

2026 AP Macroeconomics **Summer Project**

Name: _____

Your work this summer is divided into three parts

Part 1: Graphs in Economics

Visual presentations are used to make it much easier understand verbal descriptions and numerical information. In economics, graphs are used to facilitate understandings. To fully understand the ideas and information being discussed, you need to know how to interpret these visual aids.

In part 1 of the summer project, you will leverage existing graphing knowledge to complete a worksheet.

Part 2: Two Key Economic Models

In AP Macroeconomics, we use several models to simplify complex economic situations. Economic models are important because they allow economists to assess how a change in *one* variable affects overall economic outcomes. In AP Macroeconomics, models are typically depicted by graphs.

In part 2, you will learn about the two most-basic economic models: the production possibilities curve (PPC) and the supply and demand model and answer practice AP exam questions.

Part 3: Macroeconomic Indicators

To study a macroeconomy and how it can be improved, students must first understand how economists evaluate the state of an economy. There are three basic measures of economic performance: gross domestic product (GDP), unemployment, and inflation.

In part 3, you will demonstrate what you know about these basic measures of macroeconomic performance and answer practice AP exam questions.

List of deliverables

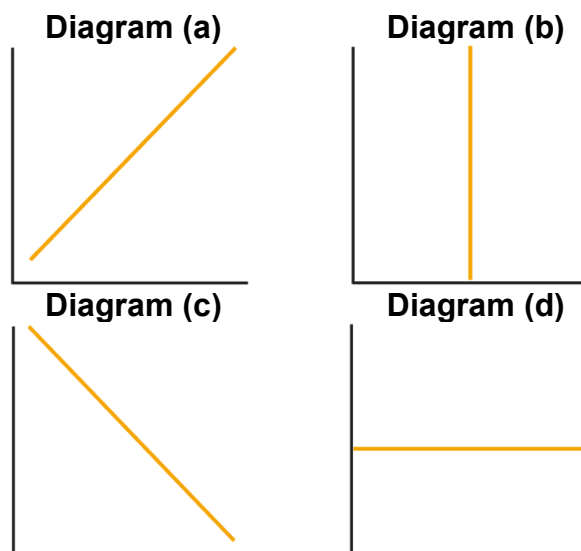
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Part 1: Graphs in Economics

Use appendix A at the end of this document to help complete the following assignment.

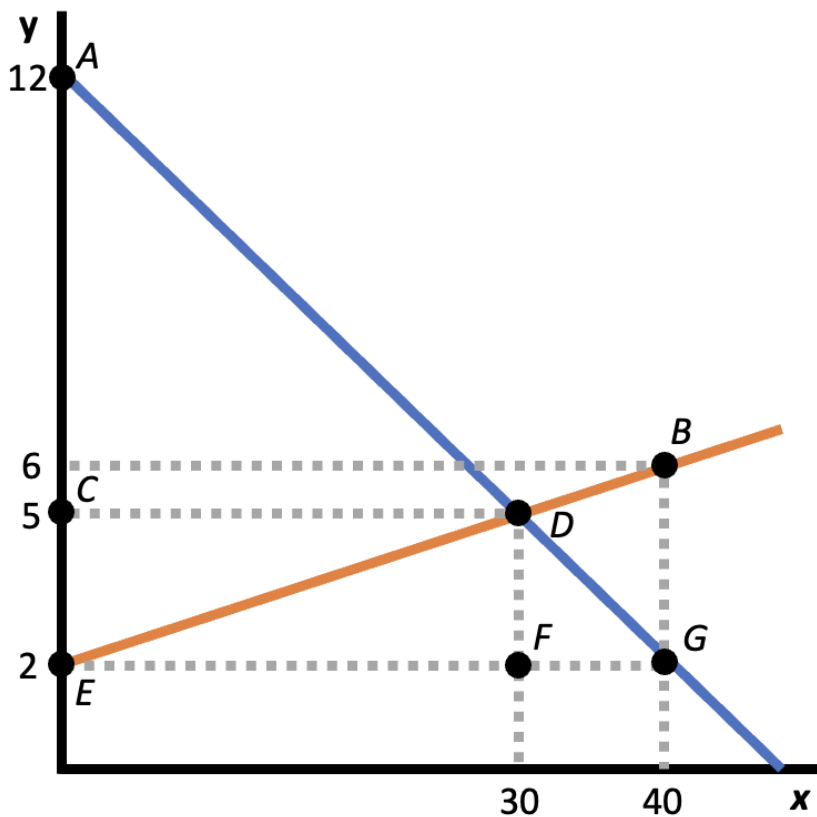
Assignment #1: Graphing Worksheet (2 points)

- 1) Study the four accompanying diagrams. Consider the following statements and indicate with diagram matches each statement. For each statement, tell which variable would appear on the horizontal axis and which on the vertical. In each of these statements, is the slope positive, negative, zero, or undefined?



Statement	Diagram	Horizontal variable	Vertical variable	Slope
If the price of movies increases, fewer consumers go to see movies.				
Workers with more experience typically make more money than people with less experience.				
Regardless of the temperature outside, American consume the same number of hot dogs per day.				
Consumers buy more frozen yogurt when the price of ice crease goes up.				
Research finds no relationship between the number of diet books purchased and pounds lost.				
Regardless of its price, there is no change in the quantity of salt that Americans buy.				

2) Use this graph to answer the following questions:



a. What is the slope of ED ?

b. What is the slope of DG ?

c. What is the area of ACD ?

d. What is the area of CDE ?

e. What is the area of BDG ?

- 3) During the Reagan administration, economist Arthur Laffer argued in favor of lowering income taxes in order to increase tax revenue. Like most economists, he believed that at tax rates above a certain level, tax revenue would fall (because high taxes would discourage some people from working) and that some people would refuse to work at all if they received no income after paying taxes. This relationship between tax rates and tax revenue is graphically summarized in what is widely known as the Laffer Curve. Plot the Laffer Curve relationship, assuming it has the shape of a nonlinear curve. The following questions will help you construct the graph.
- a. Which is the independent variable? Which is the dependent variable? On which axis do you therefore measure the tax rate? On which axis do you measure tax revenue?
 - b. What would the tax revenue be at a 0% income tax?
 - c. The maximum possible income tax rate is 100% what would the tax revenue be at a 100% income tax rate?
 - d. Estimates now show that the maximum point on the Laffer Curve is approximately at a tax rate of 80%. For tax rates less than 80%, how would you describe the relationship between the two variables? For tax rates above 80%, how would you describe the relationship between the two variables? Be sure these relationship are reflected in the slopes.



Part 2: Two Key Economic Models

Use unit 1 of the macroeconomics portion of the text and appendix B to complete the following assignments.

Link to purchase the textbook:

[Krugman's 4th edition](#)

- 3) Draw a PPC for an economy that produces only consumer goods and capital goods. Assume the economy uses specialized resources (meaning as more of one good is produced, the opportunity cost of producing that good increasing, which means the PPC is bowed out). Label a point *B* on the graph that represents a combination of outputs that is not feasible in the economy.
- 4) In the graph drawn in number three, show what would happen if the economy experiences major improvements in technology, which increases the productivity of existing resources.
- 5) Use the data in the table to create a PPC.

Product	Combination A	Combination B	Combination C	Combination D	Combination E
Tons of butter	30	28	24	16	0
Tanks	0	1	2	3	4

- a. Label the following points on the PPC:
 - i. A point indicating inefficiency/unemployed resources, labeled as *M*
 - ii. A point indicating efficiency, labeled as *N*
 - iii. An unattainable point, labeled *P*
- b. Calculate the opportunity cost of a movement between each of the following points:
 - i. Point *A* to point *B*
 - ii. Point *B* to point *C*
 - iii. Point *E* to point *D*
 - iv. Point *C* to point *A*
 - v. Point *M* to point *N*

- 4) Define supply and then identify the various determinants of supply.
- 5) What is the law of supply?
- 6) Explain whether each of these events represents 1) a change in supply (a *shift* of the supply curve or 2) a movement along the supply curve (a *change in quantity supplied*).
- a. During a real estate boom that causing housing prices to rise, more homeowners put their homes up for sale.
 - b. Many strawberry farmers open temporary roadside stands during harvest season, even though prices are usually low at the time.
 - c. Immediately after the school year begins, fewer young people are available to work. Fast-food chains must raise wages to attract workers.
 - d. Many construction workers temporarily move to areas that have suffered hurricane damage, lured by higher wages.

- 7) Draw a properly labeled generic supply and demand graph. On the graph, identify the following:
- Equilibrium price, labeled P_E
 - Equilibrium quantity, labeled Q_E
 - A price above equilibrium price, labeled P_1
 - The surplus (excess supply) found at P_1
 - A price below equilibrium price, labeled P_2
 - The shortage (excess demand) found at P_2

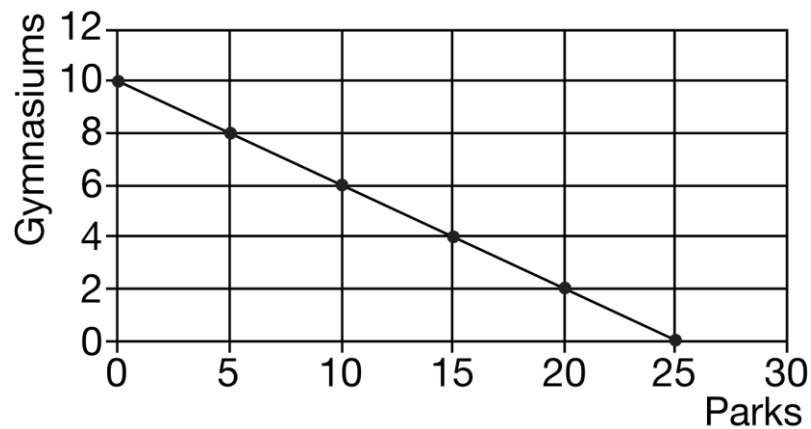
- 8) Complete this table:

Change	Rightward or leftward shift on graph	Change in equilibrium price	Change in equilibrium quantity
Increase in supply			
Decrease in supply			
Increase in demand			
Decrease in demand			

Assignment #4: Take-Home Quiz #1 (5 points)

Multiple choice questions:

Use the graph to answer questions 1 and 2.



- 1) The graph above shows the production possibilities curve for a small township that is deciding to build parks and gymsnasiums. Which of the following combinations of parks and gymsnasiums is unattainable given the township's available resources?
 - a. 5 parks and 6 gyms
 - b. 5 parks and 8 gyms
 - c. 10 parks and 6 gyms
 - d. 15 parks and 4 gyms
 - e. 20 parks and 4 gyms
- 2) A city government received a \$1 million grant to build swimming pools and skating rinks for youth. Based on the data provided in the graph, what is the opportunity cost of building one swimming pool?
 - a. 0.5 skating rink
 - b. 0.5 swimming pool
 - c. 2 skating rinks
 - d. 2 swimming pools
 - e. 5 skating rinks
- 3) Which of the following illustrates the effect of a decrease in an economy's resources using a PPC?
 - a. The economy's PPC will shift inward and to the left.
 - b. The economy's PPC will shift outward and to the right.
 - c. The economy's PPC will become steeper.
 - d. The economy's PPC will become flatter.
 - e. The economy's PPC will remain the same.

- 4) Which of the following describes the relationship between price and quantity demanded according to the law of demand?
- a. Positive relationship, illustrated by an upward-sloping demand curve
 - b. Positive relationship, illustrated by a downward-sloping demand curve
 - c. Negative relationship, illustrated by a horizontal demand curve
 - d. Negative relationship, illustrated by an upward-sloping demand curve
 - e. Negative relationship, illustrated by a downward-sloping demand curve
- 5) Which of the following changes will increase the demand for bicycles?
- a. An increase in the price of bicycle helmets, a complementary good
 - b. An increase in the price of scooters, a substitute good
 - c. A decrease in the price of bicycles
 - d. A decrease in consumers' income
 - e. A decrease in the number of buyers
- 6) Use the table to answer the question below.

Price of a candy bar	Quantity demanded	Quantity supplied
\$1.00	1,000	0
2.00	775	100
4.00	600	250
5.00	525	525
6.00	375	700
7.00	200	975
8.00	50	1,200

When the price of a candy bar is \$6, which of the following is true?

- a. The market does not clear because the price is lower than the equilibrium price and there will be a surplus in the market.
- b. The market does not clear because the price is lower than the equilibrium price and there will be a shortage in the market.
- c. The market clears because buyers and sellers are in agreement on the price.
- d. The market does not clear because the price is higher than the equilibrium price and there will be a surplus in the market.
- e. The market does not clear because the price is higher than the equilibrium price and there will be a shortage in the market.

Free-response question:

Assume gasoline is sold in a competitive market, the equilibrium price is \$50 per barrel, and the equilibrium quantity is 1000 barrels.

- a. Using the numerical values above, draw a correctly labeled graph of the gasoline market and show each of the following.
 - i. The equilibrium price
 - ii. The equilibrium quantity
- b. At a price of \$40 per barrel, will there be a surplus or a shortage in the market? Explain.
- c. Assume new oil wells are discovered. On your graph from part (a), show how this change will affect the equilibrium price and quantity in the market for gasoline.
- d. Assume instead there is an increase in the price of gasoline-operated automobiles. How will this change affect the market for gasoline? Explain.
- e. If both changes in part (c) and part (d) occurred simultaneously, what will happen to the equilibrium price and quantity of gasoline?

Part 3: Macroeconomic Indicators

Use unit 2 of the macroeconomics portion of the text and appendix C to complete the following assignments.

Link to purchase the textbook:

<https://store.bfwpub.com/hs/us/product/Krugmans-Economics-for-the-AP-Course-4th-Edition/p/131940932>

Assignment #5: Gross Domestic Product (2 points)

Use the text learn about gross domestic product (GDP), the measure economists use to compare sizes of different economies and how an economy grows over time. Most information can be found in chapter 2.1 and 2.2 of the text.

- 1) GDP is the measure of all *final* goods and services produced in a country within a given year. What is meant by *final goods and services*?

- 2) The circular-flow diagram is a simple illustration of how goods and services, resources, and money flow between households and firms (businesses). Draw a simple model (without government). Include the following:
 - a. Firms
 - b. Households
 - c. Product markets
 - d. Factor markets
 - e. Flow of goods and services
 - f. Flow of factors of production (resources)
 - g. Consumer spending
 - h. Factor payments

3) Using the expenditure approach, identify and define the four components of GDP.

GDP = _____ + _____ + _____ + _____

4) Are each of the following transactions included in calculations of GDP for the U.S? Explain why or why not.

- a. Coca-Cola builds a new bottling plant in the U.S.
- b. Delta Air Lines sells one of its existing airplanes to Korean Air.
- c. Ms. Moneybags buys an existing share of Walt Disney Company stock.
- d. A California farm produces almonds and sells them to a customer in Montreal.
- e. An American buys a bottle of French perfume in their hometown.

Assignment #6: Unemployment (2 points)

Use the text learn about unemployment, the second measure economists use to assess the health of an economy. Most information can be found in chapter 2.3 of the text.

- 1) Complete and briefly explain the following measures of employment.

**Labor force
participation rate =**

Unemployment rate =

- 2) Complete this table the three types of unemployment:

Type of unemployment	Brief definition	Example	Can this unemployment be eliminated?
Frictional unemployment			
Structural unemployment			
Cyclical unemployment			

- 3) For each of the following examples, is the person considered unemployed? If so, what category of unemployment are they a part of?
- a. Rosa, an older worker, has been laid off and gave up looking for work months ago.
 - b. Anthony, a schoolteacher, has chosen not to work during his three-month summer break.
 - c. Grace, an investment banker, has been laid off and is currently searching for another position.
 - d. Sergio, a classically trained musician, can only find work playing for local parties.
 - e. Natasha, a graduate student, went back to school because jobs are scarce.

Assignment #7: Inflation (2 points)

Use the text learn about inflation and price stability, the third measure economists use to assess the health of an economy. Most information can be found in chapter 2.4 of the text.

To calculate the inflation rate, the following steps are taken:

- 1) Determine the price of a **market basket**.
- 2) Calculate a **price index** by comparing the price of a market basket now to the price of a market basket in the **base year**.
- 3) Calculate the **inflation rate** by comparing the current price index to the price index one year ago and finding the percent rate of change.

1) Define the following terms:

- a. Market basket
- b. Price index
- c. Base year
- d. Inflation rate

2) When it comes to price levels in an economy, what is the macroeconomic goal?

Assignment #8: Current Events (3 points)

Over the summer, the government will release current data on GDP, unemployment, and inflation.

The data will be released the following days:

- 1st quarter 2026 GDP report: **June 25**
- July unemployment report: **August 7**
- July consumer price index (inflation) report: **August 12**

Real Gross domestic product

Q1 2026 data (annualized)	Q1 2025 data (annualized)	By what percent has real GDP grown over the last year?
	\$23.5 trillion	

*For GDP data, be sure you search for **real GDP** (instead of nominal). We will learn what this means in the fall!

Unemployment

July 2026 unemployment rate	July 2025 unemployment rate	What has happened to the unemployment rate over the last year?
	4.3%	

Inflation (Consumer price index)

July 2026 CPI	July 2025 CPI	By what percent has the CPI grown over the last year (this is the inflation rate)?
	322.2	

Use this link to find the data! <https://fred.stlouisfed.org>

Assignment #9: Macro Indicators Take-Home Quiz (5 points)

Multiple choice questions:

- 1) Calculate Country X's GDP using the expenditure approach.

Variable	Value (billions of \$)
Consumer spending	13
Wages	12
Government spending	3
Interest payments	1
Investment spending	4
Net exports	-1
Profit	5

- a. \$14 billion
 - b. \$18 billion
 - c. \$19 billion
 - d. \$20 billion
 - e. \$21 billion
- 2) What type of unemployment describes the situation of factory workers displaced by automation?
- a. Cyclical
 - b. Frictional
 - c. Natural
 - d. Seasonal
 - e. Structural
- 3) Given the labor market data above, what are the labor-force participation rate (LFPR) and the unemployment rate (UR)?

	Millions of people
Civilian population over 16	250
Employed	135
Unemployed	15

- a. The LFPR is 60% and UR is 6%
- b. The LFPR is 54% and UR is 6%
- c. The LFPR is 54% and UR is 10%
- d. The LFPR is 60% and UR is 10%
- e. The LFPR is 60% and UR is 3.3%

- 4) Suppose the consumer price index (CPI) was 100 on January 1st, 2017 and 110 on January 1st, 2018 with no changes in nominal wages. Which of the following is definitely true about the economy between January of 2017 and January of 2018?
- a. The inflation rate was 10 percent.
 - b. The inflation rate was -10 percent.
 - c. Real wages increased by 10 percent.
 - d. There was disinflation of 10 percent.
 - e. Nominal GDP decreased by 10 percent.
- 5) Which of the following terms describes a slowdown in the rate of increase in the consumer price index?
- a. Deflation
 - b. Disinflationx
 - c. Hyperinflation
 - d. Inflation
 - e. Stagflation

Free-response question:

The following table shows employment data for Country Z's working-age population.

