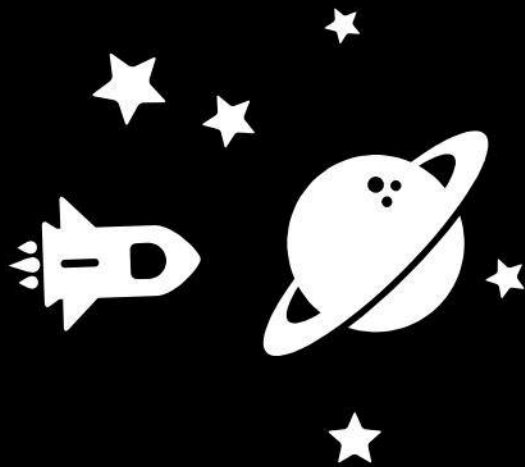




Unit 1:

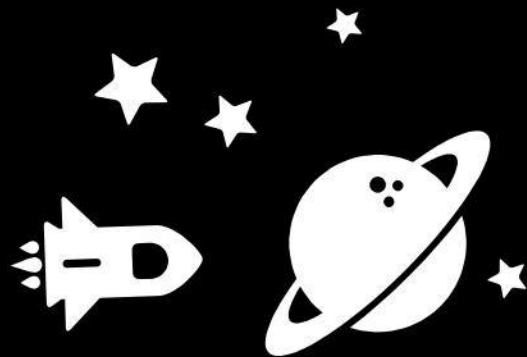
Microeconomics

SUPPLY



One half of the market structure and essential to the discipline of economics.

SUPPLY

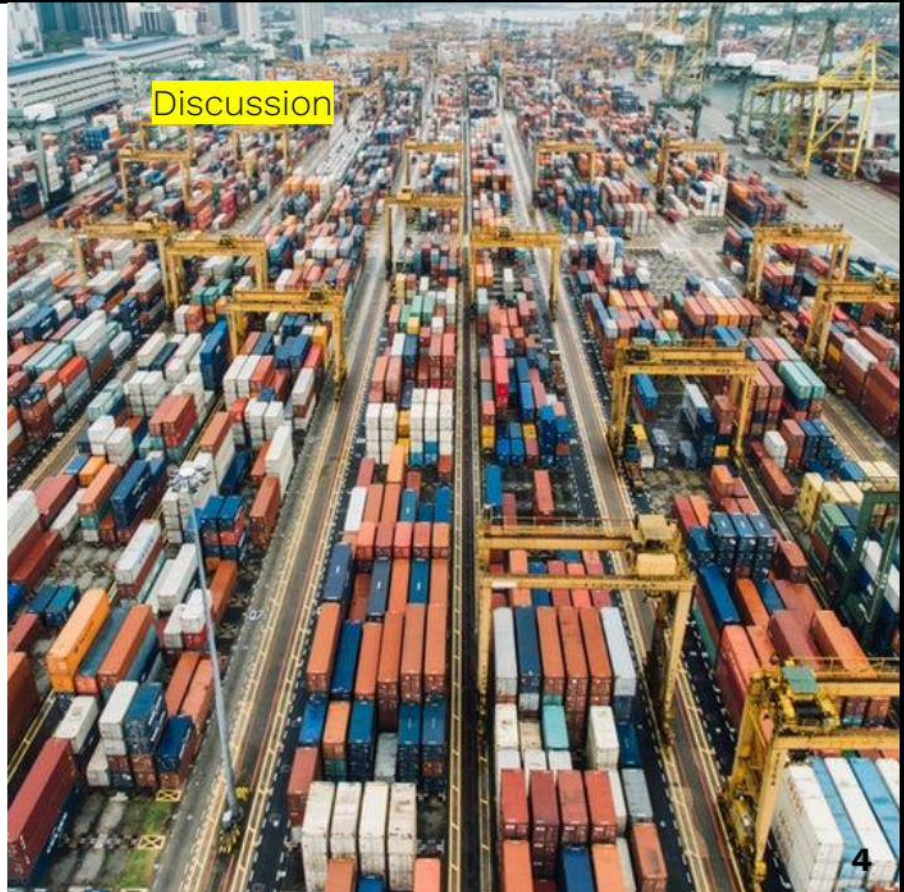


The **willingness and ability** of a **producer** to produce a quantity of a good or service at a given price, in a given time period.

Law of Supply

As the price of a good rises, the quantity supplied will normally rise, *ceteris paribus*.

...but why?



Main one

Profit Motive:

As prices increase, producers can earn higher profits for each unit sold, incentivizing them to produce more of the good. Higher revenue encourages suppliers to expand production to maximize earnings.

Covering Higher Costs:

As production expands, producers often face higher marginal costs (e.g., using more expensive inputs or less efficient production methods). The higher price helps cover these rising costs, making it financially viable for producers to supply more.

Entry of New Producers:

As prices increase, more firms or producers may find it profitable to enter the market, contributing to a rise in the overall quantity supplied.

Supply Schedule

LAW: As the price of a good rises, the quantity supplied will normally rise, *ceteris paribus*.

- Draw the supply schedule and work to fill in the right hand column of the schedule.
Assume there are 500 cans of soft drinks.
- Use the information in your supply schedule to construct a diagram featuring a supply curve.
- Be sure to label your diagram fully

DIAGRAM TIP

“Demand to the dirt, supply to the sky”

Price of soft drinks (\$)	Quantity of soft drinks supplied (cans)
4.00	
3.50	
3.00	
2.50	
2.00	
1.50	
1.00	
0.50	

Supply Schedule

LAW: As the price of a good rises, the quantity supplied will normally rise, *ceteris paribus*.

- Draw the supply schedule and work to fill in the right hand column of the schedule.
Assume there are 500 cans of soft drinks.
- Use the information in your supply schedule to construct a diagram featuring a supply curve.
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DIAGRAM TIP

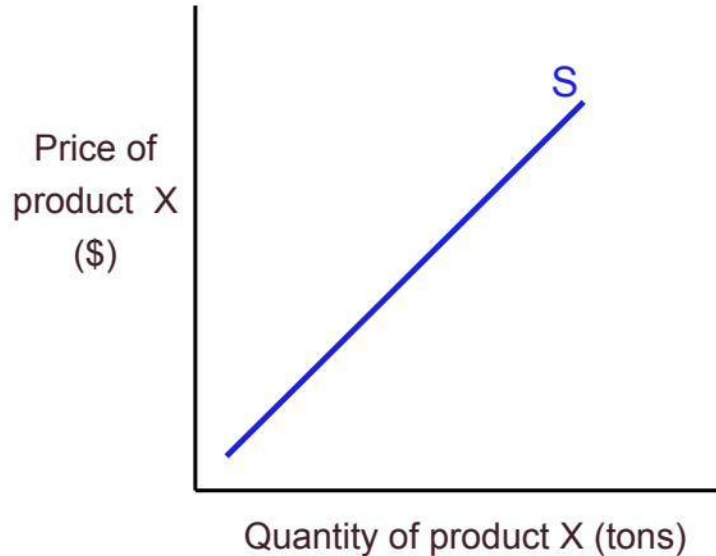
“Demand to the dirt, supply to the sky”

Price of soft drinks (\$)	Quantity of soft drinks supplied (cans)
4.00	500
3.50	450
3.00	400
2.50	350
2.00	300
1.50	250
1.00	200
0.50	150

The supply curve



Supply curve for product X:



- Slopes upwards from left to right.
- Higher prices increases the incentive for suppliers/producers to put more of the good on the market.

Drawing Supply Curves

Draw a diagram to explain how an increase in the price of burgers will impact quantity supplied of burgers.

Practice Problem #1

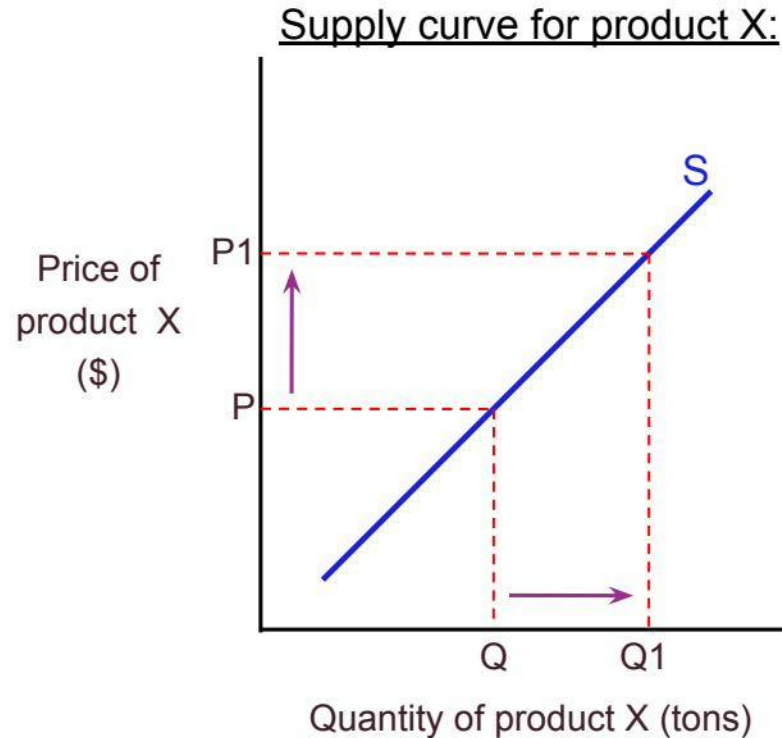


Δ supply vs Δ quantity supplied



- Based on what you know about DEMAND...
- Can you explain the difference between a change in SUPPLY and a change in QUANTITY SUPPLIED?

