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Module:

Microeconomics

Lecturer:

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Microeconomics

Lecture 2 - Foundations

The Production Possibilities Frontier

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- The Production Possibilities Frontier is a model that helps us identify & think about certain aspects of the economy
- We assume that there are only two goods produced in the economy & one factor of production
- Goods: computers & wheat
- Factor: labour (measured in hours)
- Economy has 50,000 labour hours per month available for production

Production Possibilities Frontier Example

- Producing one computer requires 100 hours labor.
- Producing one ton of wheat requires 10 hours labor.

	Employment of labor hours		Production	
	Computers	Wheat	Computers	Wheat
A	50,000	0	500	0
B	40,000	10,000	400	1,000
C	25,000	25,000	250	2,500
D	10,000	40,000	100	4,000
E	0	50,000	0	5,000

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Production Possibilities Frontier Example

Point on graph	Production	
	Com-puters	Wheat
A	500	0
B	400	1,000
C	250	2,500
D	100	4,000
E	0	5,000

PPF & Efficiency

- Point **F**: 100 computers, 3000 tons wheat
- Point **F** requires 40,000 hours of labor. Possible but not efficient: could get more of either good w/o sacrificing any of the other.

PPF & Impossibility (given resource & technological constraints)

- Point **G**:
  300 computers,
  3500 tons wheat

- Point **G** requires
  65,000 hours
  of labor.
  Not possible
  because
  economy
  only has
  50,000 hours.

The PPF: So Far

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Points on the PPF (like **A** & **E**)

- possible
- efficient: all resources are fully utilized

Points under the PPF (like **F**)

- possible
- not efficient: some resources underutilized (e.g., workers unemployed, factories idle)

Points above the PPF (like **G**)

- not possible (given the resources and technology available)

The PPF & Opportunity Cost

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- Recall: The **opportunity cost** of an item is what must be given up to obtain that item.
- Moving along a PPF involves shifting resources (e.g., labor) from the production of one good to the other.
- Society faces a tradeoff: Getting more of one good requires sacrificing some of the other.
- The slope of the PPF tells you the opportunity cost of one good in terms of the other.

The PPF & Opportunity Cost

The slope of a line equals the "**rise** over the **run**," the amount the line rises when you move to the right by one unit.

Here, the opportunity cost of 1 computer is 10 tons of wheat.

PPF & Opportunity Cost

In which country is the opportunity cost of cloth lower?

Economic Growth and the PPF

With additional resources or an improvement in technology, the economy can produce more computers, more wheat or any combination in between.

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The Shape of the PPF

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- The PPF could be a straight line or bow-shaped.
- This depends on what happens to opportunity cost as economy shifts resources from one industry to the other.
  - If opportunity cost remains constant, the PPF is a straight line.

    (In the previous example, opp. cost of a computer was always 10 tons of wheat.)
  - If opportunity cost of a good rises as more of the good is produced, PPF is bow-shaped….

Why the PPF Might Be Bow-Shaped

As the economy shifts resources from beer to mountain bikes:

- PPF becomes steeper
- opp. cost of mountain bikes increases

Why the PPF Might Be Bow-Shaped

At point **A**, most workers are producing beer, even those who are better suited to building bikes.

So, do not have to give up much beer to get more bikes.

At **A**, opportunity cost of mountain bikes is low.

Why the PPF Might Be Bow-Shaped

At **B**, most workers are producing bikes. The few left in beer are the best brewers.

Producing more bikes would require shifting some of the best brewers away from beer production, causing a big drop in beer output.

At **B**, opportunity cost of mountain bikes is high

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Why the PPF Might Be Bow-Shaped

- The PPF is bow-shaped when different workers have different skills, different opportunity costs of producing one good in terms of the other.
- The PPF would also be bow-shaped when there is another resource, or mix of resources with varying opportunity costs (E.g., different types of land suited for different uses).

The PPF: A Summary

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- The PPF shows all combinations of two goods that an economy can possibly produce, given the available resources & technology.
- The PPF illustrates the concepts of tradeoff & opportunity cost, efficiency & inefficiency, unemployment, & economic growth.
- A bow-shaped PPF illustrates the concept of increasing opportunity cost.

Trade (& International Trade)

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- Why do people & countries choose to be economically interdependent?
- Can trade make everyone better off?
- To answer these questions we need to understand the concepts of absolute advantage and comparative advantage

Trade (& International Trade)

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- Two countries: U.S. & Japan
- Two goods: computers & wheat
- One Factor of Production: labor (measured in hours)
- We will look at how much of both goods each country produces & consumes
  - if the country chooses to be self-sufficient
  - if it trades with the other country

U.S. Production Possibilities

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- The U.S. has 50,000 hours of labor available for production, per month.
  - Producing one computer requires 100 hours of labor.
  - Producing one ton of wheat requires 10 hours of labor.