Cyclically unemployed	4,000
Frictionally unemployed	1,000
Structurally unemployed	2,000
Employed	63,000
Not in the labor force	30,000

- Calculate the unemployment rate for Country Z. Show your work.
- Calculate the labor force participation rate for Country Z. Show your work.
- Is Country Z currently producing at its potential real output? Explain.
- Assuming constant opportunity costs, draw a correctly labeled graph of country Z's PPC showing consumer goods on the horizontal axis and capital goods on the vertical axis. Label a point *W* on the graph that reflects the current level of unemployment.

Appendix A

Graphs in Economics

Appendix B

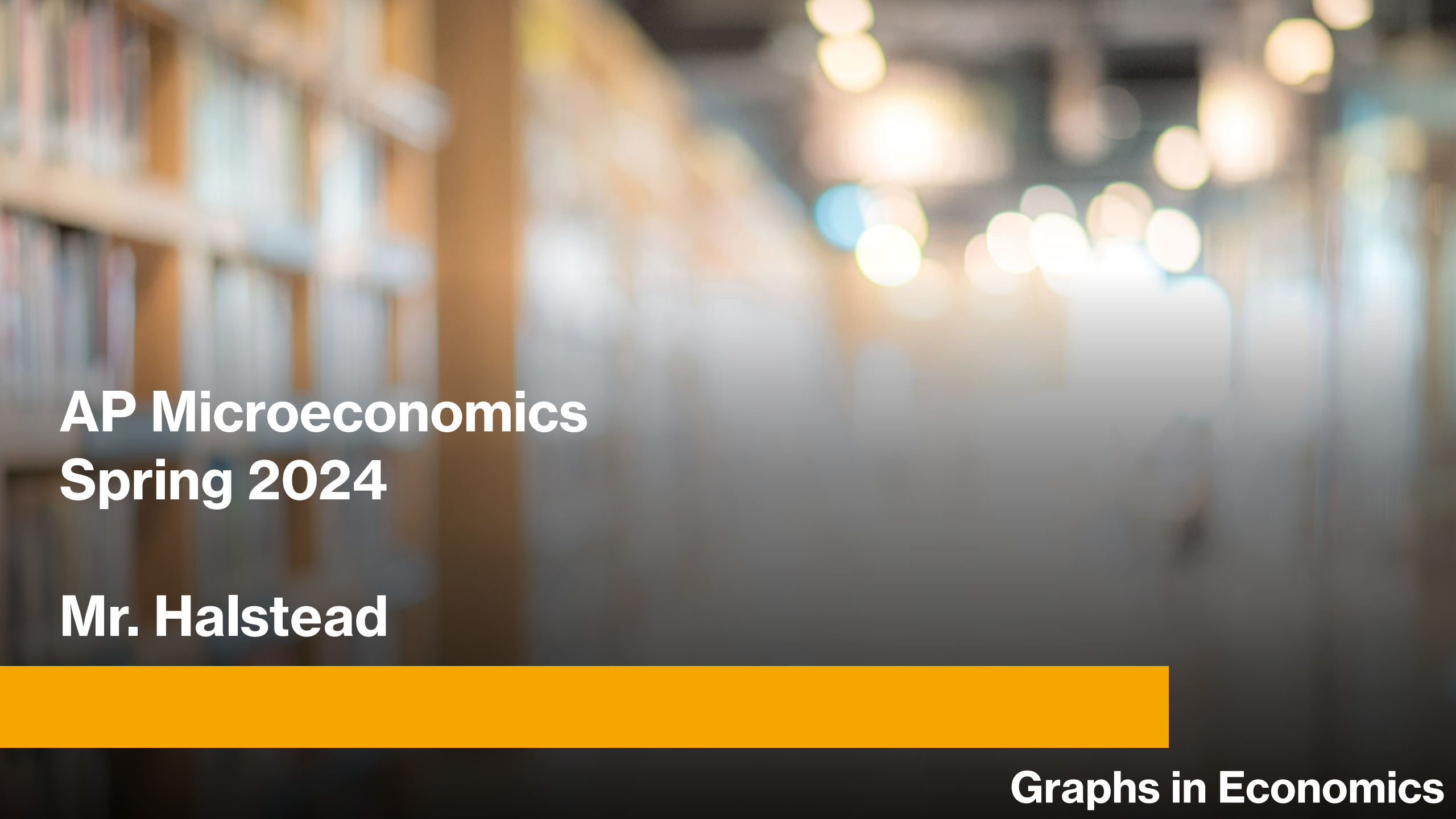
Production Possibilities Curve
Supply and Demand

Appendix C

Gross domestic product
Unemployment
Inflation

Appendix A

Graphs in Economics



AP Microeconomics Spring 2024

Mr. Halstead

Graphs in Economics

Graphs in Economics

Learning goals:

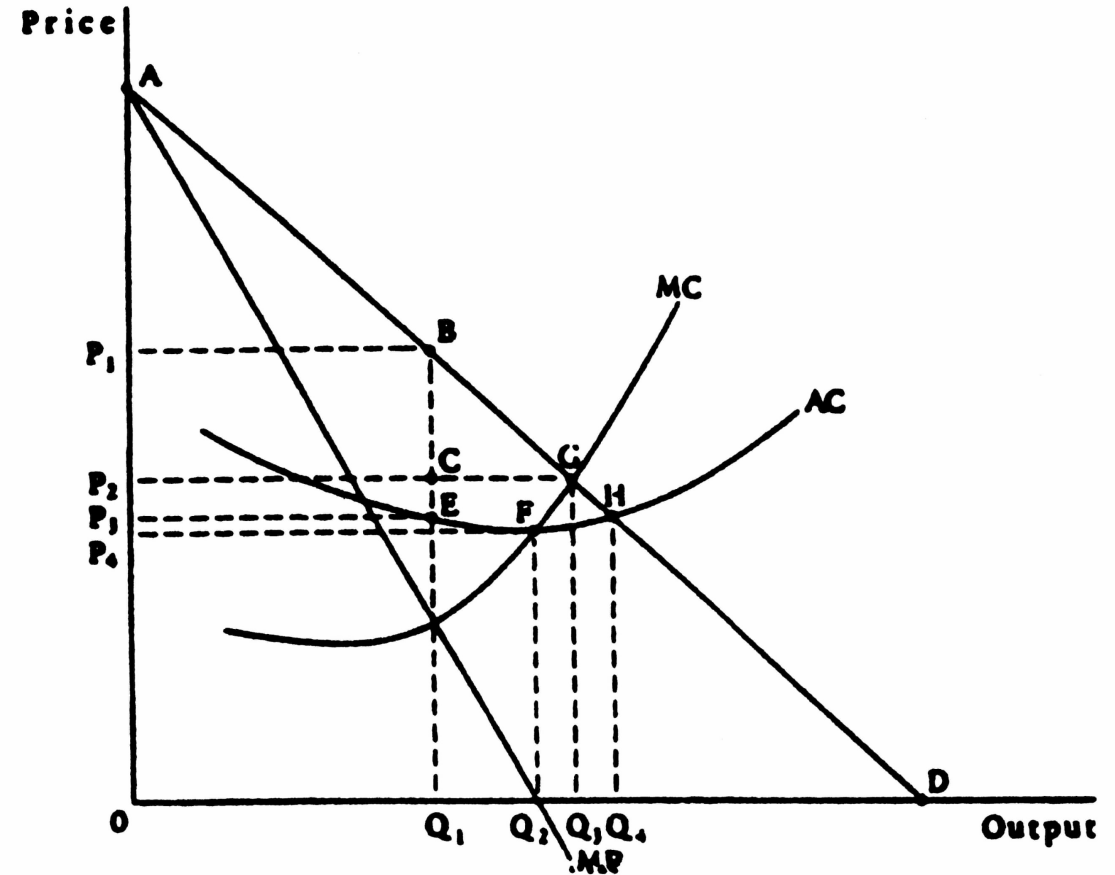
- Recognize the importance of graphs in studying economics
- Describe the basic components of a graph
- Explain how graphs illustrate the relationship between variables
- Explain how to calculate the slope of a curve and discuss what the slope means
- Describe how to calculate areas represented on graphs

Graphs in Economics

You will see **many** graphs when studying economics

- Visual representations can make it easier to understand verbal descriptions
- In economics, graphs are used to facilitate understanding

To fully understand the ideas in this class, you need to know how to interpret this graphs



Graph, Variables, and Economic Models

Most graphs in economics depicts the relationship between two economic **variables** – measures that can take on more than one value

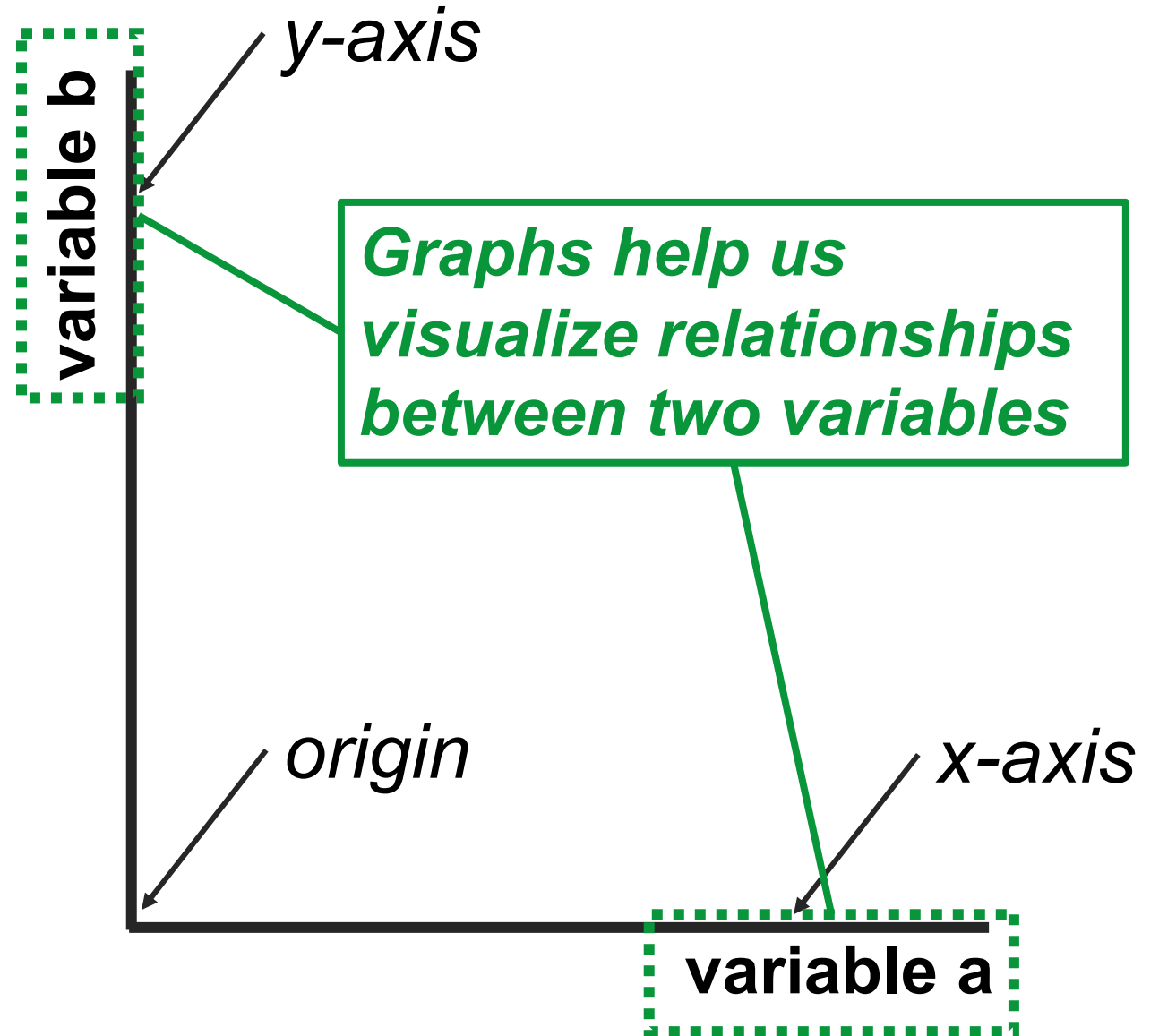
In economics, we analyze a ton of variables!

prices quantity
demanded cost inflation
quantities utility wages
revenue output GDP
unemployment supply

Two Variable Graphs

Most graphs in economics are built in a two-dimensional space with a perpendicular lines showing the values of two variables

- The horizontal line is the *x-axis*
- The vertical line is the *y-axis*
- The axes meet at the *origin*



Two Variable Graphs

Most graphs represent **causal relationships**, where one variable directly impacts another variable

- The *independent variable* is the “determining” variable
- The *dependent variable* is the “determined” variable

dependent
variable

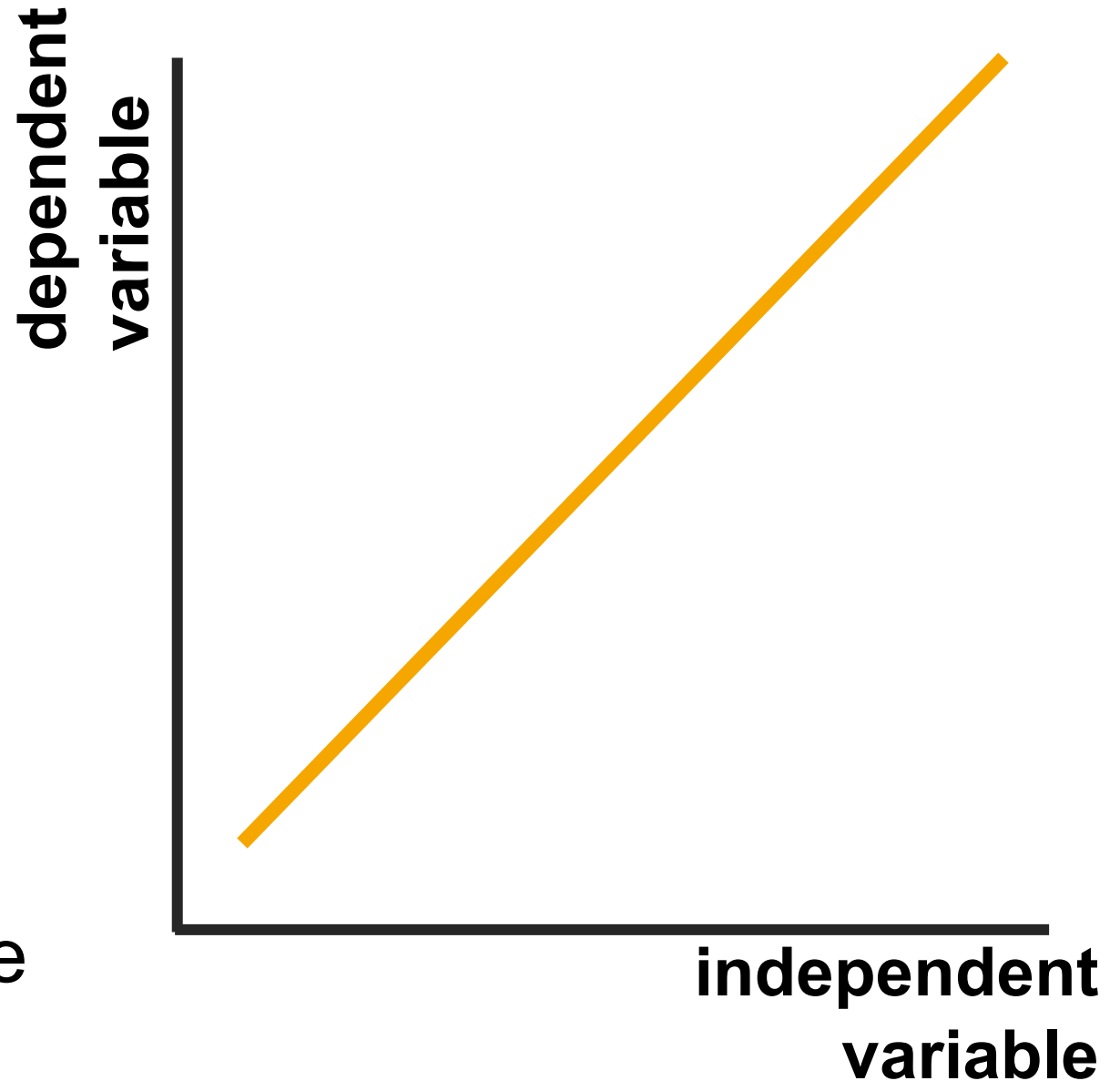
Typically, we put the independent variable on the x-axis and the dependent variable on the y-axis

independent
variable

Curves on a Graph

A **curve** is a line on a graph, *whether straight or curved*

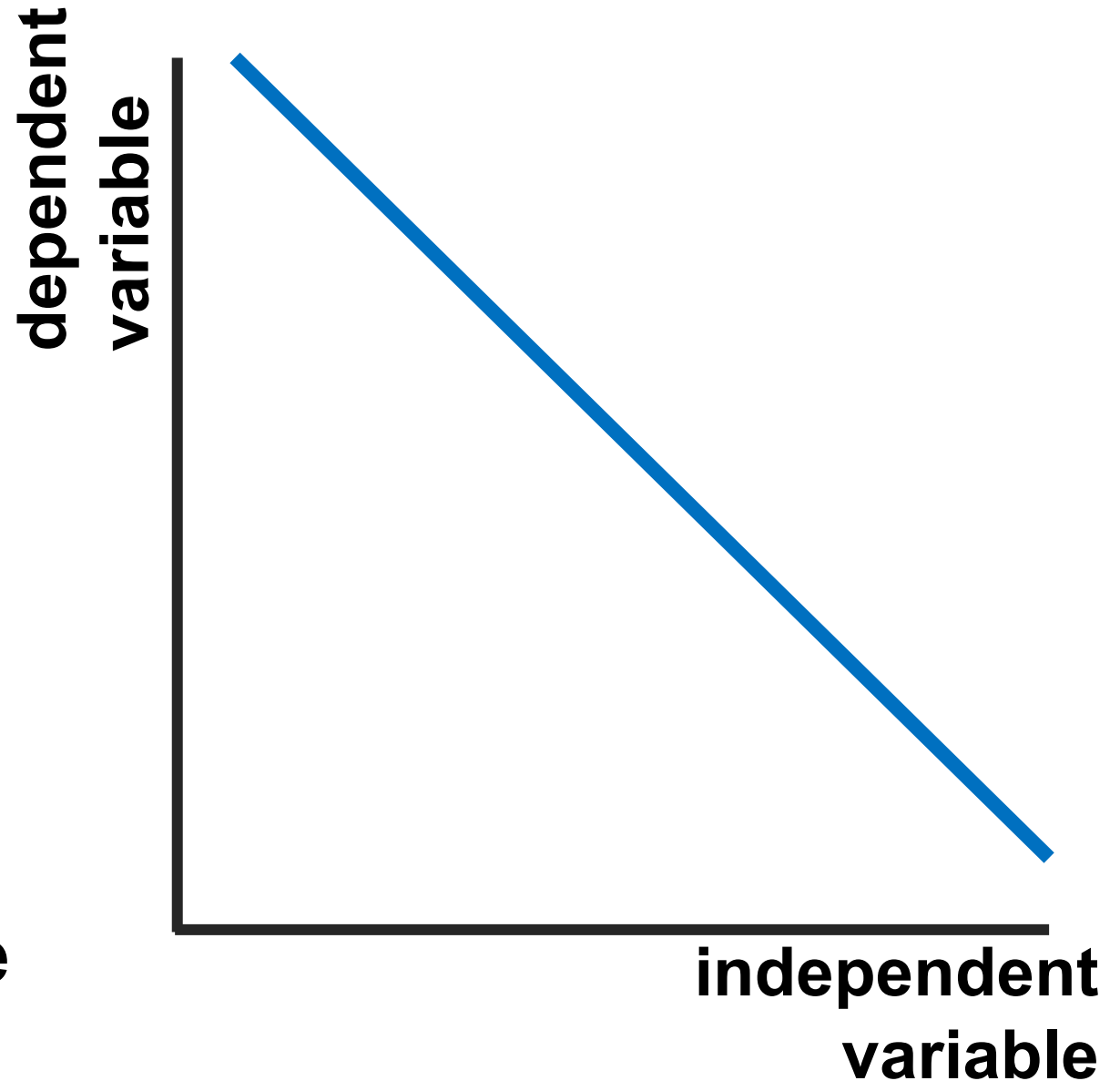
- An **upward-sloping curve** represents a positive relationship between the variables
- As the independent variable increases, it causes an increase in the dependent variable