Δ quantity supplied

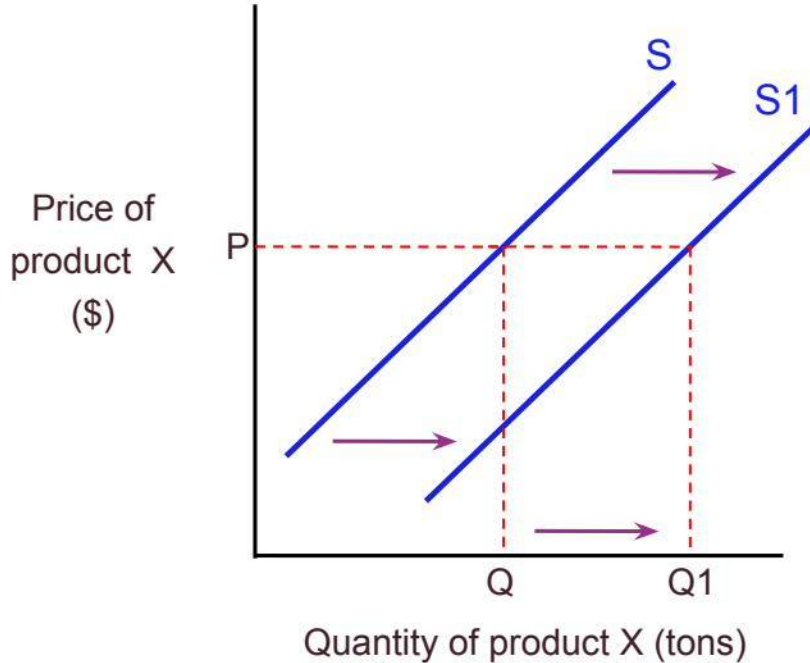


A change in price results in a change in quantity supplied and is represented by a movement along the supply curve.

Δ supply



Supply curve for product X:



A change in a non-price determinant results in a change in supply and is represented by a shift of the entire supply curve.

Non-price determinants of supply



(changes in the following will shift the supply curve)

- ★ **Costs of factors of production**
- ★ **Prices of related goods (joint & competitive supply)**
- ★ **Government intervention in the form of Indirect Taxes & Subsidies**
- ★ **Future Price Expectations**
- ★ **Changes in Technology**
- ★ **Number of Firms**

Coffee Prices Grow Fast in Nairobi

C: Costs of factors of production

P: Prices of related goods

G: Government intervention

F: Future price expectations

C: Changes in technology

N: Number of firms

NAIROBI

.....

THE TASTE OF DISTINCTION

Cost of Factors of Production



- Draw a diagram to show how an increase in the cost of water used to irrigate crops would impact the supply of wheat.

Increase in cost of production:

Water is a key input in wheat production. If the cost of water increases, the overall cost of producing wheat rises.

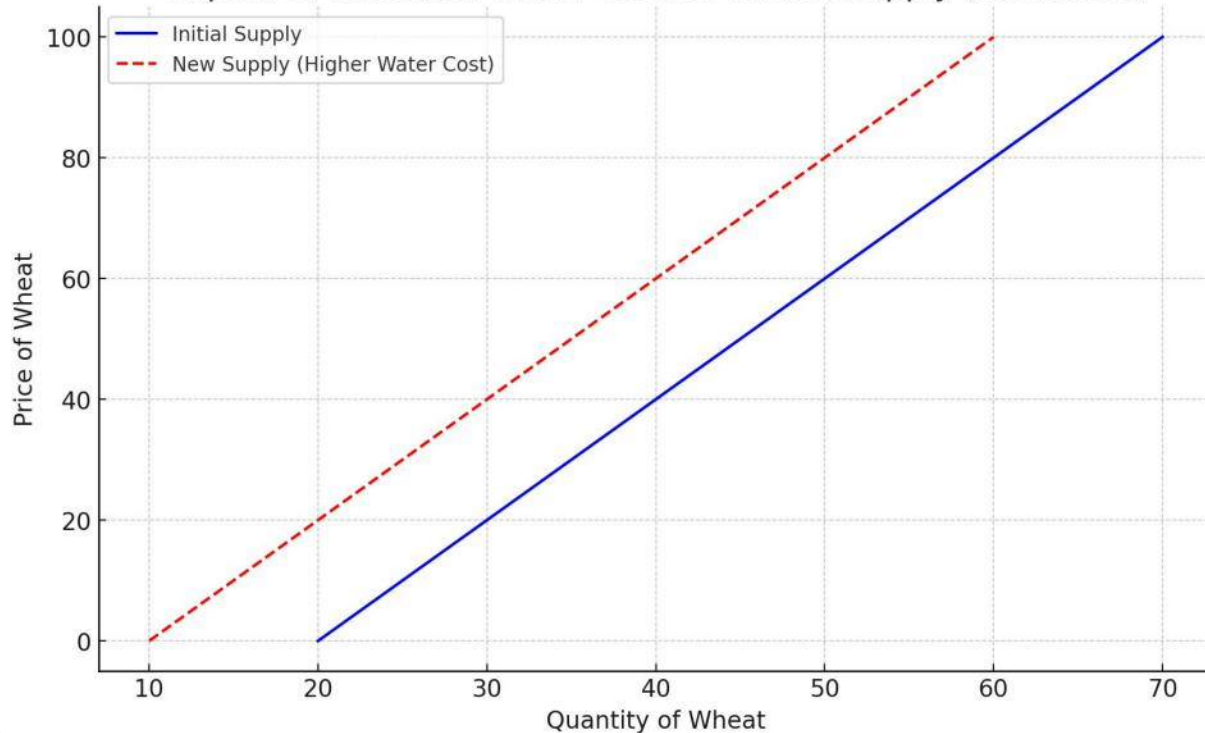
Impact on supply:

Higher production costs typically reduce the willingness or ability of producers to supply the same quantity of wheat at the same price. As a result, the supply curve shifts leftward (representing a decrease in supply).



Cost of Factors of Production

Impact of Increased Water Cost on Wheat Supply (Corrected)