The U.S. PPF

The U.S. has enough labor to produce 500 computers, or 5000 tons of wheat or any combination along the PPF.

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The U.S. Without Trade

Suppose the U.S. uses half its labor to produce each of the two goods.

Then it will produce and consume 250 computers and 2500 tons of wheat.

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Japan Production Possibilities

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- Japan has 30,000 hours of labour available for production, per month.
  - Producing one computer requires 125 hours of labor.
  - Producing one ton of wheat requires 25 hours of labor.

Japan's PPF

Japan has enough labor to produce 240 computers,

or 1200 tons of wheat,

or any combination along the PPF.

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Japan Without Trade

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Suppose Japan uses half its labor to produce each good.

Then it will produce and consume 120 computers and 600 tons of wheat.

Consumption With and Without Trade

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- Without trade,
  - U.S. consumers get 250 computers and 2500 tons wheat.
  - Japanese consumers get 120 computers and 600 tons wheat.
- We will compare consumption without trade to consumption with trade.
- First, we need to see how much of each good is produced and traded by the two countries.

U.S. Production With Trade

Producing 3400 tons of wheat requires 34,000 labor hours.

The remaining 16,000 labor hours are used to produce 160 computers.

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Japan's Production With Trade

Producing 240 computers requires all of Japan's 30,000 labor hours.

So, Japan would produce 0 tons of wheat.

U.S. Consumption With Trade

	computers	wheat
produced	160	3400
+ imported	110	0
– exported	0	700
= amount consumed	270	2700

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Japan's Consumption With Trade

	computers	wheat
produced	240	0
+ imported	0	700
– exported	110	0
= amount consumed	130	700

Trade Makes Both Countries Better Off

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U.S.			
	consumption without trade	consumption with trade	gains from trade
computers	250	270	**20**
wheat	2500	2700	**200**

Japan			
	consumption without trade	consumption with trade	gains from trade
computers	120	130	**10**
wheat	600	700	**100**

Where Do These Gains Come From?

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- **Absolute advantage**: the ability to produce a good using fewer inputs than another producer
- The U.S. has an absolute advantage in wheat: producing a ton of wheat uses 10 labor hours in the U.S. vs. 25 in Japan.
- If each country has an absolute advantage in one good & specializes in that good, then both countries can gain from trade.

Where Do These Gains Come From?

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- Which country has an absolute advantage in computers?
- Producing one computer requires
  125 labor hours in Japan,
  but only 100 in the U.S.
- The U.S. has an absolute advantage in <u>both</u> goods!

So why does Japan specialize in computers?
Why do <u>both</u> countries gain from trade?

Two Measures of the Cost of a Good

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- Two countries can gain from trade when each specializes in the good it produces at lowest cost.
- Absolute advantage measures the cost of a good in terms of the inputs required to produce it.
- Recall:
  Another measure of cost is *opportunity cost.*
- In our example, the opportunity cost of a computer is the amount of wheat that could be produced using the labor needed to produce one computer.

Opportunity Cost & Comparative Advantage

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- **Comparative advantage**: the ability to produce a good at a lower opportunity cost than another producer
- Which country has the comparative advantage in computers?
- To answer this, must determine the opportunity cost of a computer in each country.

Opportunity Cost & Comparative Advantage

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- The opportunity cost of a computer is
  - 10 tons of wheat in the U.S.: Producing one computer requires 100 labor hours, which instead could produce 10 tons of wheat.
  - 5 tons of wheat in Japan: Producing one computer requires 125 labor hours, which instead could produce 5 tons of wheat.
- So, Japan has a comparative advantage in computers.
- *Lesson: Absolute advantage is not necessary for comparative advantage!*

Comparative Advantage & Trade

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- Gains from trade arise from comparative advantage (differences in opportunity costs).
- When each country specializes in the good(s) in which it has a comparative advantage, total production in all countries is higher, the world's "economic pie" is bigger, & all countries can gain from trade.
- The same applies to individual producers (like You & I) who benefit by specializing in different goods and trading with each other.

Markets and Competition

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- A **market** is a group of buyers and sellers of a particular product.
- A **competitive market** is one with many buyers and sellers, each has a negligible effect on price.
- In a **perfectly competitive** market:
  - The good produced is homogenous (i.e. consumer cannot tell the difference between different brands)
  - Buyers & sellers so numerous that no one can affect market price each is a "**price taker**"
- For the moment, we assume markets are perfectly competitive.