Curves on a Graph

A **curve** is a line on a graph, *whether straight or curved*

- An **downward-sloping curve** represents a negative relationship between the variables
- As the independent variable increases, it causes a decrease in the dependent variable

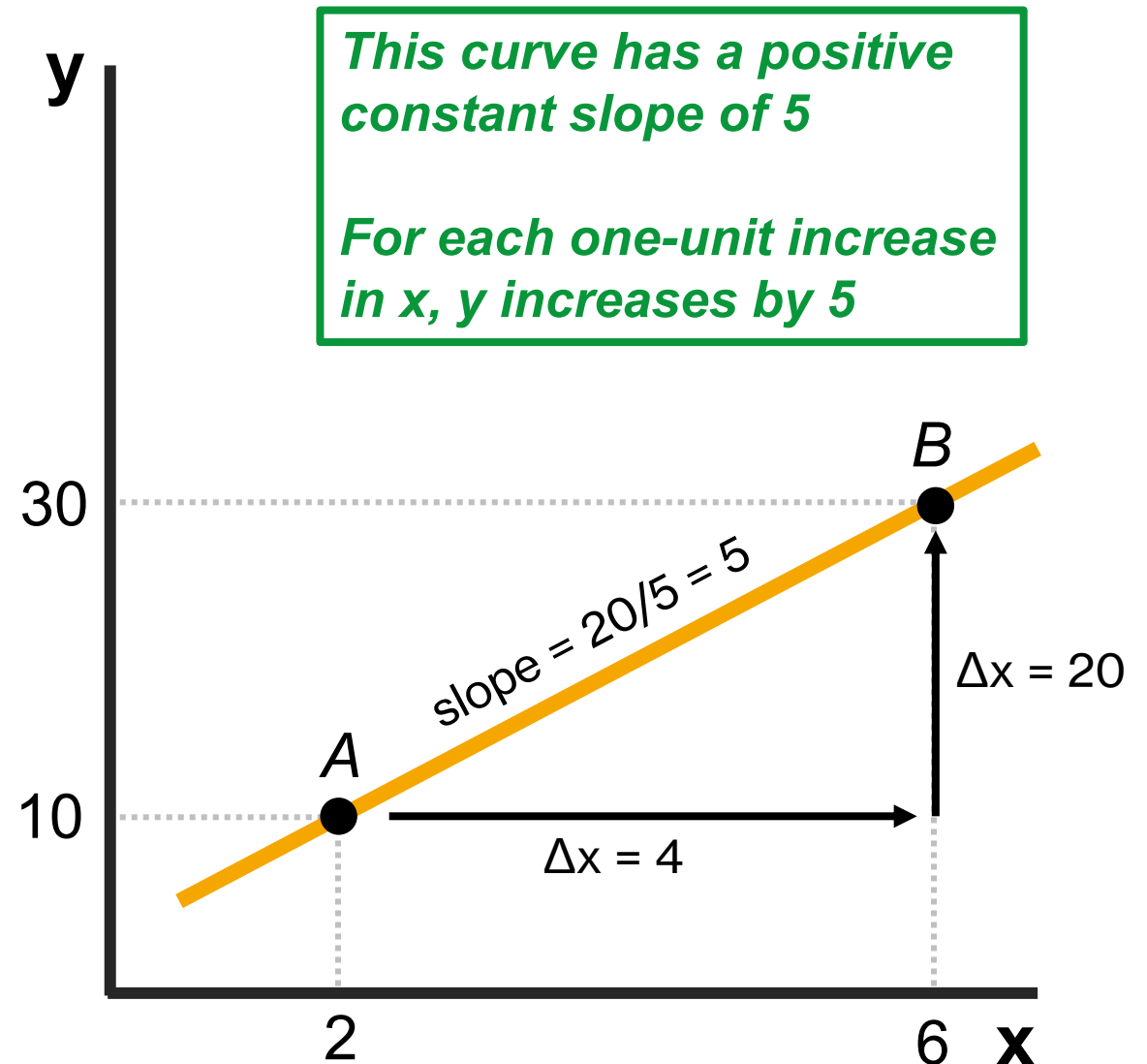


Slopes of Curves

The **slope** of a curve is the measure of how steep the curve is

The slope indicates how sensitive the y-variable is to a change in the x-variable

$$\text{Slope} = \frac{\text{change in } y}{\text{change in } x} = \frac{\Delta y}{\Delta x}$$

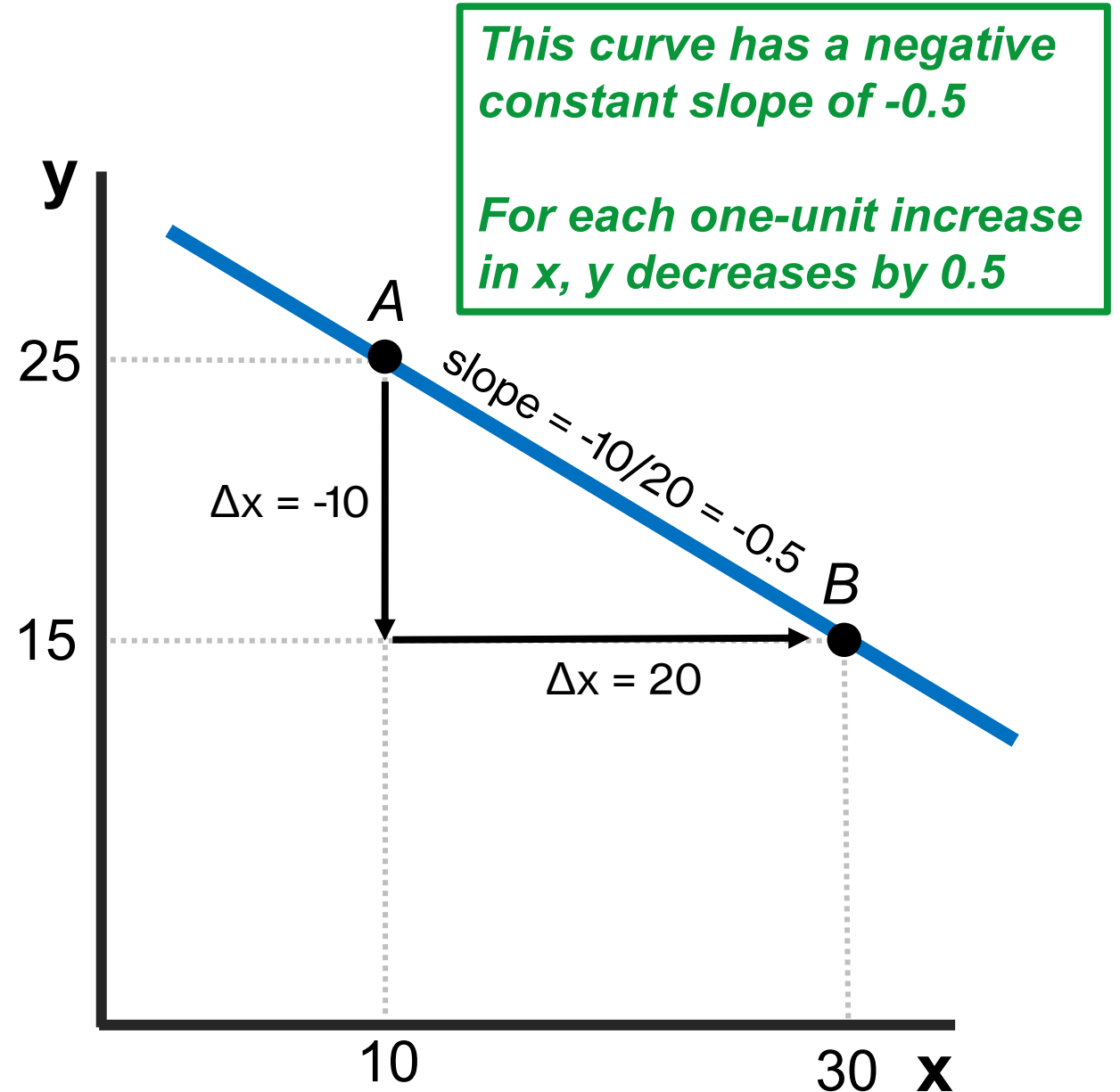


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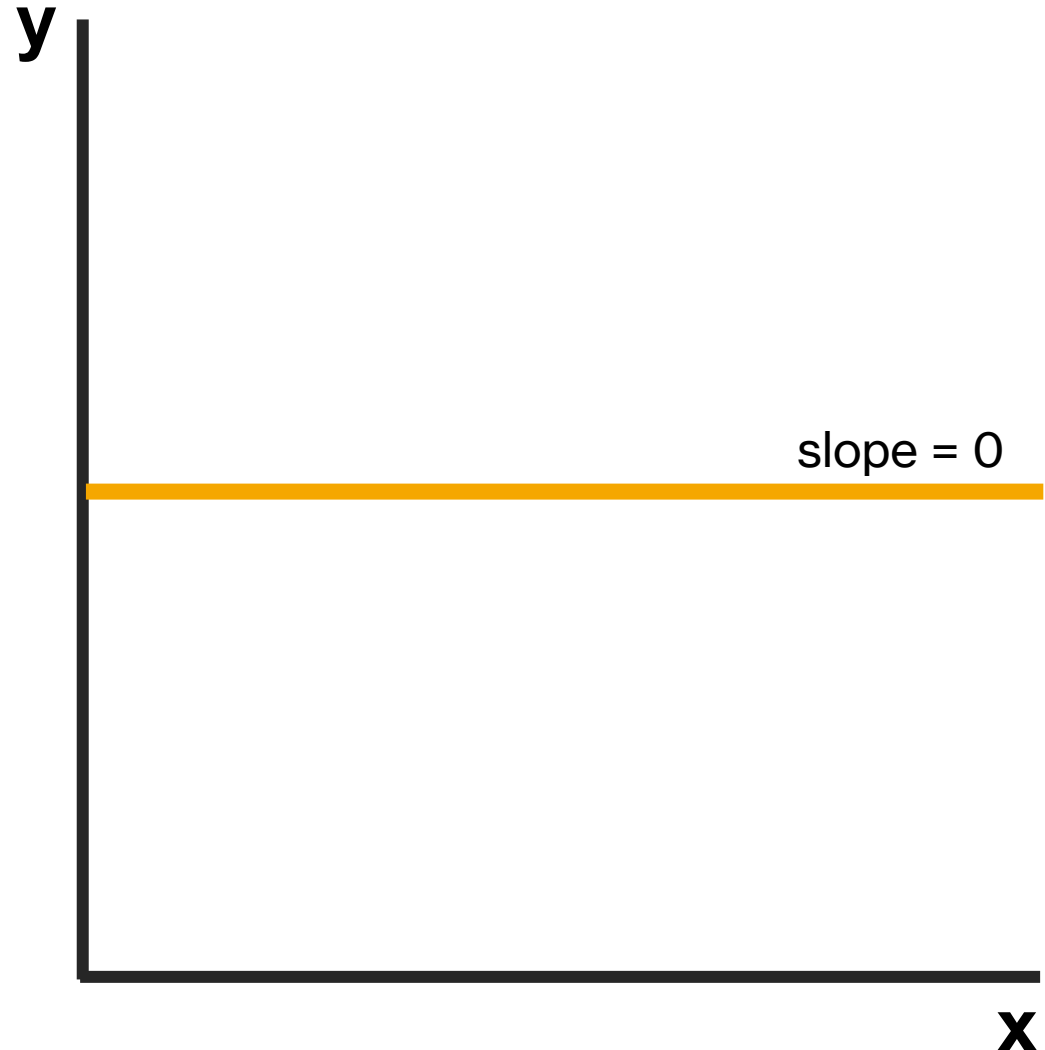


Slopes of Curves

When a curve is horizontal, the value of the dependent variable never changes

The slope is zero

The variables are unrelated if the slope is zero

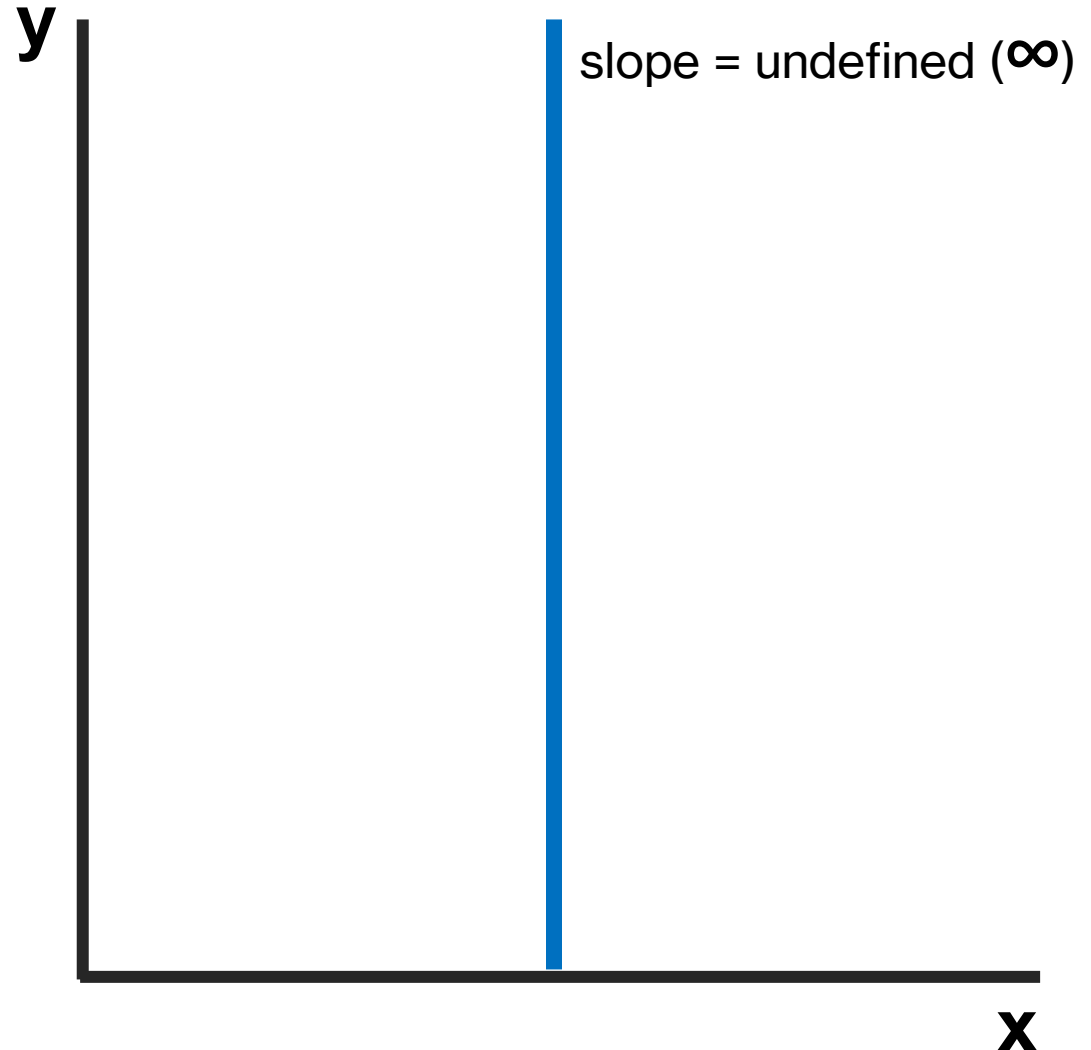


Slopes of Curves

When a curve is vertical, the value of the independent variable never changes

The slope is undefined (*or infinite*)

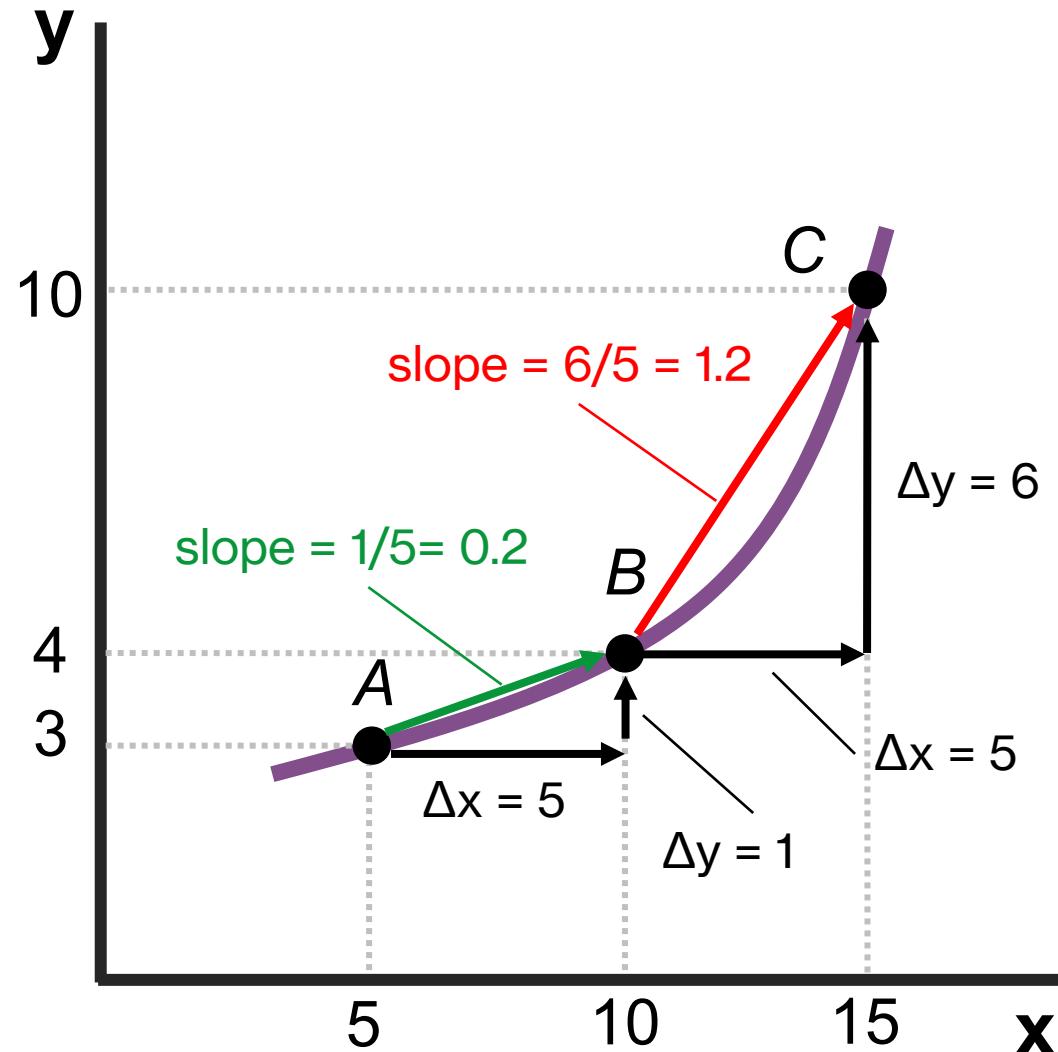
The variables are unrelated if the slope is undefined



Slopes of Curves

What about nonlinear curves?