Price of related goods - Competitive Supply

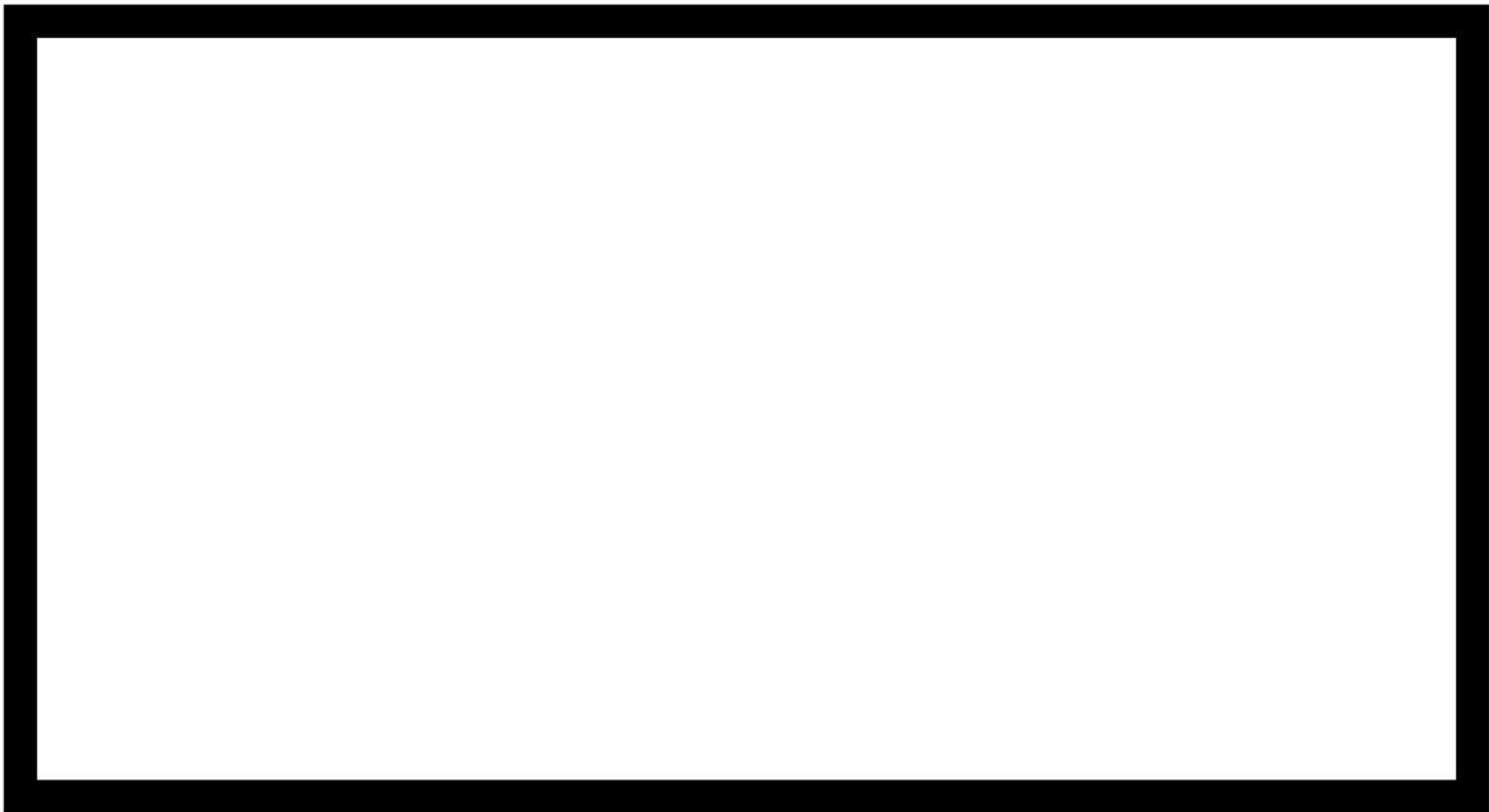


Often, producers have a choice about what they are going to produce, because the factors of production that they control are capable of producing more than one product

Price of related goods - Competitive Supply



- Draw TWO diagrams to show how an increase in the price of whiteboard markers would impact on the supply of permanent markers.



Price of related goods - Competitive Supply



- Producers switch from producing permanent markers to whiteboard markers which causes a decrease in supply of permanent markers and the supply curve shifts left.

When the price of whiteboard markers goes up, businesses that manufacture writing tools may shift their resources towards producing more permanent markers instead, as these become relatively cheaper to produce and sell compared to whiteboard markers.

This shift happens because companies aim to maximize profits by producing goods with higher demand or lower costs.



Scarcity of time...
scarcity of
resources... we
want to maximize
our efficiency.

Price of related goods - Joint Supply



- Sometimes when one good is produced, another good is produced at the same time. Examples:
 - ❑ Petrol - Diesel
 - ❑ Lamb chops - Wool
 - ❑ Corn Oil and Ethanol



Petrol and Diesel



Petrol: Used in cars and motorcycles.

Lighter, burns quickly, and less energy-efficient.

Diesel:

Used in trucks and large vehicles.

Heavier, more energy-efficient, burns slower.

Often made in same refineries.

Price of related goods - Joint Supply

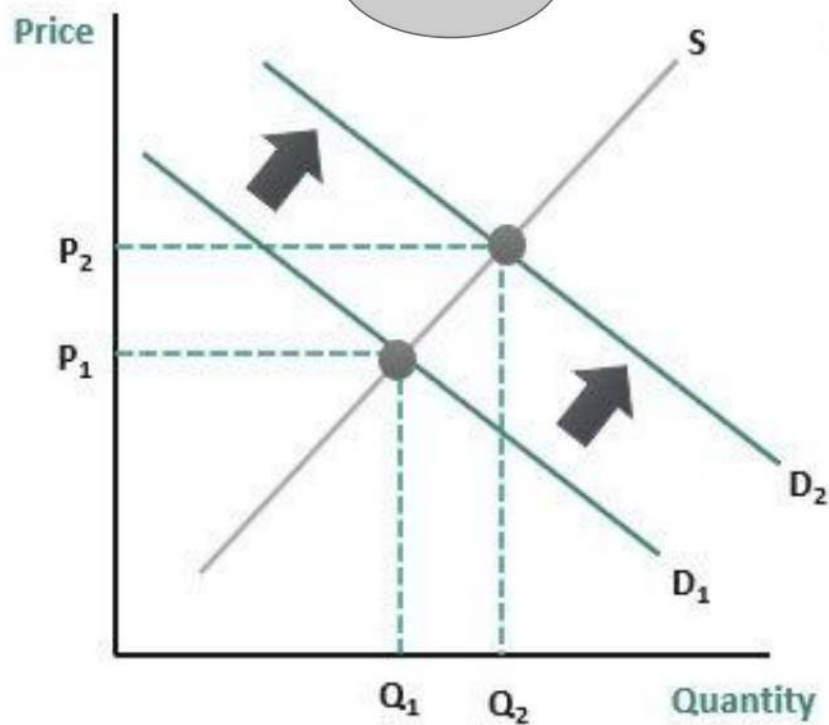


Draw TWO diagrams to show how an increase in the **demand** for petrol would impact the **supply** of diesel.

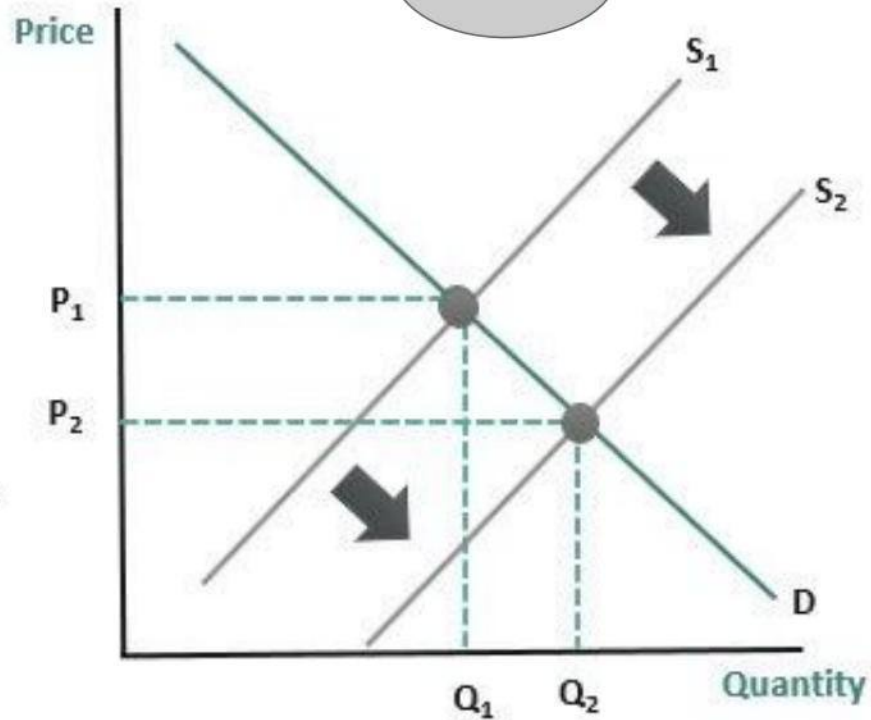
So, now we are talking
both demand AND supply

Joint Supply

Petrol



Diesel



Price of related goods

Joint Supply



An increase in the demand for petrol shifts the demand curve right and the quantity supplied of petrol increases. In the market for diesel, the supply curve will shift right as a result.