Demand

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- The **quantity demanded** of any good is the amount of the good that buyers are willing & able to purchase.
- **Law of demand**: the claim that the quantity demanded of a good falls when the price of the good rises, other things equal

The Demand Schedule

- **Demand schedule**: a table that shows the relationship between the price of a good and the quantity demanded
- Example: Helen's demand for lattes.
- Notice that Helen's preferences obey the law of demand.

Price of lattes	Quantity of lattes demanded
$0.00	16
1.00	14
2.00	12
3.00	10
4.00	8
5.00	6
6.00	4

Helen's Demand Schedule & Curve

Price of lattes	Quantity of lattes demanded
$0.00	16
1.00	14
2.00	12
3.00	10
4.00	8
5.00	6
6.00	4

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Demand Curve Shifters

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- The demand curve shows how price affects quantity demanded, *other things being equal*.
- These "other things" are non-price determinants of demand (i.e., things that determine buyers' demand for a good, other than the good's price).
- Changes in them shift the ***D*** curve…

Demand Curve Shifters: **# of Buyers**

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- Increase in # of buyers increases quantity demanded at each price, shifts ***D*** curve to the right.

Demand Curve Shifters: # of Buyers

Suppose the number of buyers increases.

Then, at each ***P***, Q^d will increase (by 5 in this example).

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Demand Curve Shifters: **Income**

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- Demand for a **normal good** is positively related to income.
  - Increase in income causes increase in quantity demanded at each price, shifts ***D*** curve to the right.

(Demand for an **inferior good** is negatively related to income. An increase in income shifts ***D*** curves for inferior goods to the left.)

Demand Curve Shifters: **Prices of Related Goods**

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- Two goods are **substitutes** if an increase in the price of one causes an increase in demand for the other.
- Example: pizza & hamburgers. An increase in the price of pizza increases demand for hamburgers, shifting hamburger demand curve to the right.
- Other examples: Coke & Pepsi, laptops & desktop computers, CDs & music downloads

Demand Curve Shifters: **Prices of Related Goods**

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- Two goods are **complements** if an increase in the price of one causes a fall in demand for the other.
- Example: computers & software. If price of computers rises, people buy fewer computers, & therefore less software.
- Software demand curve shifts left.
- Other examples: college tuition & textbooks, bagels & cream cheese, eggs & bacon

Demand Curve Shifters: **Tastes**

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- Anything that causes a shift in tastes *toward* a good will increase demand for that good & shift its ***D*** curve to the right.
- Example:
  The Atkins diet became popular in the '90s,
  caused an increase in demand for eggs,
  shifted the egg demand curve to the right.

Demand Curve Shifters: **Expectations**

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- Expectations affect consumers' buying decisions.
- Examples:
  - If people expect their incomes to rise, their demand for meals at expensive restaurants may increase now.
  - If the economy sours and people worry about their future job security, demand for new car may fall now.

Summary: Variables That Influence Buyers

Variable	*A change in this variable…*
Price	…causes a movement along the ***D*** curve
# of buyers	…shifts the ***D*** curve
Income	…shifts the ***D*** curve
Price of related goods	…shifts the ***D*** curve
Tastes	…shifts the ***D*** curve
Expectations	…shifts the ***D*** curve

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Supply

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- The **quantity supplied** of any good is the amount that sellers are willing & able to sell.
- **Law of supply**: the claim that the quantity supplied of a good rises when the price of the good rises, other things equal

The Supply Schedule

- **Supply schedule**: A table that shows the relationship between the price of a good and the quantity supplied.
- Example: Starbucks' supply of lattes.
  - Does Starbucks' supply schedule obeys the law of supply?

Price of lattes	Quantity of lattes supplied
$0.00	0
1.00	3
2.00	6
3.00	9
4.00	12
5.00	15
6.00	18

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Starbucks' Supply Schedule & Curve

Price of lattes	Quantity of lattes supplied
$0.00	0
1.00	3
2.00	6
3.00	9
4.00	12
5.00	15
6.00	18

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Supply Curve Shifters

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- The supply curve shows how price affects quantity supplied, *other things being equal.*
- These "other things" are non-price determinants of supply.
- Changes in these shift the ***S*** curve…

Supply Curve Shifters: **Input Prices (Business costs)**

- Examples of input prices: wages, prices of raw materials.
- A fall in input prices makes production more profitable at each output price, so firms supply a larger quantity at each price, & the ***S*** curve shifts to the right.

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Supply Curve Shifters: **Input Prices**

Suppose the price of milk falls.

At each price, the quantity of lattes supplied will increase (by 5 in this example).