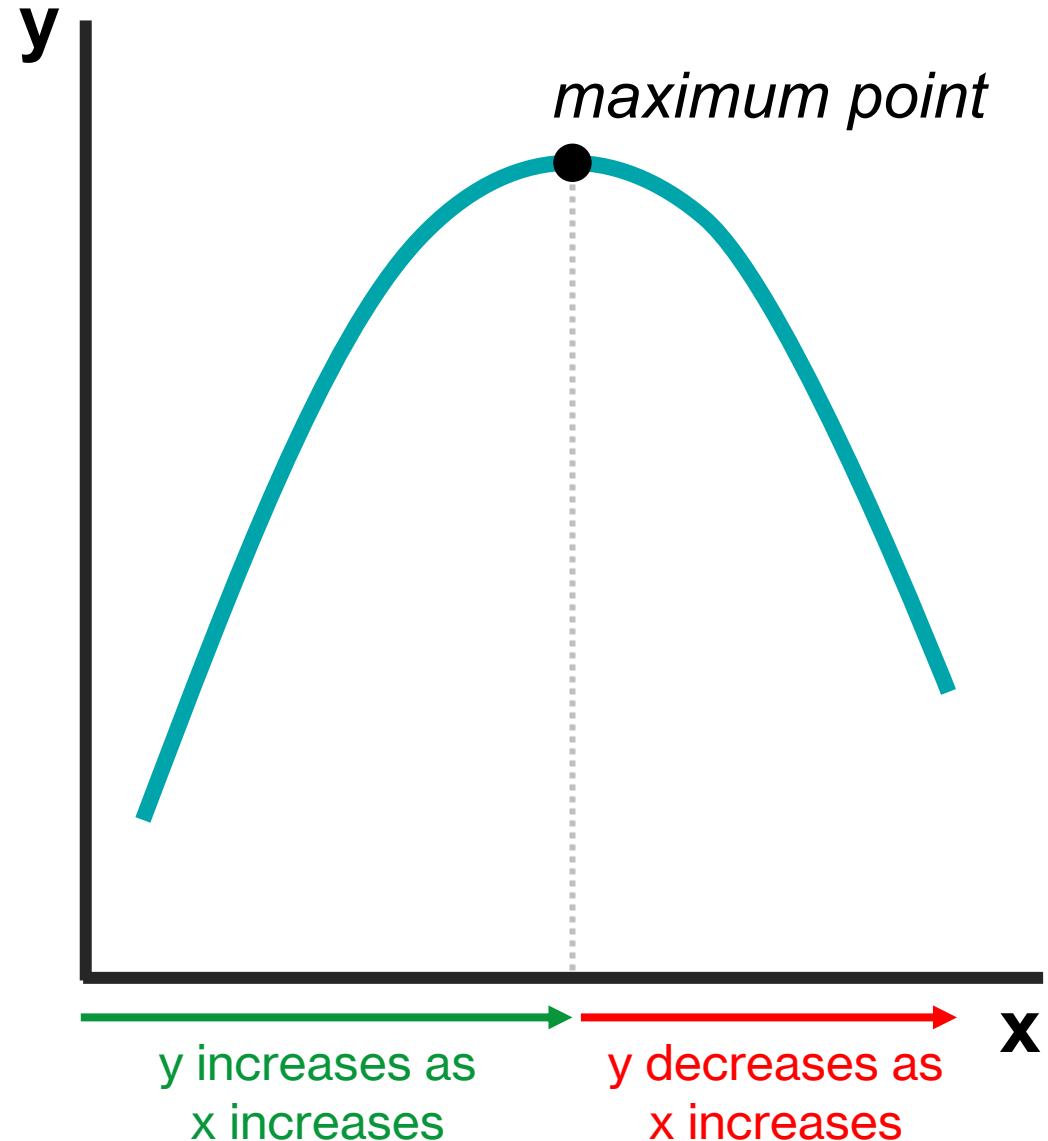
- We must obtain the value of different slopes at different point
- How the slope changes along the curve determines the curve's shape



Maximum and Minimum Points

The slope of nonlinear curves can also switch from positive to negative and vice versa

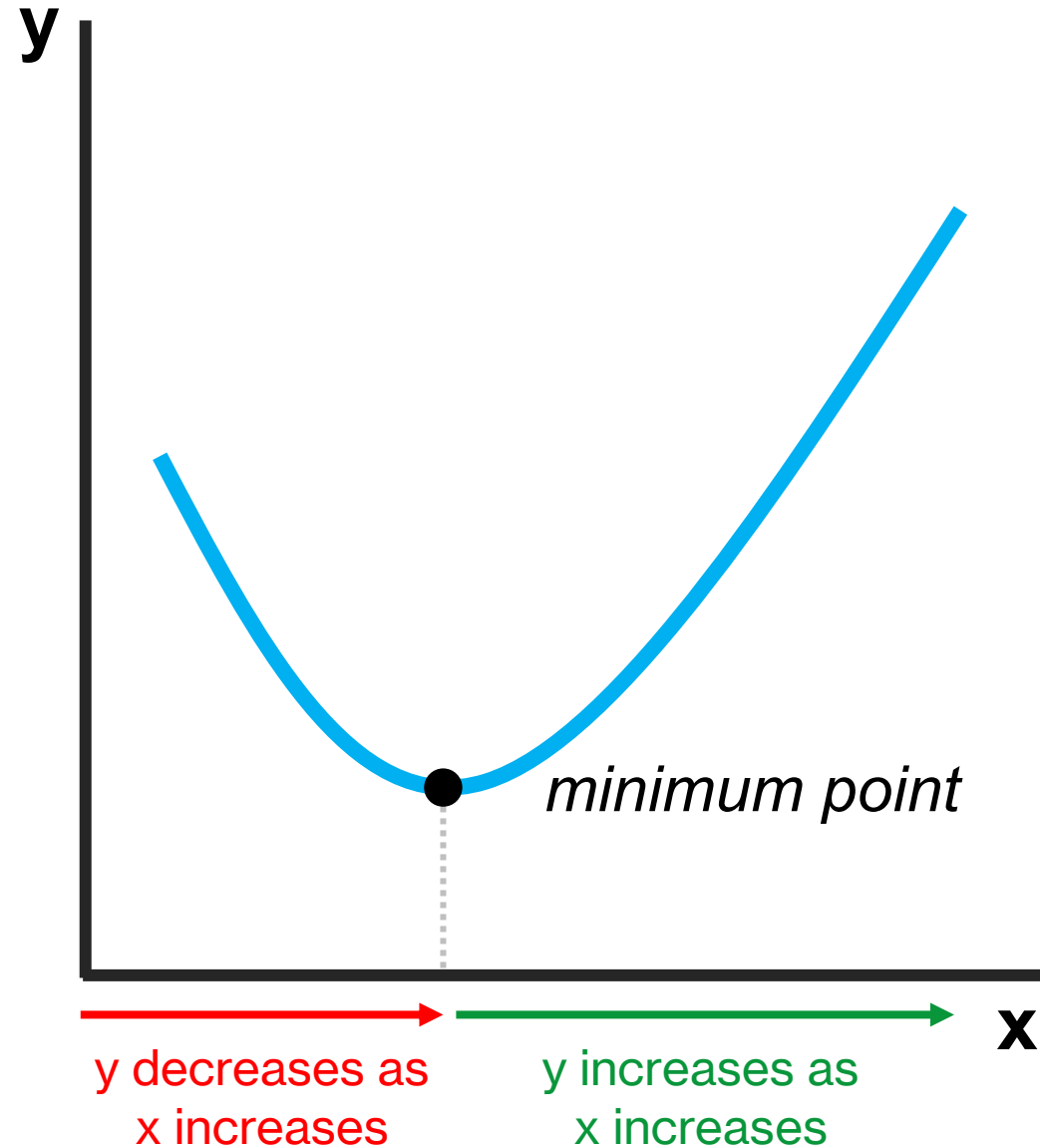
- When a curve switches from positive to negative, it creates a *maximum point*
- When a curve switched from negative to positive, it creates a *minimum point*



Maximum and Minimum Points

The slope of nonlinear curves can also switch from positive to negative and vice versa

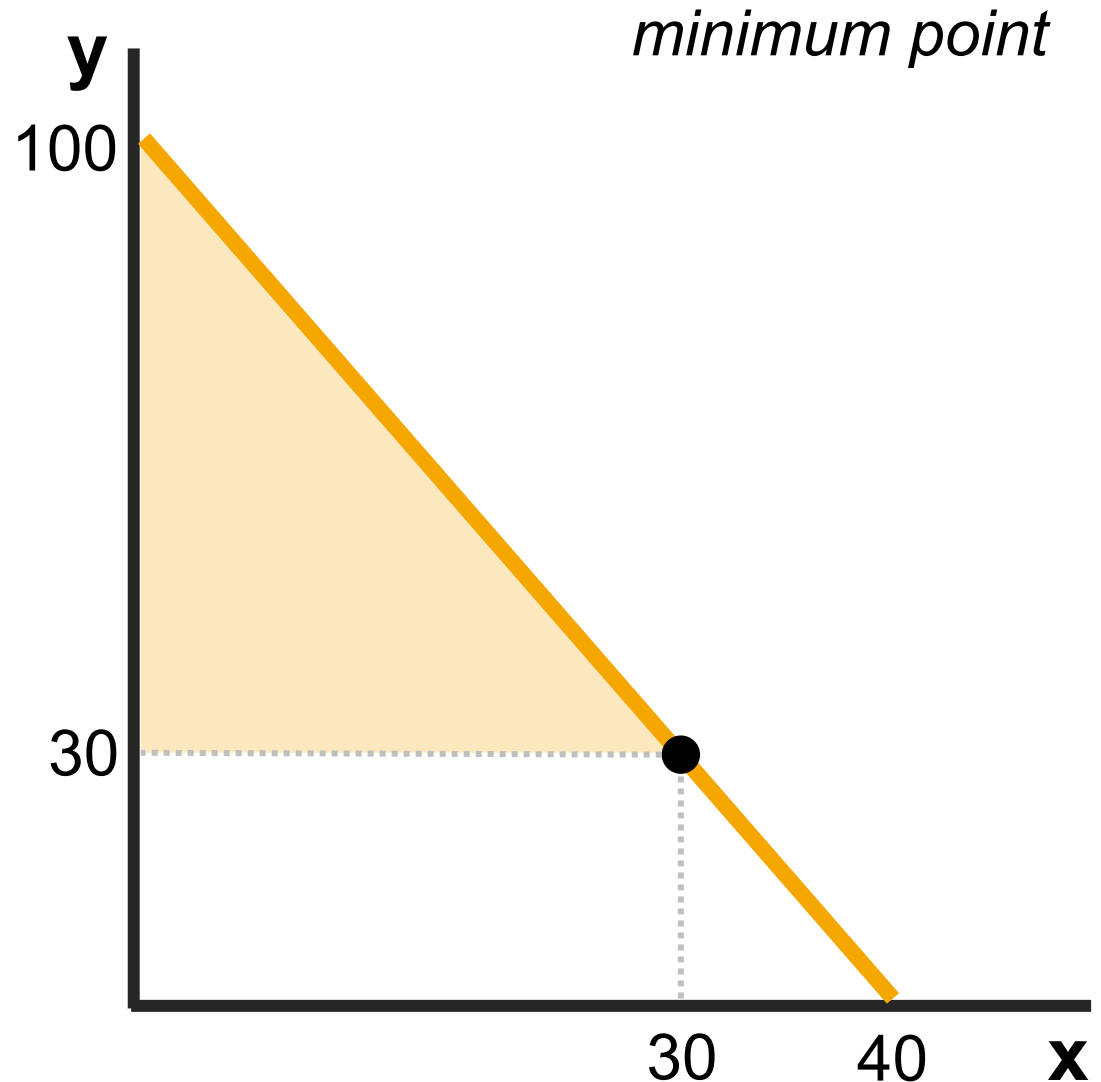
- When a curve switches from positive to negative, it creates a *maximum point*
- When a curve switched from negative to positive, it creates a *minimum point*



Calculating the Area Above or Below a Curve

Sometimes we will need to calculate the area above or below a curve

For our purposes, we will calculate only the area above or below a linear curve

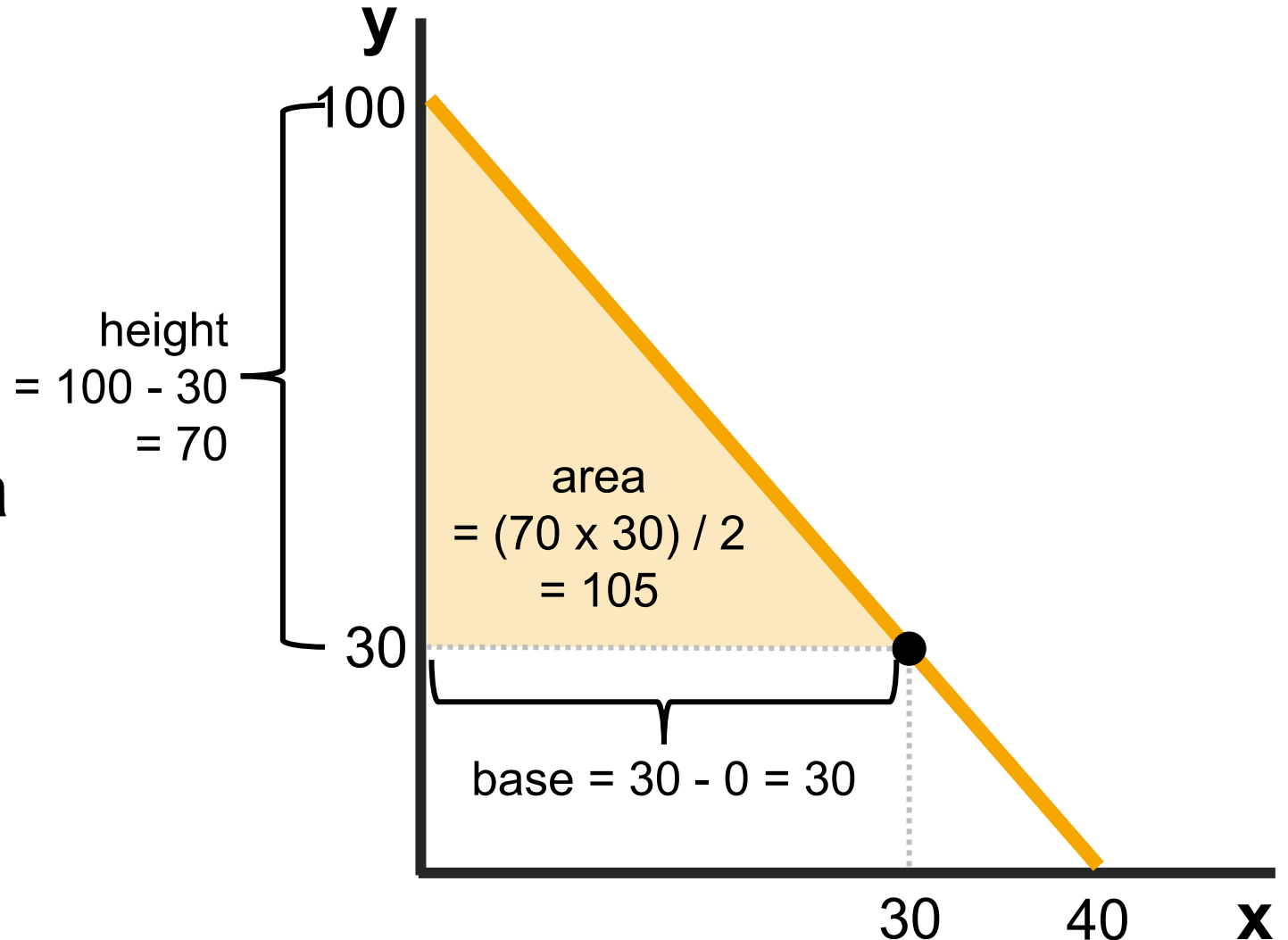


Calculating the Area Above or Below a Curve

Sometimes we will need to calculate the area above or below a curve

Calculating the area of a triangle is straightforward:

$$\text{Area} = \frac{(\text{base} \times \text{height})}{2}$$

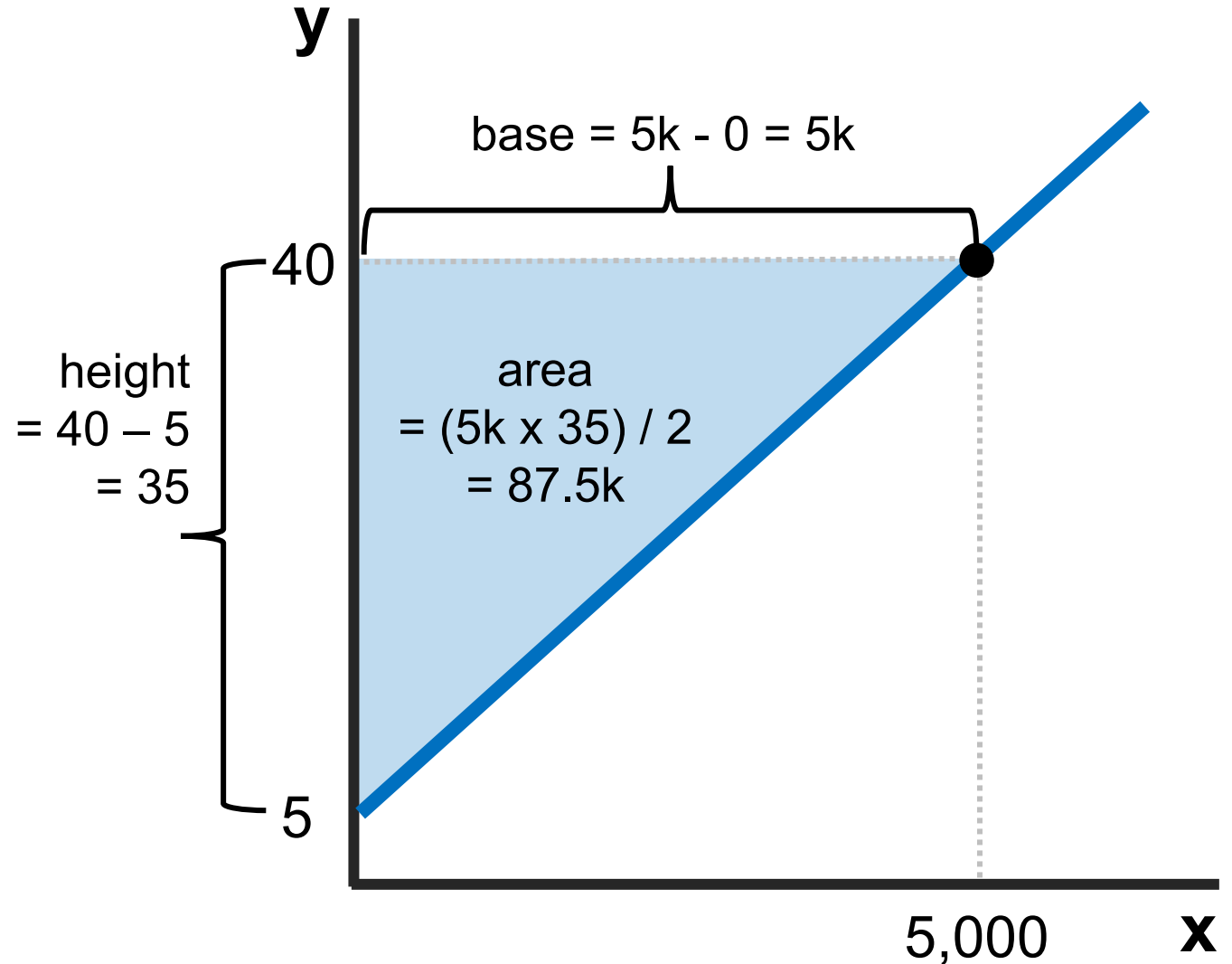


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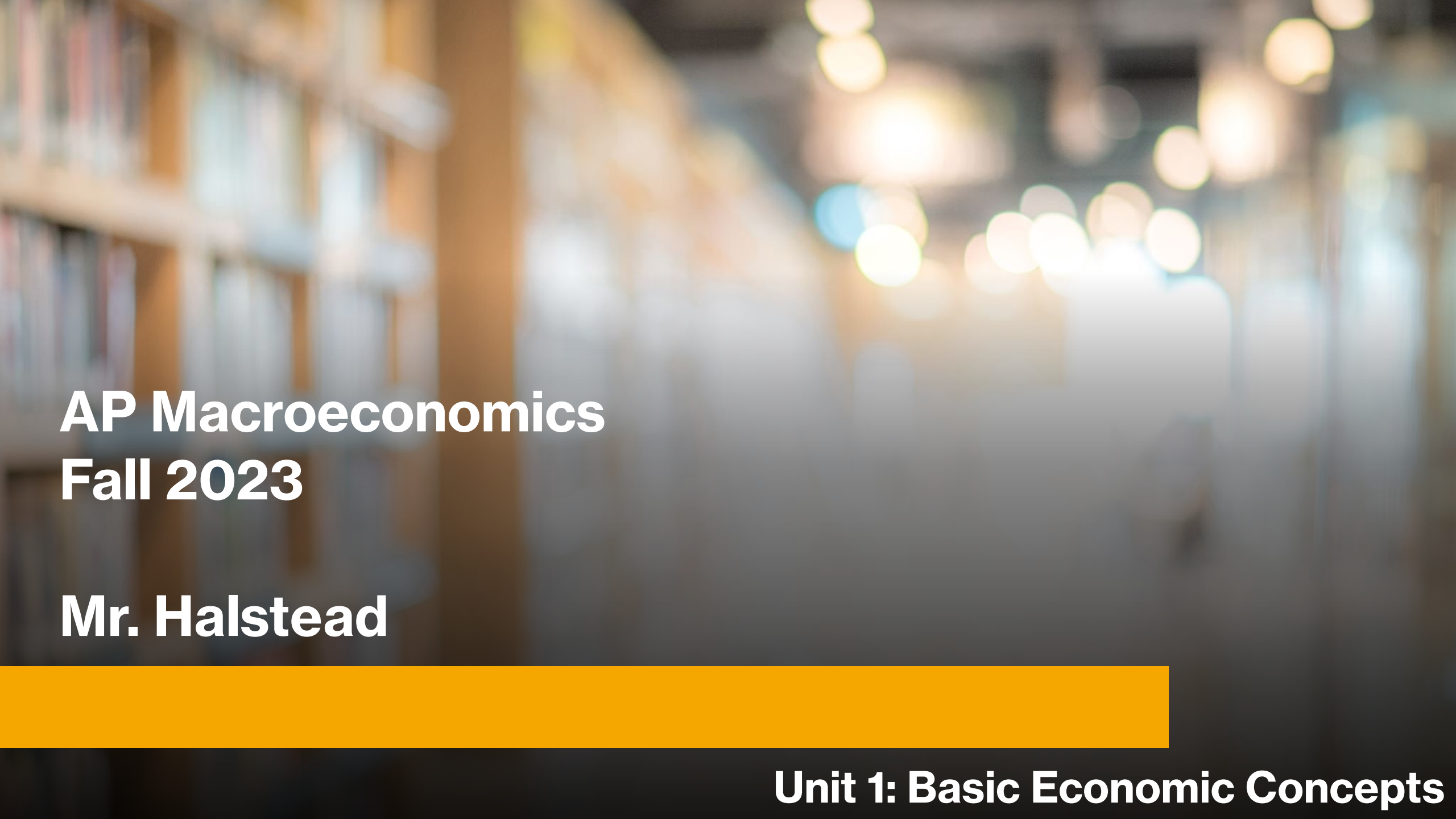
Calculating the area of a triangle is straightforward:

$$\text{Area} = \frac{(\text{base} \times \text{height})}{2}$$



Appendix B

Production Possibilities Curve
Supply and Demand



AP Macroeconomics Fall 2023

Mr. Halstead

Unit 1: Basic Economic Concepts

Unit 1: Basic Economic Concepts

- Students must first understand that resources are scarce, so individuals and societies must make choices
- Examining how and why these choices are made will help students understand supply & demand and specialization & exchange
- This unit introduces students to foundational models that are used in more advanced units
 - Production possibilities curve (PPC)
 - Supply and demand model

Resources Are Scarce

Economics is the study of scarcity and choice

- Most things are desired in quantities greater than what is available
- Because of this, individuals and societies must make choices about how to allocate these resources
- With very few exceptions, resources are scarce

Resources < needs/wants

The diagram consists of the text ***Resources < needs/wants*** in red. Below the word ***Resources*** is the word **limited** in black, with a black arrow pointing from **limited** up to ***Resources***. Below the word ***needs/wants*** is the word **unlimited** in black, with a black arrow pointing from **unlimited** up to ***needs/wants***.

Resources Are Scarce

Resource (factors of production): anything that can be used to produce something else

1. Land
2. Labor
3. Capital
4. Entrepreneurship

A resource is scarce when there is not enough of it to satisfy all the various ways a society wants to use it

Opportunity Cost

All choices involve **trade-offs**

- When you choose one thing, you are also giving up something else
- You make a trade-off whenever you give something up in order to have something else



The Production Possibilities Curve (PPC)

The first model you learn in any economics course is the *production possibilities curve (PPC)*

Recall:

- Resources are scarce
- Scarcity means choices must be made
- All choices have trade-offs, or opportunity costs

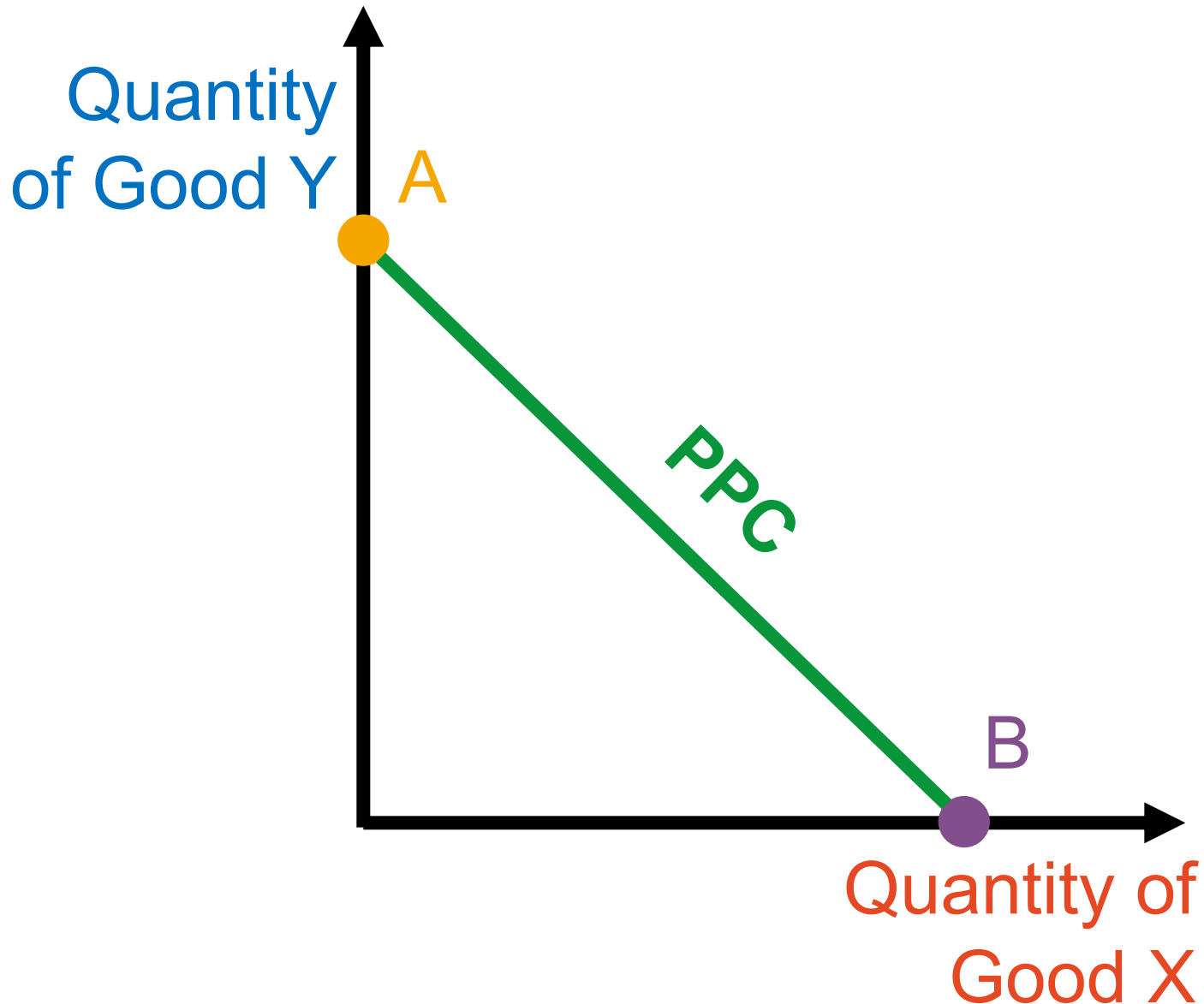
To illustrate these trade-offs, economists used the PPC model

The Production Possibilities Curve (PPC)

PPC:

- Model that illustrates the trade-offs in a simple economy that produces only two goods
- Model shows the maximum quantity of one good that can be produced for each possible quantity of the other good produced

The Production Possibilities Curve (PPC)

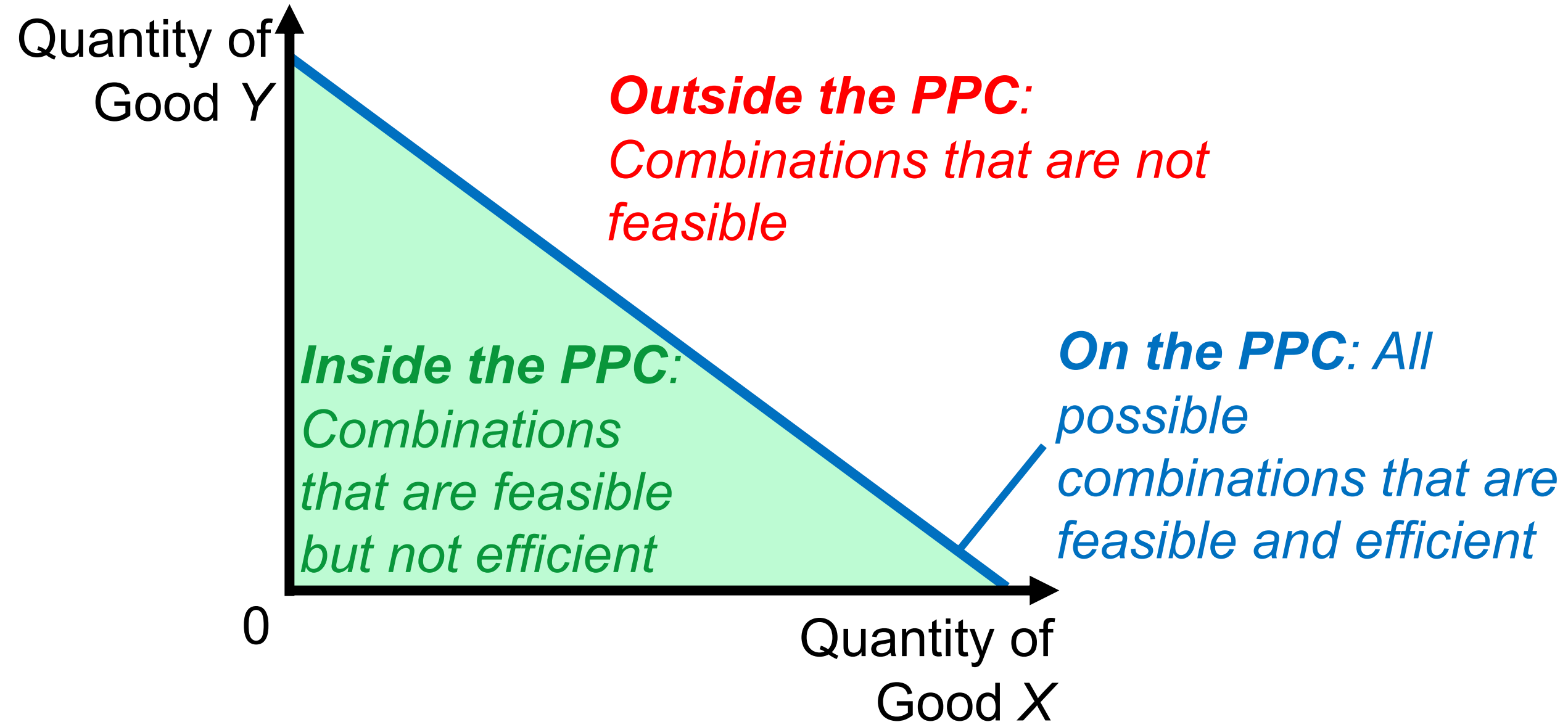


Point A: All resources are dedicated to Y; zero X is produced

Point B: All resources are dedicated to X; zero Y is produced

PPC: All possible combinations of output possible when using all resources

The Production Possibilities Curve (PPC)