Rationale

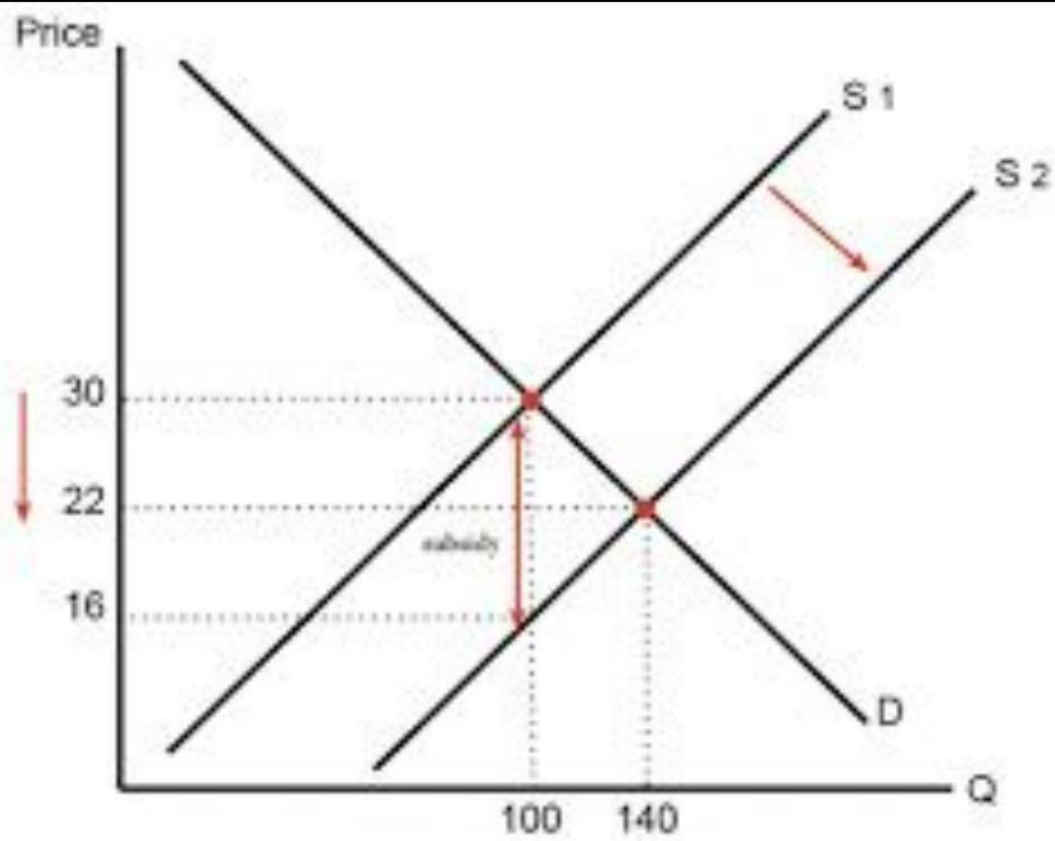
Since diesel and petrol are often produced together in refineries, the supply of diesel also increases, shifting the supply curve for diesel to the right.



Government Intervention



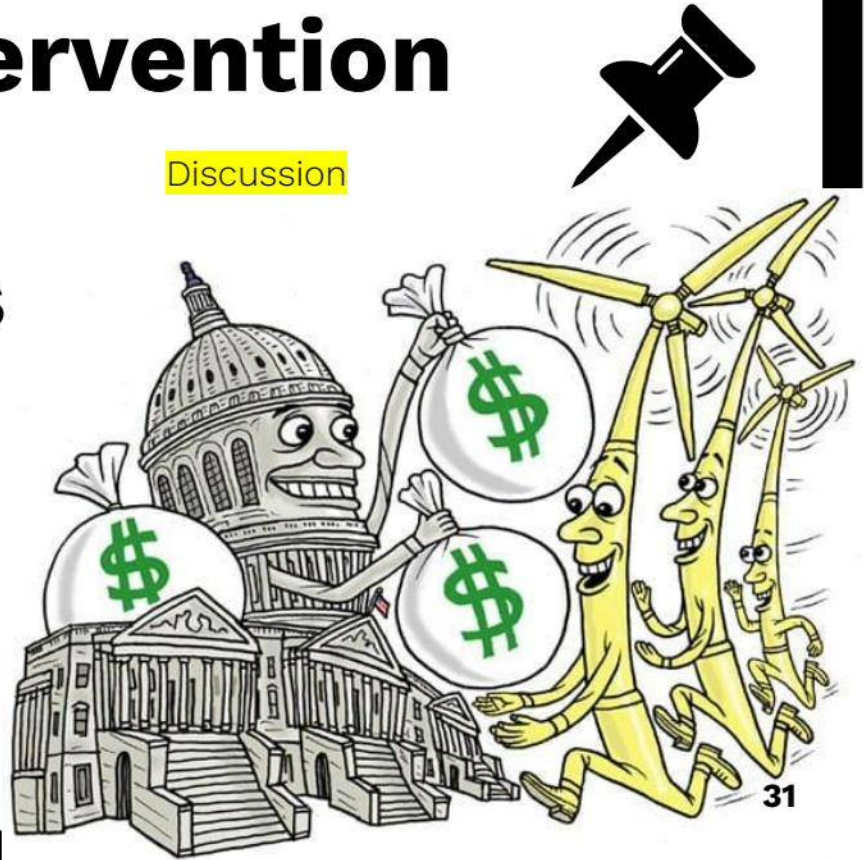
- **Subsidies** are per unit payment made by the government to firms, effectively reducing a firm's costs. Will the supply curve shift?



Government Intervention

Discussion

Why do governments
subsidize?



**What are the most
highly subsidized
products?**

Corn:

- **Subsidies:** About \$10 billion annually
- Corn receives substantial subsidies through direct payments, crop insurance, and ethanol production incentives.

Soybeans:

- **Subsidies:** Around \$2.3 billion annually
- Soybeans receive subsidies mainly through crop insurance and price support programs.

Wheat:

- **Subsidies:** Approximately \$1.5 billion annually
- Wheat farmers benefit from subsidies in the form of price supports and crop insurance.

Cotton:

- **Subsidies:** Close to \$1 billion annually
- The cotton industry receives subsidies through direct payments.



Why those?

Food security and price stability:

Ensures a stable food supply and controls prices for essential goods.

Economic support:

Sustains rural economies and helps farmers stay competitive globally.

Strategic importance:

Key products like corn and soybeans are crucial for multiple industries, including food and biofuels.

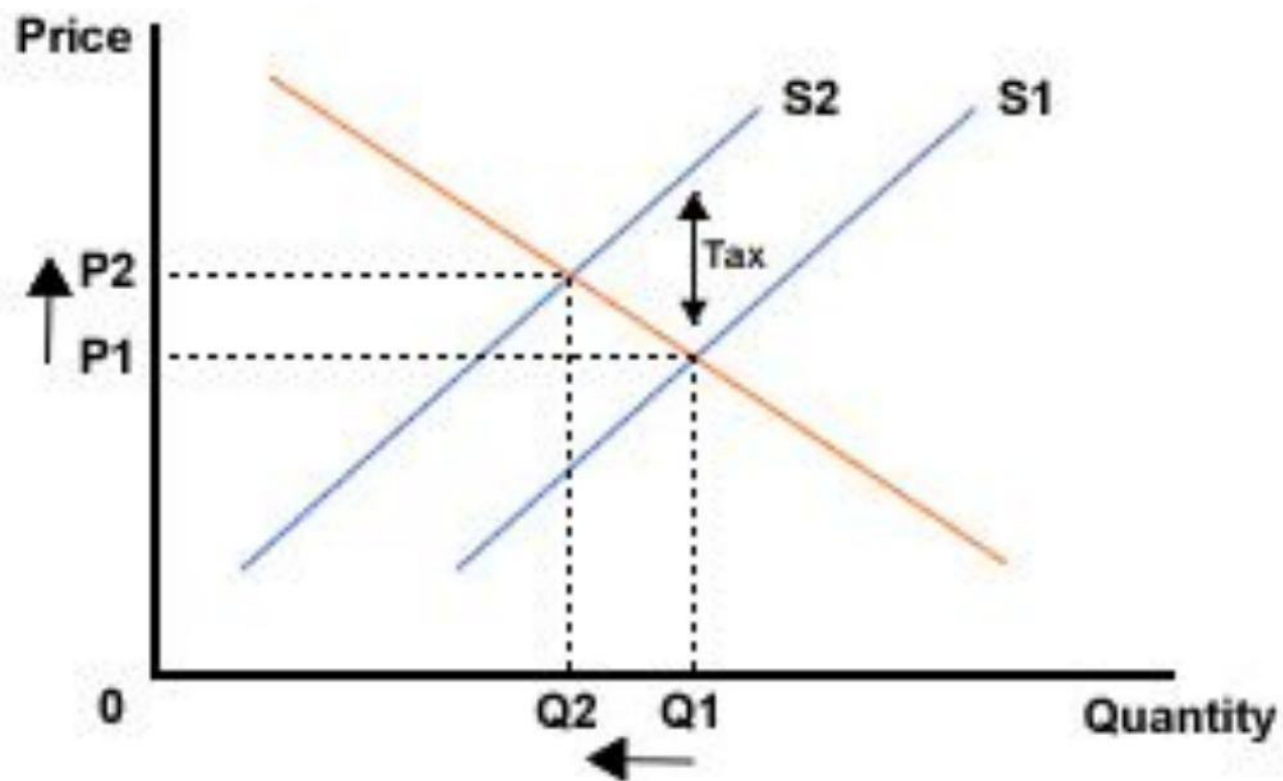


**Reminder:
This is why
politics and
economics are
intertwined.**

Government Intervention



- **Indirect taxes** are a per unit tax that effectively forces up the price of a product, increasing firms costs. Supply curve shifts?
 - Examples: VAT, sales tax



Government Intervention

Discussion



Why do governments tax?