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Supply Curve Shifters: **Technology**

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- Technology determines how much inputs are required to produce a unit of output.
- A cost-saving technological improvement shifts ***S*** curve to the right.

Supply Curve Shifters: **# of Sellers**

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- An increase in the number of sellers increases the quantity supplied at each price.
- Shifts ***S*** curve to the right.
- A decrease in the number of sellers decreases the quantity supplied at each price.
- Shifts ***S*** curve to the left.

Supply Curve Shifters: **Expectations**

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- Example:
  - Events in the Middle East lead to expectations of higher oil prices.
  - In response, owners of Texas oilfields reduce supply now, save some inventory to sell later at the higher price.
  - ***S*** curve shifts left.
- In general, sellers may adjust supply when their expectations of future prices change. (*If good not perishable*)

Summary: Variables that Influence Sellers

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Variable	*A change in this variable…*
Price	…causes a movement along the ***S*** curve
Input Prices	…shifts the ***S*** curve
Technology	…shifts the ***S*** curve
# of Sellers	…shifts the ***S*** curve
Expectations	…shifts the ***S*** curve

Supply & Demand Together

Equilibrium:
P has reached the level where quantity supplied equals quantity demanded

Equilibrium price: the price that equates quantity supplied with quantity demanded

P	Q^D	Q^S
$0	24	0
1	21	5
2	18	10
3	15	15
4	12	20
5	9	25
6	6	30

Equilibrium quantity: the quantity supplied & demanded at the equilibrium price

P	Q^D	Q^S
$0	24	0
1	21	5
2	18	10
3	15	15
4	12	20
5	9	25
6	6	30

Excess Supply

Example: If ***P*** = $5, then Q^D = 9 lattes & Q^S = 25 lattes resulting in a surplus of 16 lattes

Excess Supply: when quantity supplied is greater than quantity demanded

Excess Supply

Facing a surplus, sellers try to increase sales by cutting price. This causes Q^D to rise and Q^S to fall……which reduces the surplus.

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Excess Supply

Prices continue to fall until market reaches equilibrium.

Excess Demand

Example: If ***P*** = $1, then Q^D = 21 lattes & Q^S = 5 lattes resulting in a shortage of 16 lattes

Excess Demand: when quantity demanded is greater than quantity supplied

Excess Demand

Facing a shortage, sellers raise the price, causing Q^D to fall and Q^S to rise, …which reduces the shortage.

Excess Demand

Prices continue to rise until market reaches equilibrium.

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3 Steps to Analyzing Changes in Equilibrium

To determine the effects of any event,

1. Decide whether the event shifts ***S*** curve, ***D*** curve, or both.
2. Decide in which direction curve shifts.
3. Use supply—demand diagram to see how the shift changes equilibrium ***P*** and ***Q***.

EXAMPLE: The Market for Hybrid Cars

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EXAMPLE 1: A Shift in Demand

EVENT TO BE ANALYZED:
Increase in price of gas.

STEP 1:

D curve shifts

STEP 2:

D shifts <u>right</u>

STEP 3:

The shift causes an increase in price and quantity of hybrid cars.

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EXAMPLE 1: A Shift in Demand

Notice:
When ***P*** rises, producers supply a larger quantity of hybrids, even though the ***S*** curve has not shifted.

Always be careful to distinguish b/w a shift in a curve and a movement along the curve.

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Terms for Shift vs. Movement Along Curve

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- **Change in the quantity demanded**: a movement along a fixed ***D*** curve occurs when ***P*** changes
- **Change in demand**: a shift in the ***D*** curve occurs when a non-price determinant of demand changes (like income or # of buyers)
- **Change in the quantity supplied**: a movement along a fixed ***S*** curve occurs when ***P*** changes
- **Change in supply**: a shift in the ***S*** curve occurs when a non price determinant of supply changes (like technology or costs)

EXAMPLE 2: A Shift in Supply

EVENT: New technology reduces cost of producing hybrid cars.

STEP 1:

S curve shifts

STEP 2:

S shifts <u>right</u>

STEP 3:

The shift causes price to fall and quantity to rise.

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EXAMPLE 3: A Shift in Both Supply and Demand

EVENTS:
Price of gas rises AND new technology reduces production costs

STEP 1:
Both curves shift.

STEP 2:
Both shift <u>to the right</u>.

STEP 3:
Q rises, but effect on ***P*** is ambiguous:
If demand increases more than supply, ***P*** rises.

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EXAMPLE 3: A Shift in Both Supply and Demand

EVENTS:
price of gas rises AND new technology reduces production costs

STEP 3, cont.

But if supply increases more than demand, ***P*** falls.

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