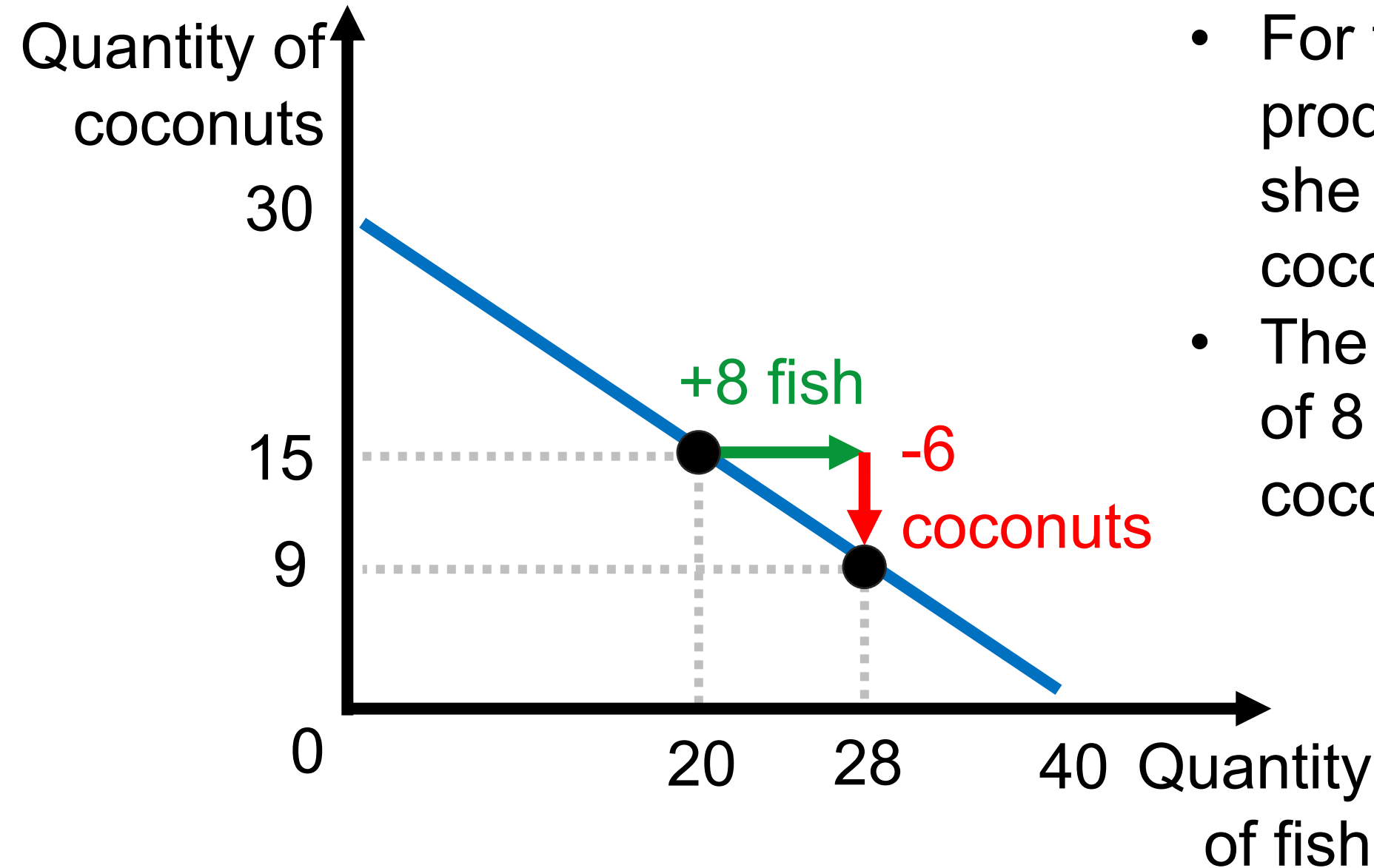


The PPC and Modeling Efficiency

An economy is ***efficient*** if there are no missed opportunities

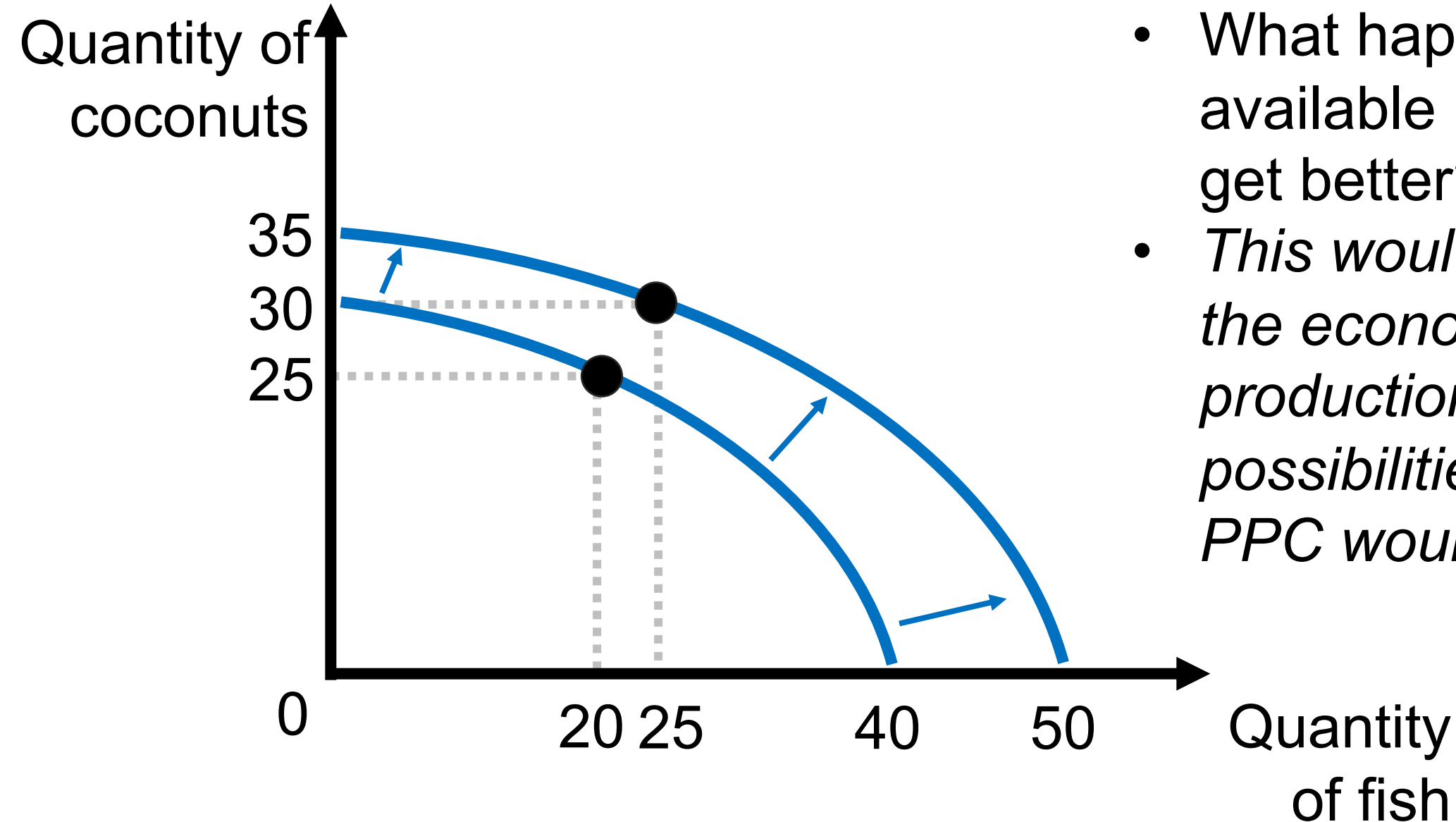
- Efficiency exists when all resources are being used at their full capacity
- When operating efficiently, it is impossible to produce one more unit of one good with sacrificing the other good
- Efficient outcomes are illustrated as points along the PPC

The PPC and Modeling Opportunity Cost



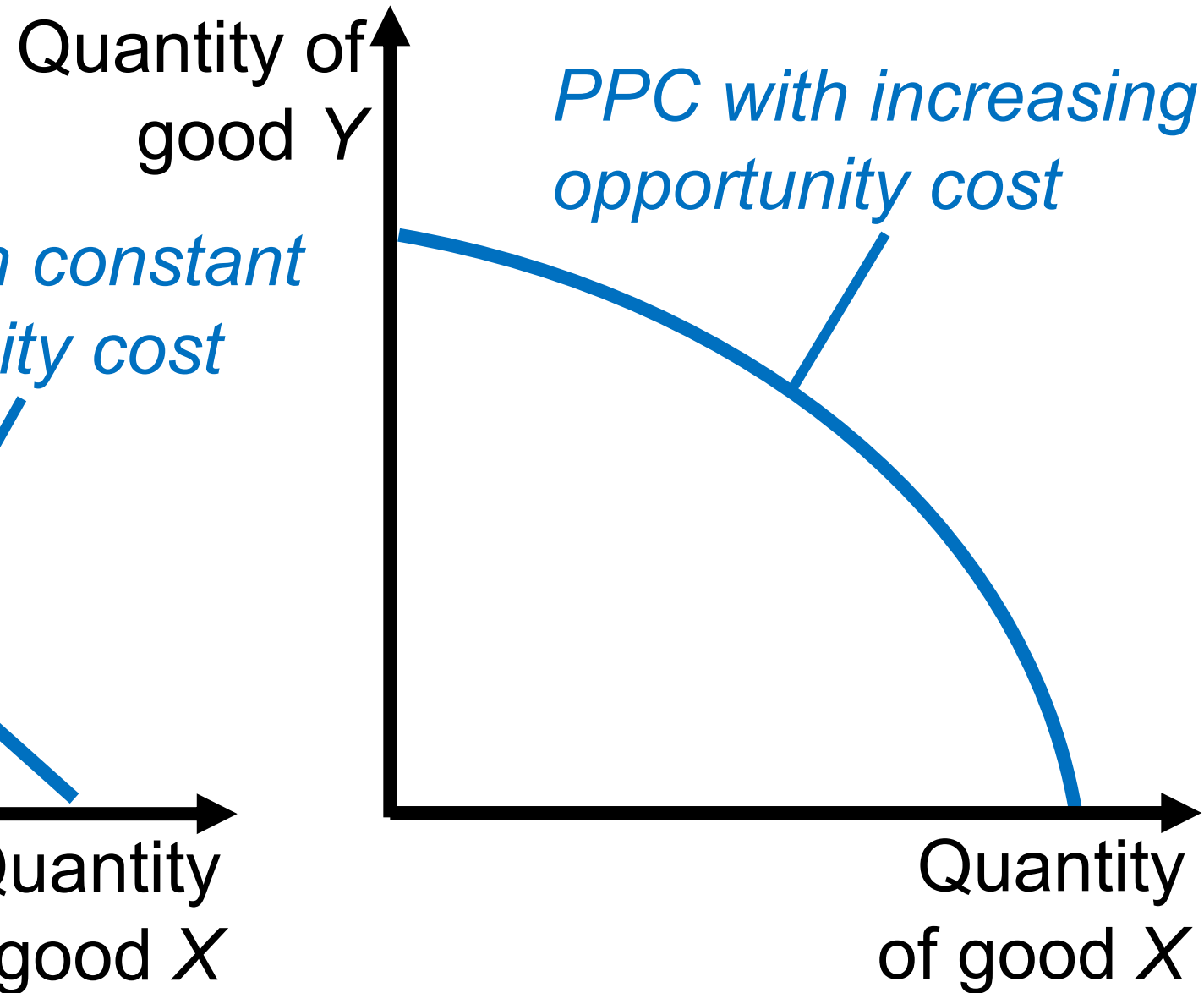
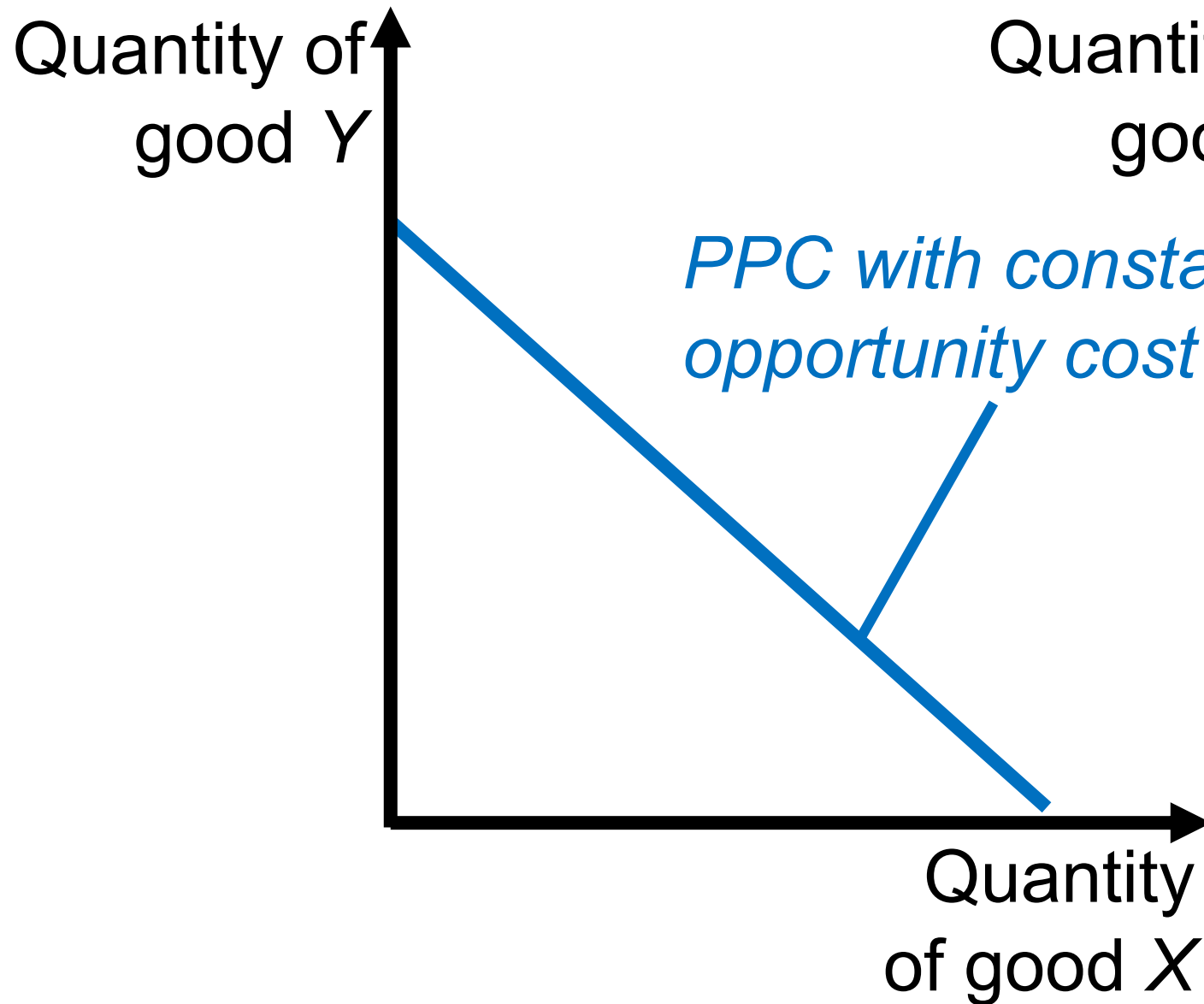
- For the castaway to produce more fish, she must sacrifice coconuts
- The opportunity cost of 8 additional fish is 6 coconuts

The PPC and Modeling Economic Growth



- What happens if the available resources get better?
- *This would expand the economy's production possibilities, and the PPC would shift out*

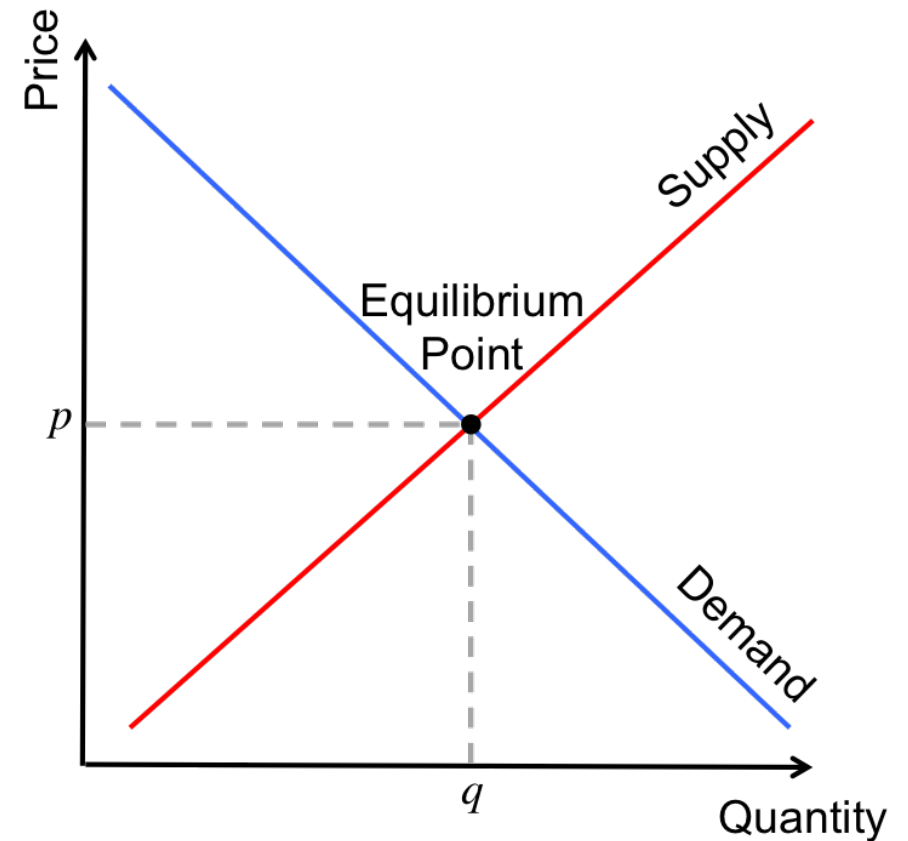
The PPC and Modeling Opportunity Cost



The Supply and Demand Model

The *supply and demand model* is the most well-known economic model

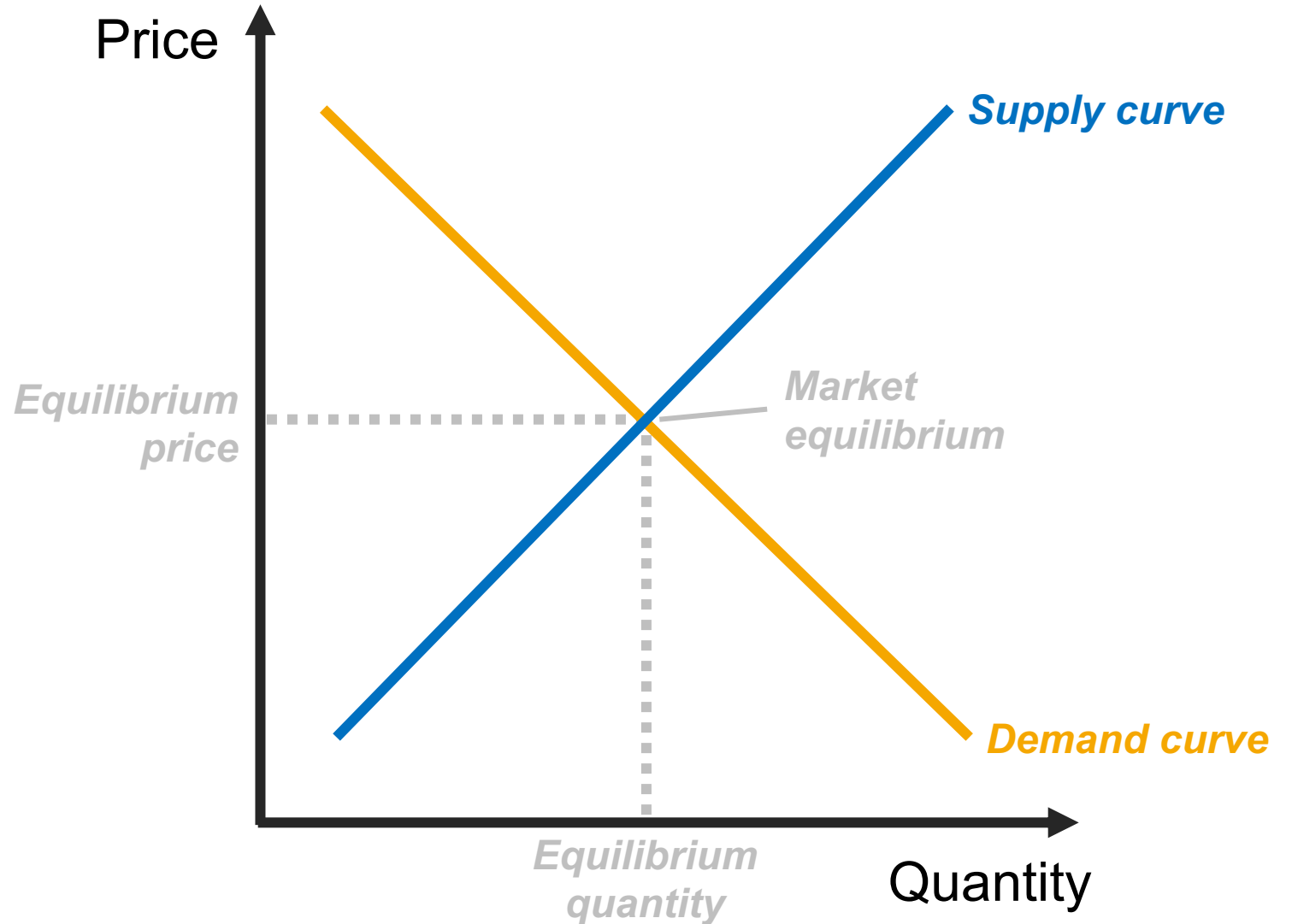
- It is used to understand how markets determine the price and quantity of a good or service
- Markets are made up of 1) buyers, who demand a good or service, and 2) sellers, who produce them