Reasons for Imposing Indirect Taxes:

Revenue Generation: Taxes like sales tax and excise tax are major sources of government revenue, funding public services such as infrastructure, education, and healthcare.

Discouraging Harmful Consumption: Taxes on goods like tobacco, alcohol, and sugary drinks are imposed to reduce consumption of harmful products, often called "sin taxes."

Redistribution of Wealth: Some taxes target luxury or non-essential goods, helping shift the tax burden toward higher-income consumers.



Cigarette Tax: Applied to tobacco products to discourage smoking. The federal tax on cigarettes is \$1.01 per pack, and many states add their own taxes (e.g., New York has a \$4.35 per pack tax).

Alcohol Tax: Federal and state taxes are applied to beer, wine, and spirits. For example, the federal excise tax on distilled spirits is \$13.50 per proof gallon.

Sugary Drink Tax: Some cities and states, like Berkeley, California, impose taxes on sugary beverages to combat obesity and promote healthier lifestyles. Berkeley's tax is 1 cent per ounce.



Other non-price determinants of supply

(changes in the following will shift the supply curve)



★ Changes in Technology

What happens to supply if technology improves? How could it get worse and what would happen?

★ Number of Firms

What happens to supply if the number of firms in the market goes up?
Down?

★ Future Price Expectations

A change in technology typically shifts the supply curve to the right, meaning that supply increases. This happens because technological improvements reduce production costs, increase efficiency, or improve output, allowing firms to produce more goods at lower costs.

Why It Happens:

Improved Efficiency:

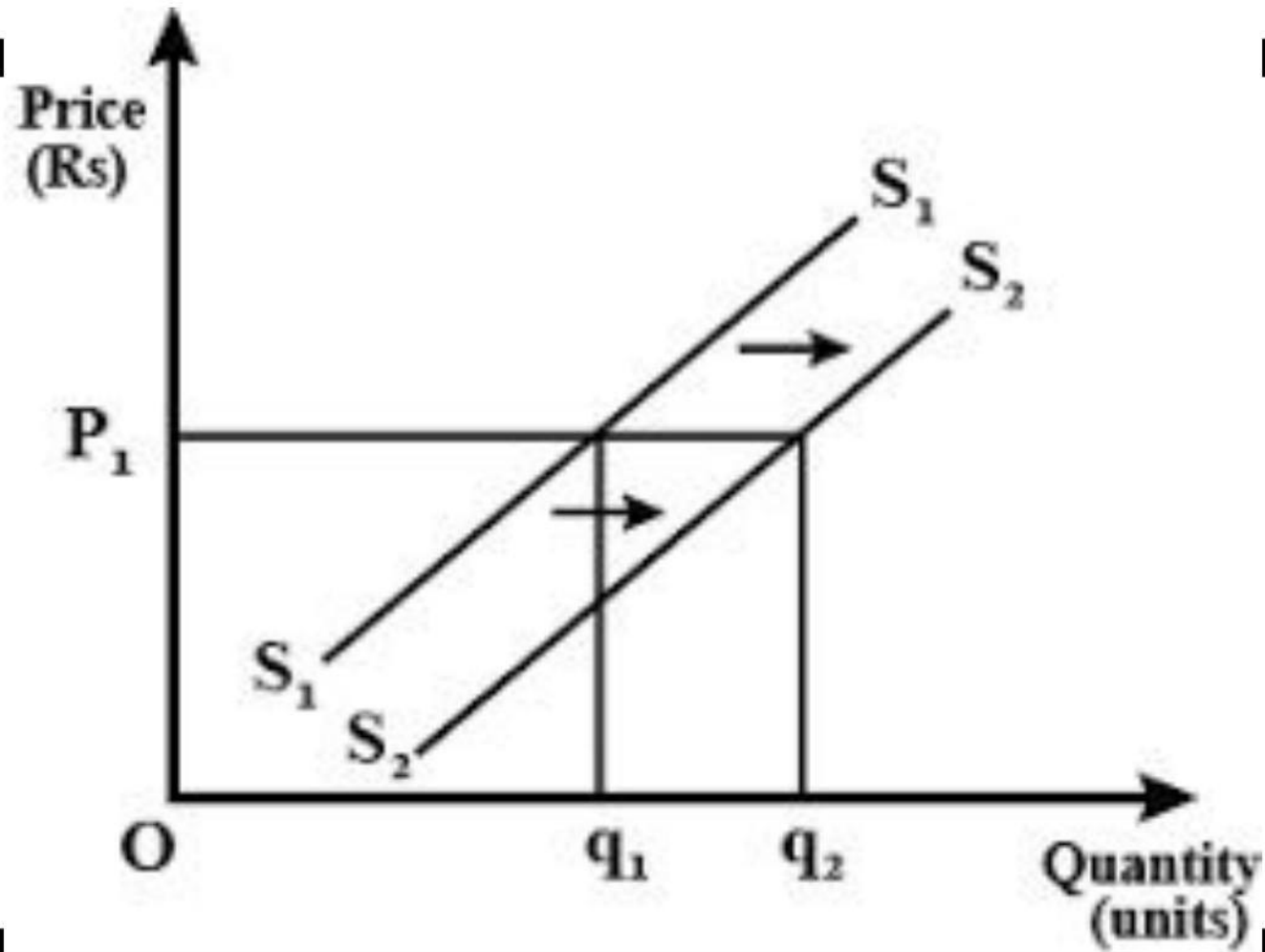
New technologies streamline production processes, reducing the time and resources needed to produce each unit.

Lower Production Costs:

Advanced machinery or automation reduces labor and material costs, allowing firms to produce more at the same price.

Higher Output:

Technology can enable firms to produce a greater quantity of goods with the same amount of input.

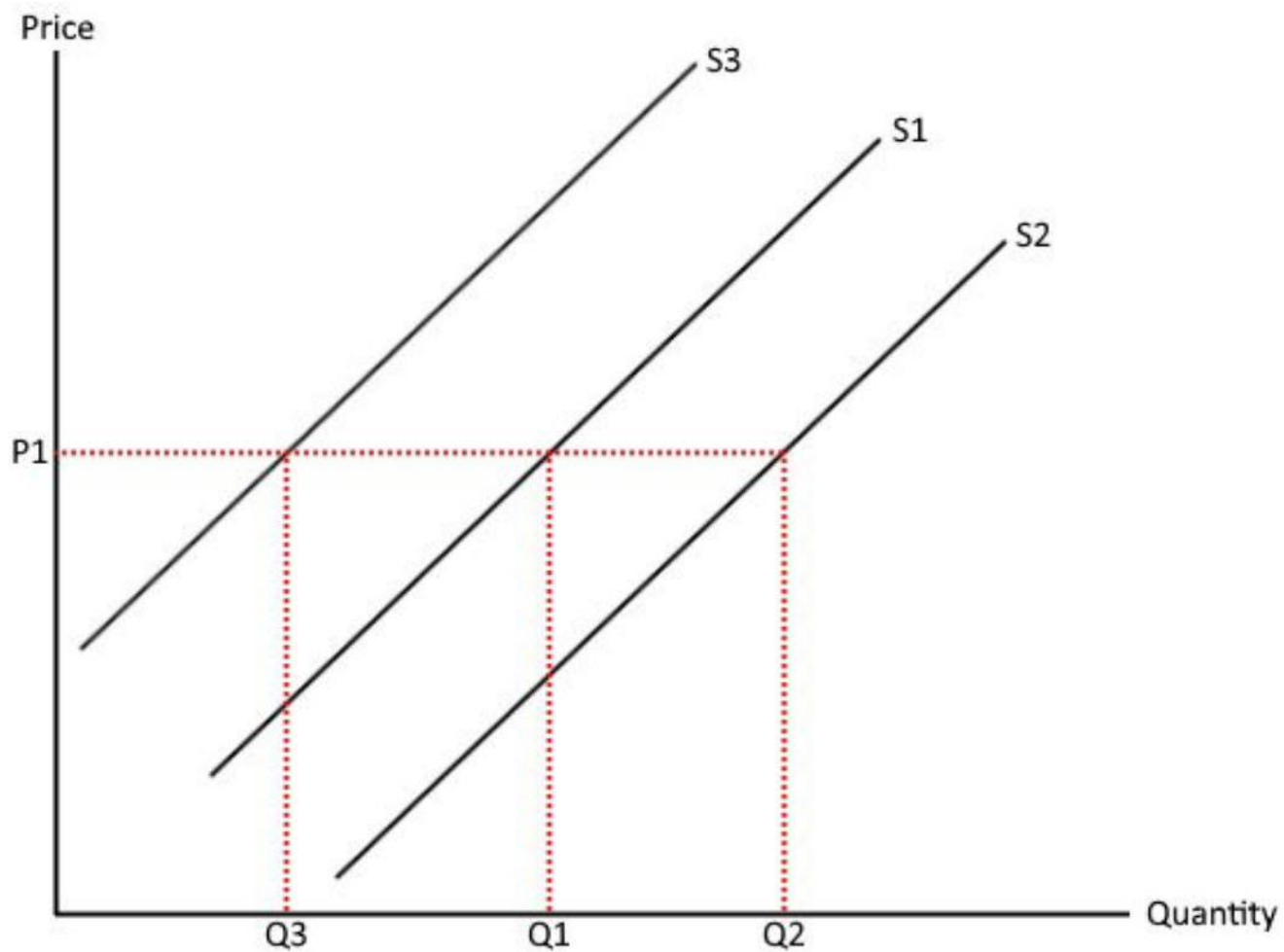


When the number of firms increases:
If more firms enter the market, the total quantity of goods produced at every price level increases, leading to a rightward shift of the supply curve.

