suppose without trade, Liz is able to produce and sell 15 smoothies and 15 salads, whereas Joe makes and sells 5 smoothies and 5 salads

Production	Liz	Joe
Smoothies	15	5
Salads	15	5

Gain from Trade

Liz's proposal for Joe: Joe would allocate all his time in making 30 salads and Liz would allocate all her time in making 30 smoothies and they would trade as follows

Production	Liz	Joe
Smoothies	30	0
Salads	0	30
Trade	Liz	Joe
Smoothies	Sell 10	Buy 10
Salads	Buy 20	Sell 20
After Trade	Liz	Joe
Smoothies	20	10
Salads	20	10

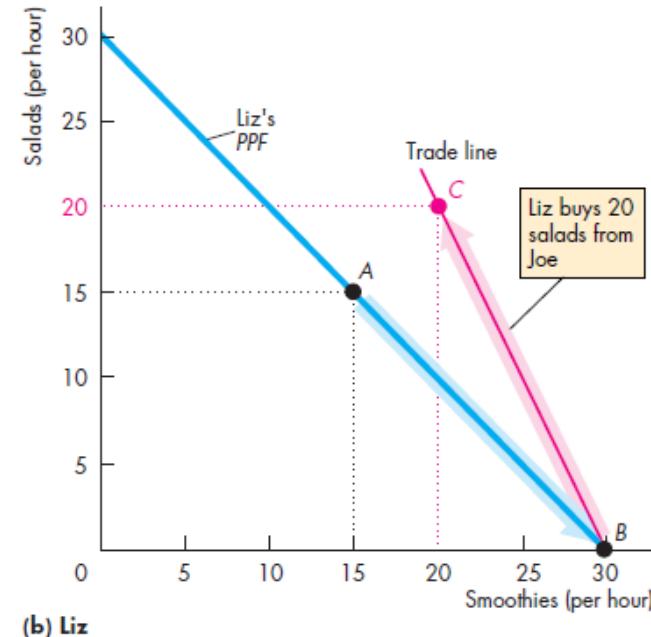
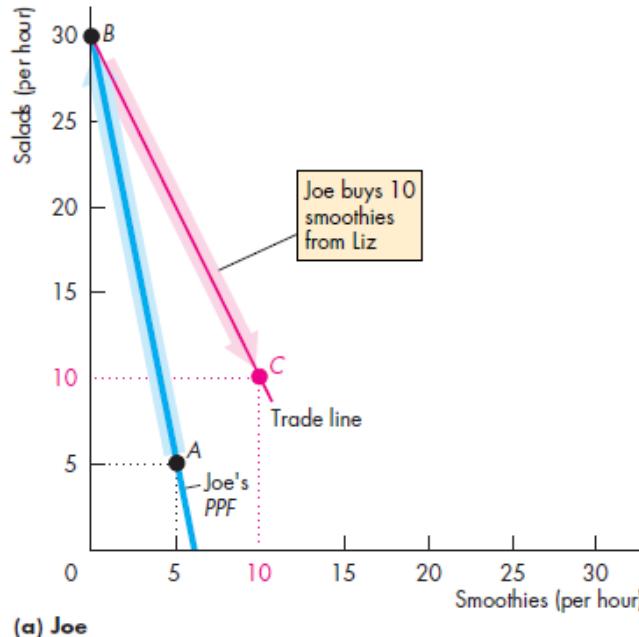
Gains from Trade

Both Liz and Joe gain 5 smoothies and 5 salads

Gains from Trade	Liz	Joe
Smoothies	+5	+5
Salads	+5	+5

Gains from Trade

FIGURE 2.6 The Gains from Trade



Exercise - No Trade

Now consider the following:

Liz's PPF

Item	Quantity per hour
Smoothies	20
Salad	40

Joe's PPF

Item	Quantity per hour
Smoothies	15
Salad	30

Exercise - No Trade

- For Liz
 - OC of producing a smoothie is 2 salads
 - OC of producing a salad is $\frac{1}{2}$ a smoothie
- For Joe
 - OC of producing a smoothie is 2 salads
 - OC of producing a salad is $\frac{1}{2}$ a smoothie
- Therefore, no comparative advantage, no trade

Gains from Trade

PPFs and workings demonstrated and explained in class