The Supply and Demand Model

The *supply and demand model* is made up of three key elements:

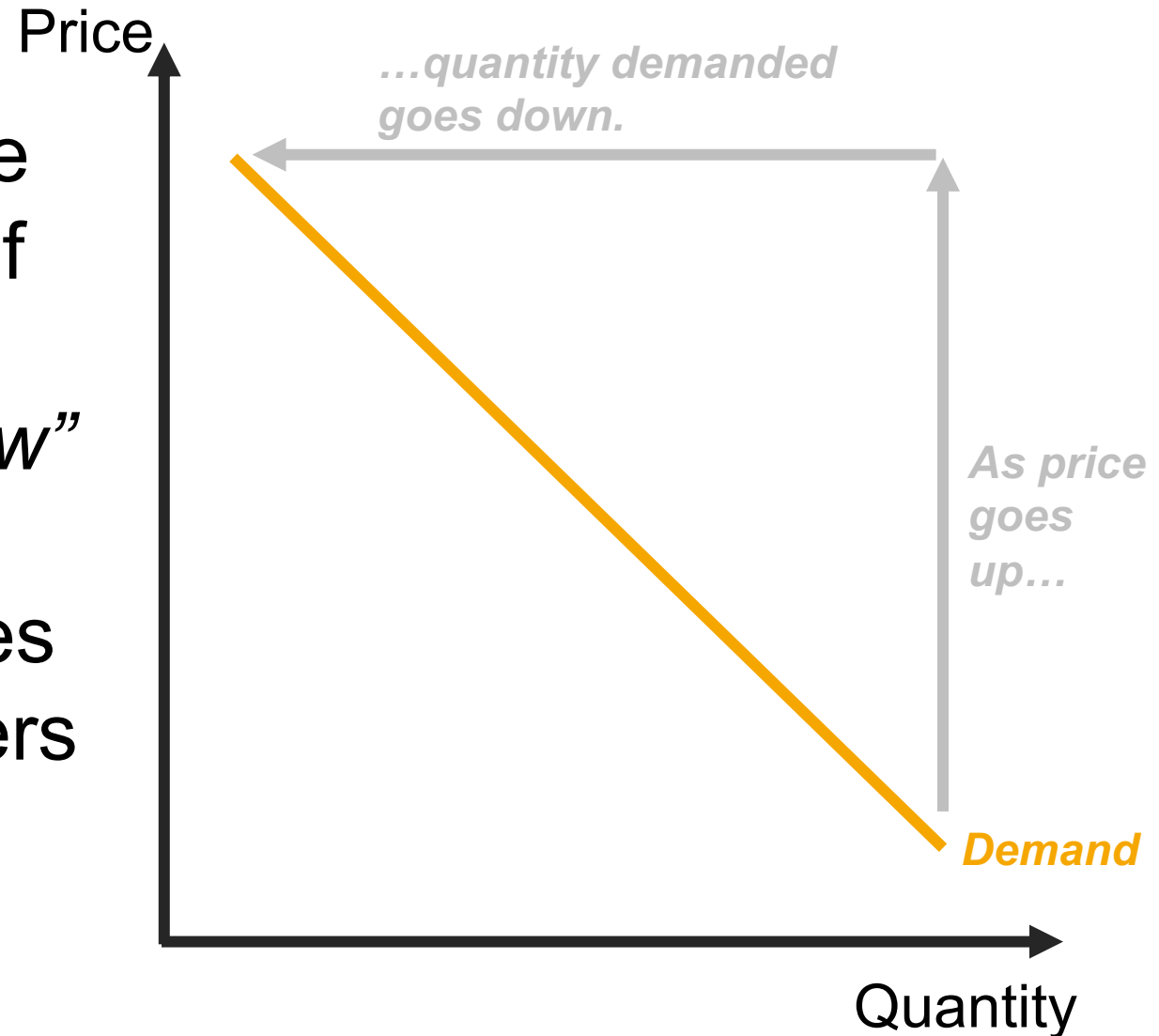
- 1) Demand curve
- 2) Supply curve
- 3) Market equilibrium



The Law of Demand

Economists are willing to call the relationship between the price of something and the quantity demanded for that product a “*law*”

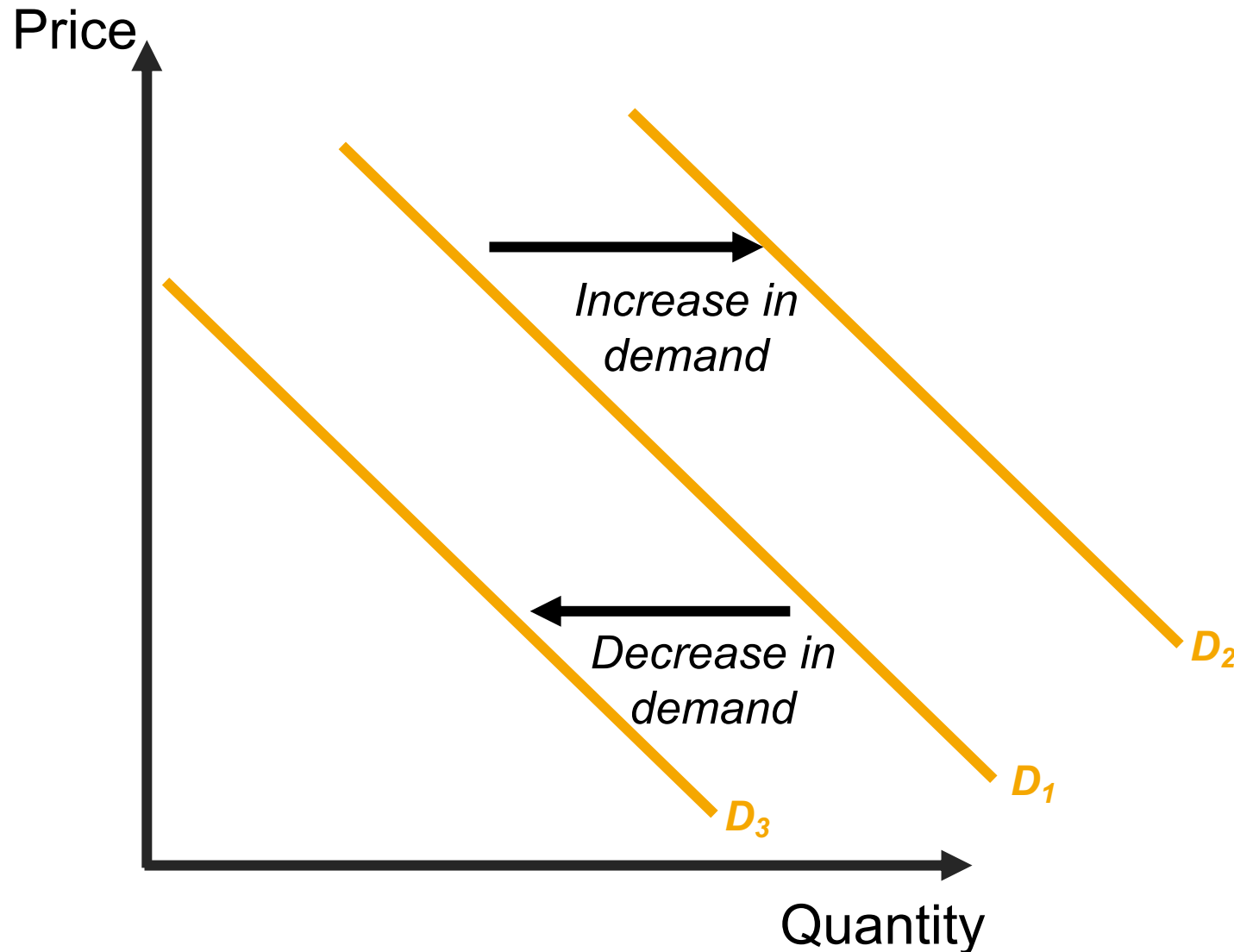
The law of demand: higher prices for a good or service leads buyers to demand a smaller quantity of that good or service



Shifts of the Demand Curve

- A change in the price of something changes the *quantity demanded*, which is illustrated as a movement along the demand curve
- Changes in factors other than price will increase or decrease *demand*, which is illustrated as a shift of the demand curve

Shifts of the Demand Curve



An increase in demand means the demand curve shifts to the *right*

- At any price, buyers demand a **higher** quantity

A decrease in demand means the demand curves shifts to the *left*

- At any price, buyers demand a **lower** quantity

Determinants of Demand (Curve Shifters)

There are five principal factors that shift the demand curve for a good or service

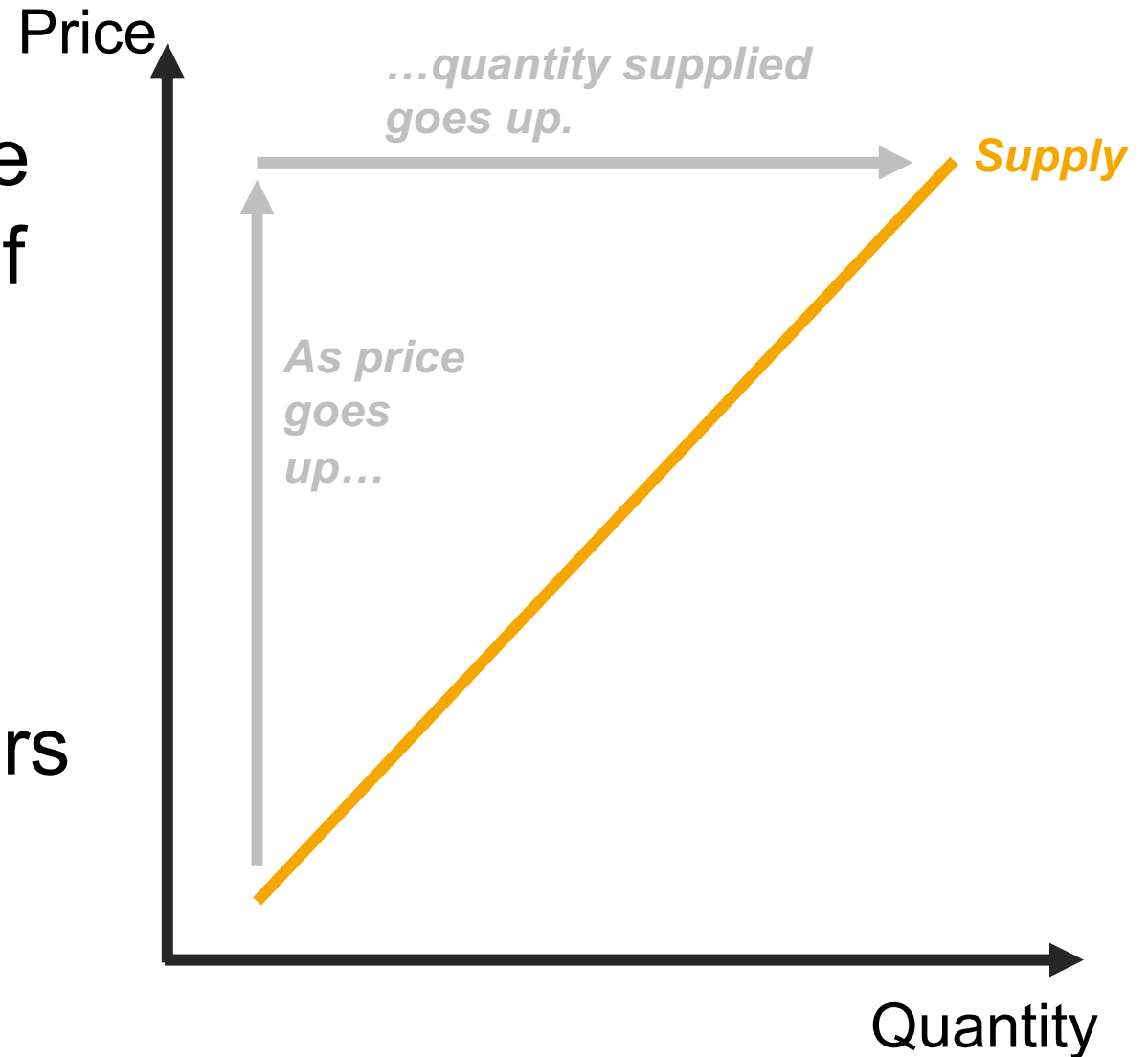
- Changes in **T**astes
- Changes in the price of **R**elated goods
- Changes in **I**ncome
- Changes in the number of **B**uyers
- Changes in **E**xpectations

Think: **TRIBE**

The Law of Supply

Economists are willing to call the relationship between the price of something and the quantity supplied for that product a “*law*”

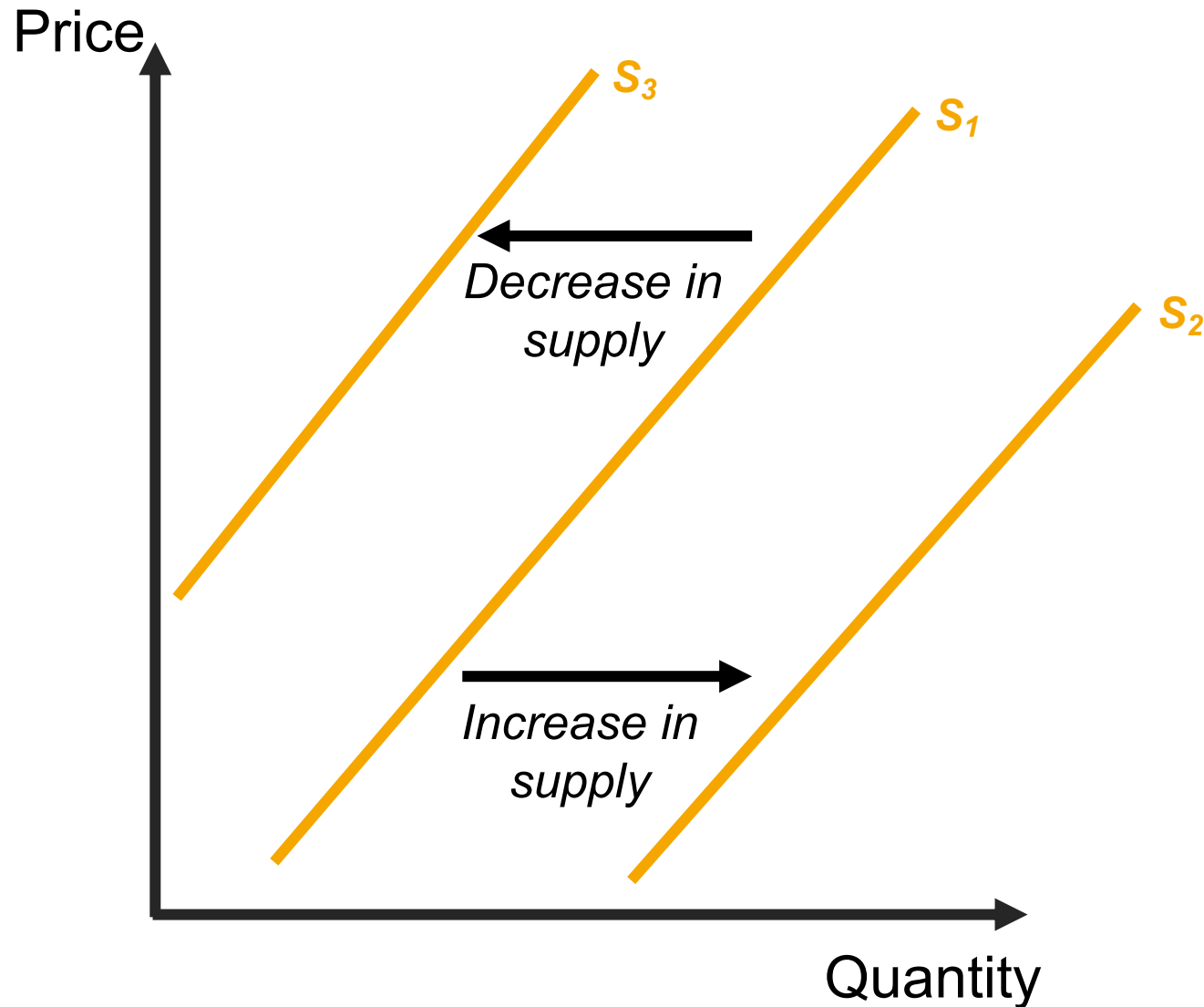
The law of supply: higher prices for a good or service leads sellers to produce a greater quantity of that good or service



Shifts of the Supply Curve

- A change in the price of something changes the *quantity supplied*, which is illustrated as a movement along the supply curve
- Changes in factors other than price will increase or decrease *supply*, which is illustrated as a shift of the supply curve