More firms mean more overall supply, pushing the curve to the right.

When the number of firms decreases:
If firms exit the market, the overall supply decreases. This leads to a leftward shift of the supply curve, as fewer firms are producing goods, reducing the total supply available.







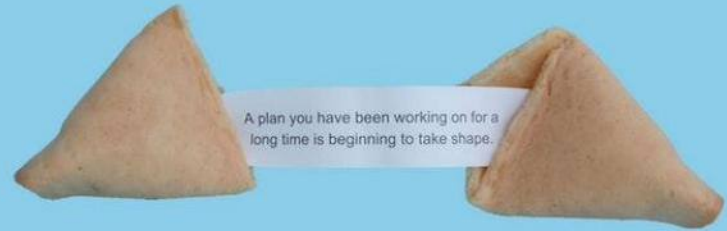
In the **solar energy market**, as more companies have entered the market (e.g., Tesla Solar, Sunrun, and others), the supply of solar panels has increased.

This has led to a **rightward shift** in the supply curve as more panels are available at every price point. This increase in competition also often lowers prices for consumers.

Future Price Expectations

If an increase in demand is expected, supply may be increased.

If future prices are expected to increase, current supply may decrease.



★ Future Price Expectations

If firms expect prices to rise in the future:

- Firms may **withhold some of their current supply** in anticipation of higher future profits. This reduces the supply available in the market today, causing the **supply curve to shift to the left**.

Example: Oil companies might reduce current oil production if they expect oil prices to increase in the future, leading to a leftward shift in the supply curve.

Contrast this with the consumer who wants the opposite. They want to buy now if they know prices will go up.



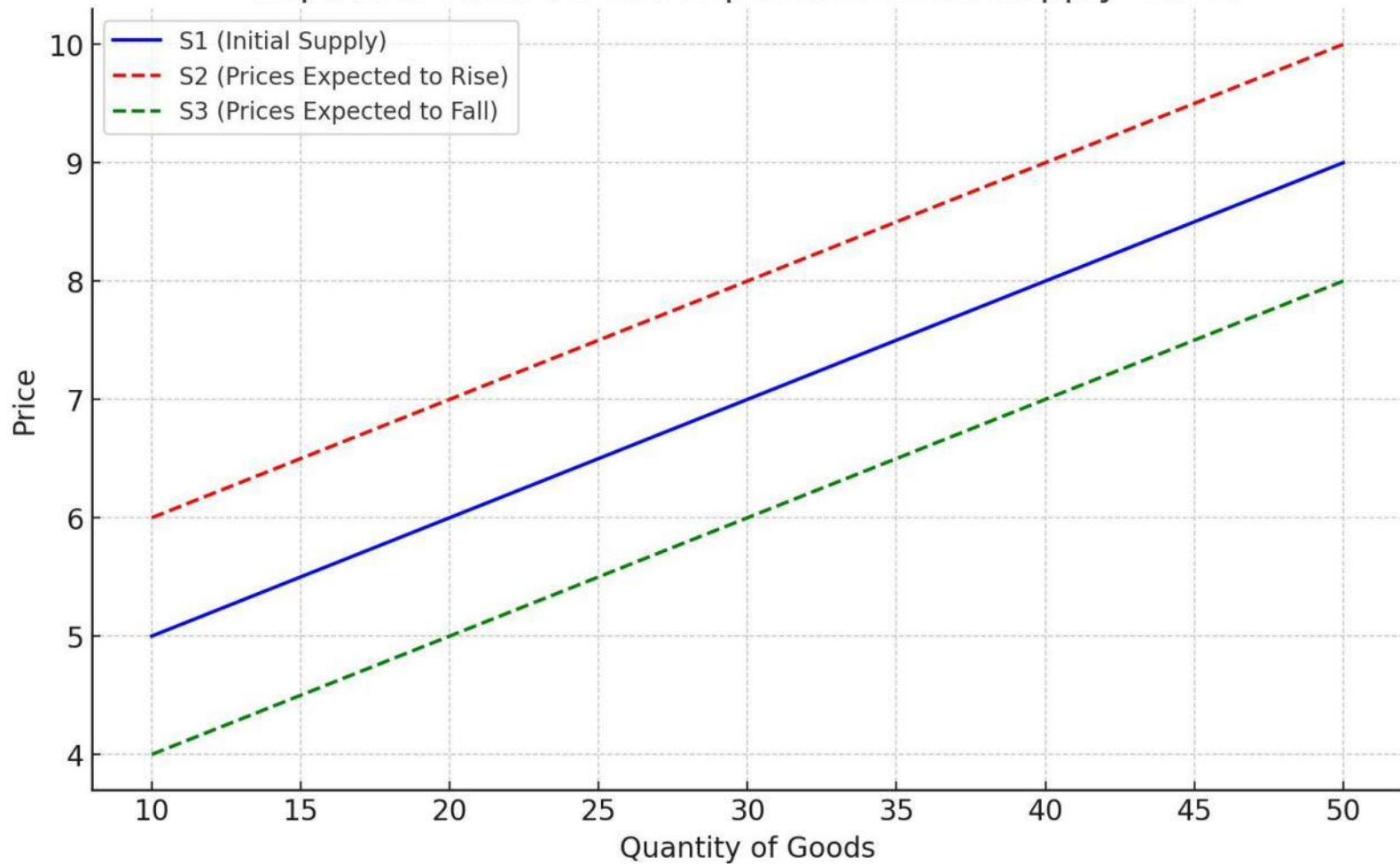
If firms expect prices to fall in the future:

- Firms may want to **increase current supply** to sell as much as possible before prices drop. This increases the current supply, shifting the **supply curve to the right**.

Example: A tech company might increase production of a current smartphone model if it expects the prices to drop with the release of a new model, leading to a rightward shift in the supply curve.



Impact of Future Price Expectations on Supply Curve

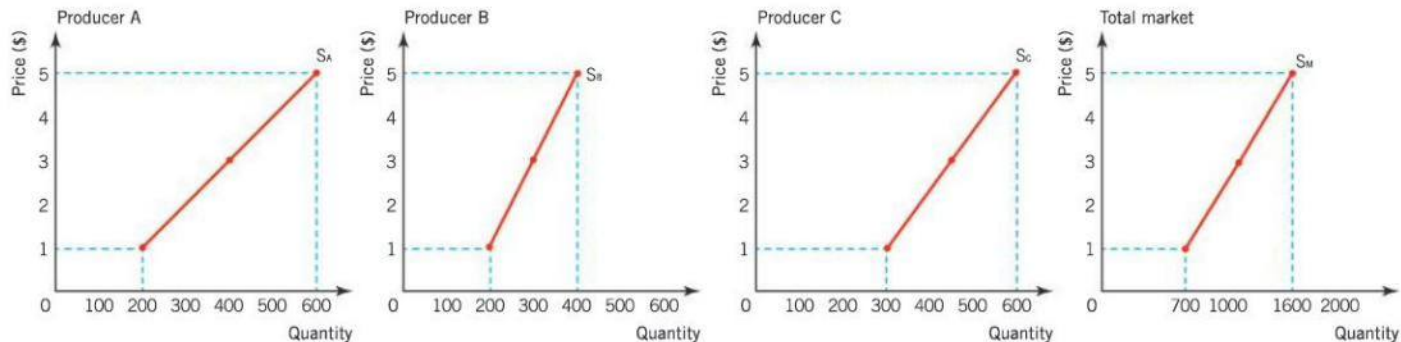


Relationship between individual producer's supply and market supply

It's possible to focus on individual producers as well as the whole market when constructing supply curves. To construct a whole market diagram using information from individual producers, we use *horizontal summing*.

Price [\$]	Producer A supply ['000s]	Producer B supply ['000s]	Producer C supply ['000s]	Market supply ['000s]
1	200	200	300	700
3	400	300	450	1,150
5	600	400	600	1,600

Relationship between individual producer's supply and market supply



Price (\$)	Producer A supply ['000s)	Producer B supply ['000s)	Producer C supply ['000s)	Market supply ['000s)
1	200	200	300	700
3	400	300	450	1,150
5	600	400	600	1,600

Underlying Assumptions of the Law of Supply

(HL ONLY)

Short run vs. Long run

All firms have **costs of input**. To make pizza, you need a building, workers, a pizza oven, ingredients, etc. Some of these things can change over time, so there is an important distinction between short run inputs and long run inputs.

Short run

Time period during which at least ONE input is fixed. As long as the firm has at least ONE fixed input, it is operating in the short run.

Long Run

Time period when ALL inputs can be changed.
In the long run the firm's inputs are all *variable*.

For example. **Pizza Ovens**

Short Run

I cannot buy five new pizza ovens for just today or just this week.



Long Run

I do have the choice of purchasing 5 new ovens if its for next year.

The Law of Diminishing Marginal Returns

According to the LODMR, as more and more units of a variable input (such as labor) are added to one or more fixed inputs (such as land), the marginal product of the variable input at first increases, but there comes a point when it begins to decrease.

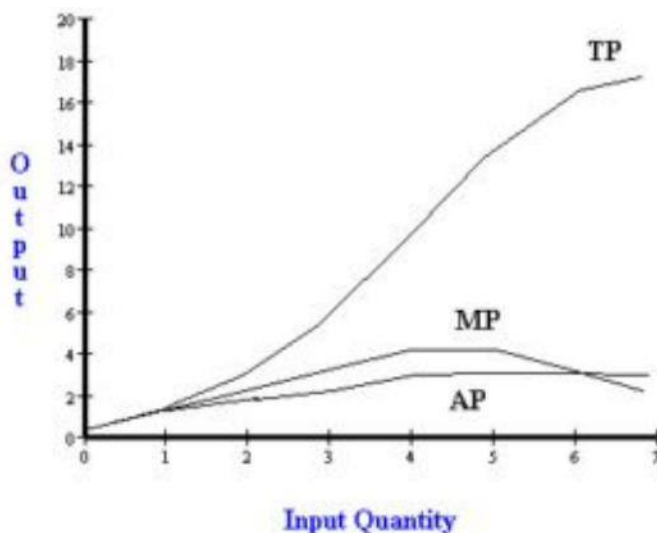
This relationship assumes that the fixed input(s) remain fixed and that technology is also fixed.

[More Here](#)

Total Product (TP)

- **Definition:** Total Product is the overall output a firm produces using both fixed and variable factors during a given time period.
- **Related to Factors of Production:** In this context, fixed factors (like capital or land) remain constant, and labor (a variable factor) is adjusted. Increasing labor leads to changes in total product, reflecting the combined effort of all factors of production.

Average, Total, and Marginal Product



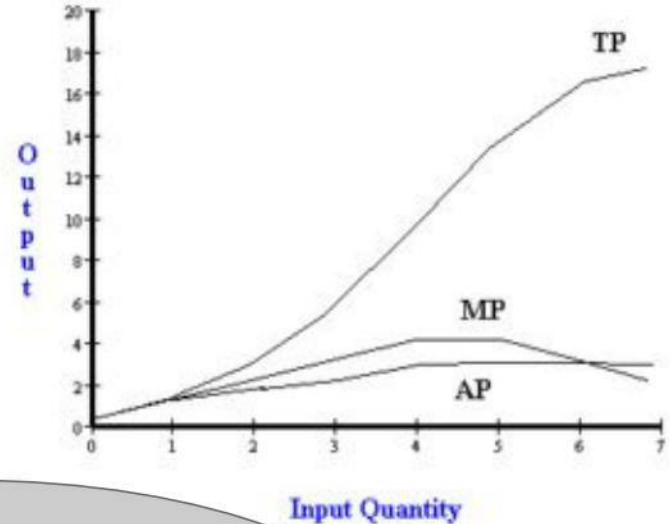
Average Product (AP)

- **Definition:** Average Product is calculated as the total product (TP) divided by the number of units of the variable factor employed (V), representing the average output per unit of labor.
- **Equation:** $AP = TP / V$

Keep in mind, not limited to laborers, although most examples use laborers.

AP helps firms understand how efficiently they are using labor. If AP is high, the workers are highly productive. If AP falls, it might be a sign of inefficiency or overcrowding in the production process.

Average, Total, and Marginal Product

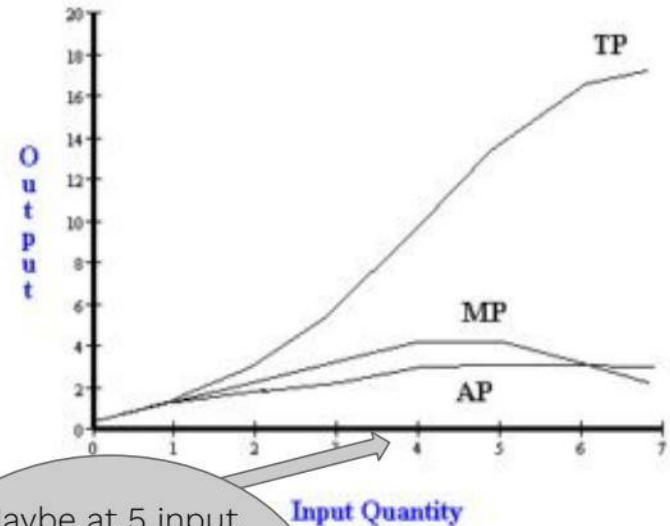


Marginal Product (MP)

Definition: Marginal Product represents the additional output derived from employing an additional unit of labor. **It's a key measure of how effective it is to add more labor under current conditions.**

Equation: $MP = \Delta TP / \Delta V$, where ΔTP is the change in total output, and ΔV is the change in the number of units of labor.

Average, Total, and Marginal Product



Maybe at 5 input, I should stop since the marginal product is going down after that.



**So, let's play
this scenario
out with Harris
Pizza.**



Total Product (TP) – Pizza Shop Overview

Total Product (TP) is the total output (pizzas) produced using both fixed and variable factors.

Ceteris paribus

Example at my restaurant

Fixed Inputs: Ovens and kitchen space.

Variable Input: Number of workers.

So, let's play this out in our head.

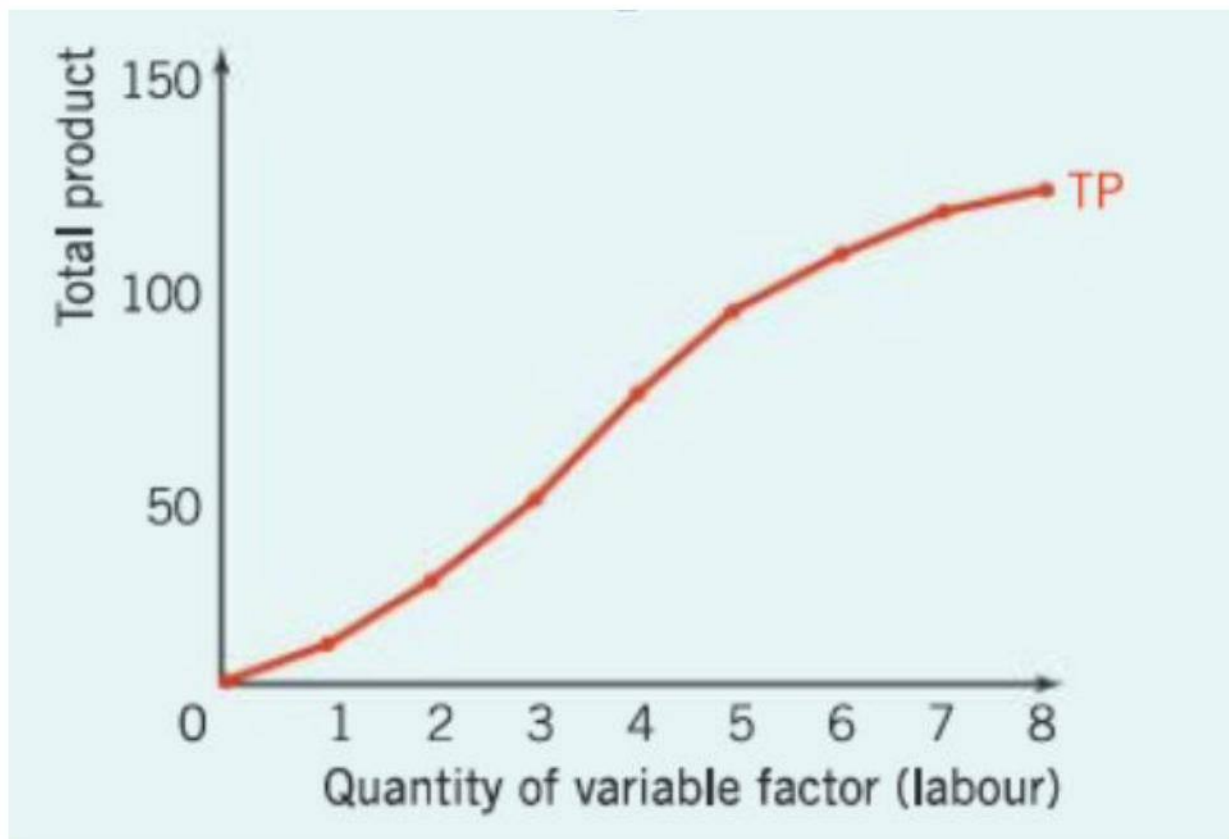
Initial increase: As workers are added, TP rises significantly due to specialization (e.g., one makes dough, another adds toppings).

HOWEVER, Diminishing Returns will happen at some point.

Eventually, **TP increases at a slower rate** because fixed factors (space, ovens) limit how many pizzas can be produced efficiently.

TP Curve:

Starts rising quickly but flattens as more labor is added due to diminishing





Think about the phrase - too many cooks in the kitchen.

Average Product (AP) – Output Per Worker

Average Product (AP) is the total output divided by the number of workers.

Formula:

$AP = \frac{\text{Total Product (TP)}}{\text{Number of Workers (V)}}$

AP =

Number of Workers (V)

Total Product (TP)

Pizza Shop Example: With 4 workers: If total output is 40 pizzas:

$AP = \frac{40 \text{ pizzas}}{4 \text{ workers}} = 10 \text{ pizzas per worker}$

AP rises initially: When tasks are shared, productivity improves.

AP declines: Eventually, workers get in each other's way or wait for access to resources (e.g., ovens).

Marginal Product (MP) measures the additional output produced by hiring one more worker.

Formula: $MP = \frac{\Delta \text{Total Product (TP)}}{\Delta \text{Number of Workers (V)}}$

MP = $\frac{\Delta \text{Total Product (TP)}}{\Delta \text{Number of Workers (V)}}$

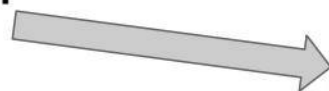
MP = $\frac{\Delta \text{Total Product (TP)}}{\Delta \text{Number of Workers (V)}}$

$$MP = \frac{\Delta \text{Total Product (TP)}}{\Delta \text{Number of Workers (V)}}$$

Pizza Shop Example:

Adding a 3rd worker increases output from **25 to 40 pizzas**:

Number of workers has increased from 2 to 3 (+1)



$$MP = \frac{40 - 25}{3 - 2} = 15 \text{ pizzas}$$

MP rises at first: Specialization boosts productivity.

MP falls later: Adding more workers results in diminishing re

MP can turn negative: Overcrowding reduces total output.

Increasing Marginal Costs

Marginal cost is the increase in total cost of producing an extra unit of output.

Increasing marginal costs are clearly related to diminishing marginal returns.

If the output produced by each additional worker (MP) begins to fall, yet each worker costs the same, then the cost of producing each extra unit (MC) begins to increase.

Because of the law of diminishing returns, as output increases, marginal costs will begin to increase also.

Therefore, firms will only be prepared to supply more if the prices they receive for their products are also going up. That way they can cover their marginal costs with the increase in price.



For Example, imagine a school

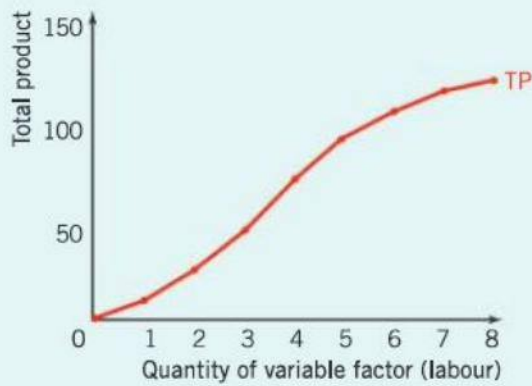
The new principal and head of school were former IB Economics but they received 1s... they didn't understand the concept of diminishing marginal returns....

They arrive to AISR with the idea that more teachers is a great thing. Teachers help with learning, and they read somewhere that fewer students to teachers is a great thing.

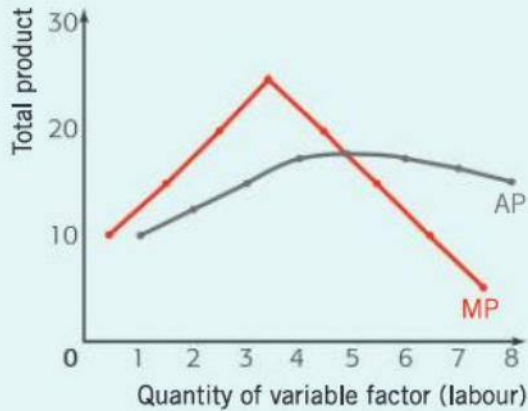
As part of their first moves as school leaders, they inform the AISR community that they will be making some cuts in other places of the budget, and will be employing 350 more teachers at AISR

**What will
happen to
AISR?!?!**

Why?



▲ **Figure 5.8** The total product curve



▲ **Figure 5.9** Average and marginal product curves

Total product (TP) is the total output that a firm produces, using its fixed and variable factors in a given time period. As we have already said, output in the short run can only be increased by applying more units of the variable factors to the fixed factors.

Do you remember the factors of production?

Average product (AP) is the output that is produced, on average, by each unit of the variable factor. $AP = TP/V$, where TP is the total output produced and V is the number of units of the variable factor employed.

Marginal product (MP) is the extra output that is produced by using an extra unit of the variable factor. $MP = \Delta TP / \Delta V$, where ΔTP is the change in total output and ΔV is the change in the number of units of the variable factor employed.

Supply and Demand Practice



1. What would happen to the demand for bicycles if there was a large increase in the tax on motor scooters?
2. What would happen to the demand for foreign holidays if there were an increase in incomes?
3. What would happen to the demand for DVDs if there were a significant fall in the price of DVD players?
4. What would happen to the demand for beef if the price of chicken decreased substantially?

Supply and Demand Practice



1. The demand for bicycles would likely increase. Bicycles and motor scooters are substitutes in transportation. If the tax on motor scooters increases, making them more expensive, consumers may switch to bicycles as a cheaper alternative.

What would happen to the demand for foreign holidays if there were an increase in incomes?

2. The demand for foreign holidays would likely increase. Foreign holidays are typically considered a normal good, meaning that as people's incomes rise, they can afford more luxurious or non-essential activities like traveling abroad.

What would happen to the demand for DVDs if there were a significant fall in the price of DVD players?

3. The demand for DVDs would likely increase. DVDs and DVD players are complementary goods, so if the price of DVD players falls, more people might buy players, which would in turn increase the demand for DVDs.

What would happen to the demand for beef if the price of chicken decreased substantially?

4. The demand for beef would likely decrease. Beef and chicken are substitute goods, so if the price of chicken decreases significantly, more people might buy chicken instead of beef, reducing the demand for beef.



Continued...

5. What would happen to the supply of DVDs if there were a significant increase in the price of the components used to make DVDs?
6. What would happen to the supply of cars if the government were to subsidise car production in order to protect employment?
7. What would happen to the supply of skateboards if a firm were to discover there had been a large increase in the demand for roller skates, which they could also produce?

What would happen to the supply of DVDs if there were a significant increase in the price of the components used to make DVDs?



Answer: The supply of DVDs would likely decrease. If the components used to make DVDs become more expensive, production costs rise. As a result, producers might reduce the number of DVDs they supply because it is less profitable to produce them at the same price levels.

What would happen to the supply of cars if the government were to subsidize car production in order to protect employment?

Answer: The supply of cars would likely increase. A government subsidy lowers production costs for car manufacturers, making it cheaper for them to produce cars. This encourages manufacturers to supply more cars to the market.

What would happen to the supply of skateboards if a firm were to discover there had been a large increase in the demand for roller skates, which they could also produce?



Answer: The supply of skateboards would likely decrease. If the firm can also produce roller skates and demand for roller skates increases, the firm may shift its resources (like labor and materials) to produce more roller skates. This would reduce the resources available for producing skateboards, leading to a decrease in skateboard supply.



# Workers (Input)	# Pizza (Output)	Marginal Product
5	22	0
6	18	-4