Shifts of the Supply Curve



An increase in supply means the supply curve shifts to the *right*

- At any price, sellers produce a **higher** quantity

A decrease in supply means the supply curves shifts to the *left*

- At any price, sellers produce a **lower** quantity

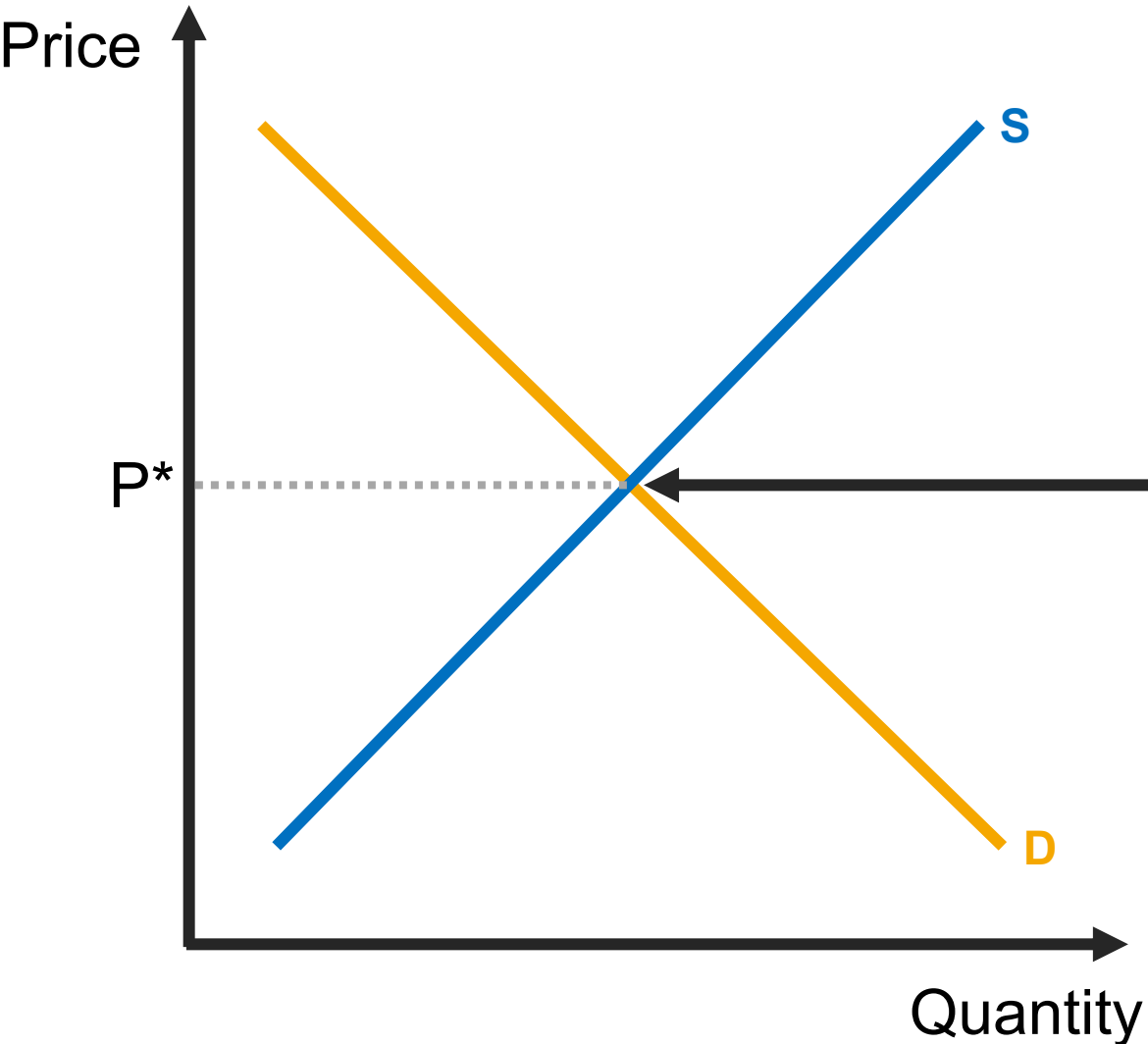
Determinants of Supply (Curve Shifters)

There are five principal factors that shift the supply curve for a good or service

- Changes in **I**ntput prices
- Changes in the price of **R**elated goods
- Changes in **E**xpectations
- Changes in the **N**umber of producers
- Changes in **T**echnology

Think: **I-RENT**

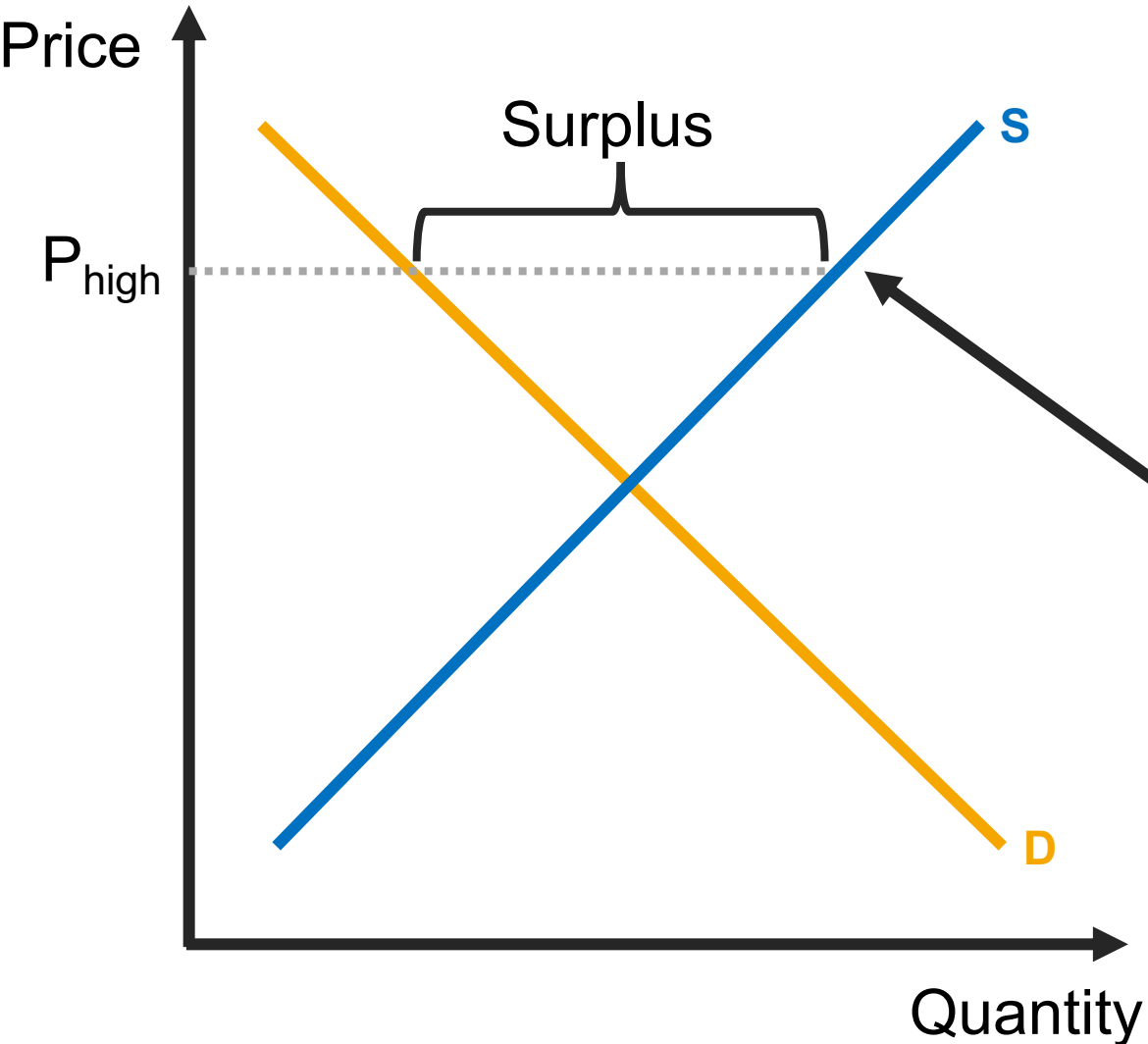
Finding Equilibrium Price and Quantity



At equilibrium price...

- Quantity demanded *equals* quantity supplied
- There is no surplus (excess supply) or shortage (excess demand)
- Buyers and sellers have no incentive to change prices

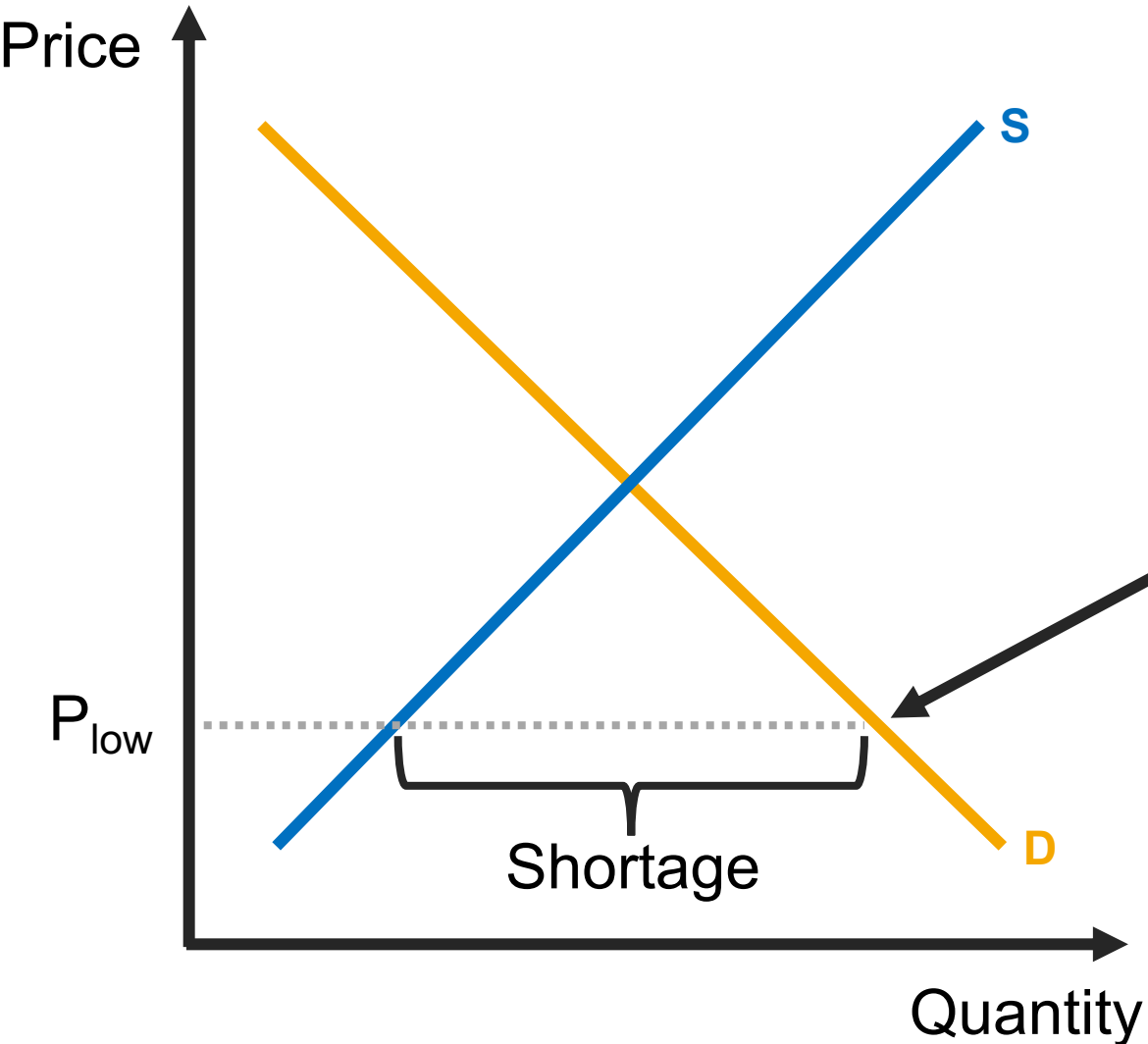
Finding Equilibrium Price and Quantity



If prices are too high...

- Quantity supplied *exceeds* quantity demanded
- There is a surplus (excess supply)
- Sellers have an incentive to lower prices
- Prices will fall until the surplus is eliminated

Finding Equilibrium Price and Quantity



If prices are too low...

- Quantity demanded *exceeds* quantity supplied
- There is a shortage (excess demand)
- Buyers/sellers have an incentive to raise prices
- Prices will go up until the shortage is eliminated

Changes in Supply and Demand

Markets can change in four ways:

Increased demand ($D\uparrow$)
 $Q\uparrow, P\uparrow$

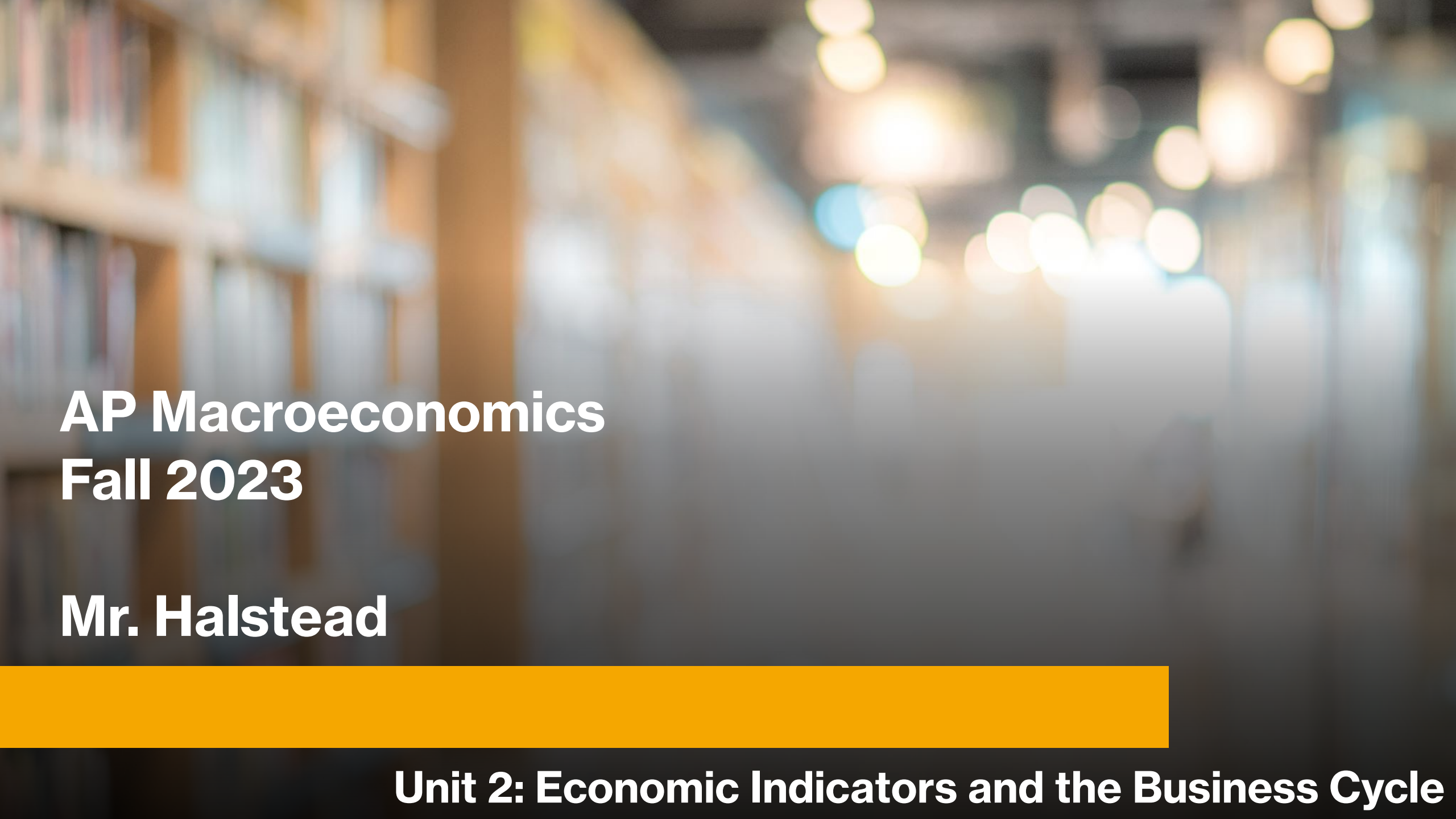
Decreased demand ($D\downarrow$)
 $Q\downarrow, P\downarrow$

Increased supply ($S\uparrow$)
 $Q\uparrow, P\downarrow$

Decreased supply
 $Q\downarrow, P\uparrow$

Appendix C

Gross domestic product
Unemployment
Inflation



AP Macroeconomics Fall 2023

Mr. Halstead

Unit 2: Economic Indicators and the Business Cycle

The Circular-Flow Diagram

In the *circular-flow diagram*, we consider the interactions between three economic actors:

- Households (consumers)
- Businesses (producers)
- Governments

These groups interact in two types of markets:

- Product markets
- Factor markets



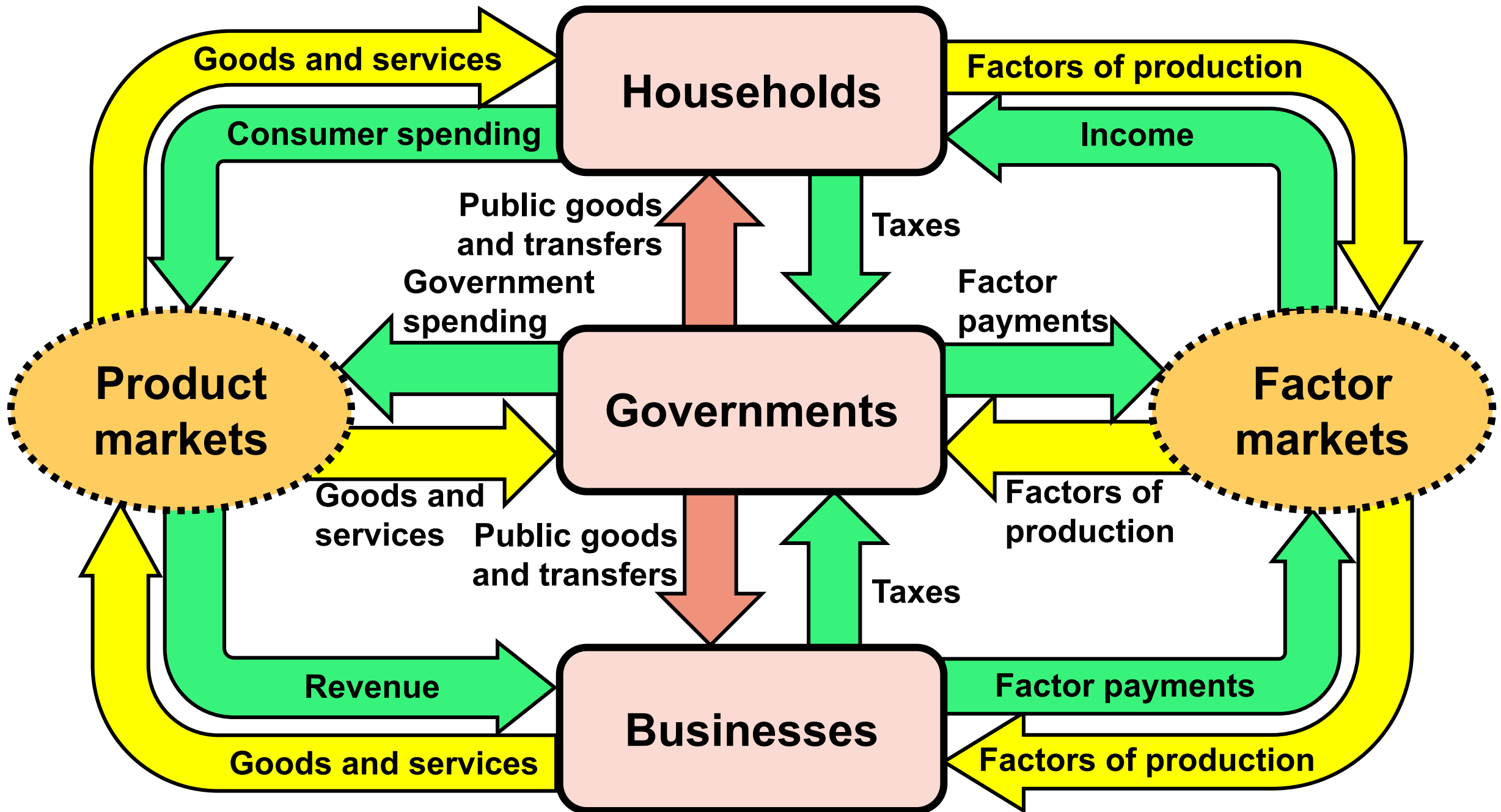
The Circular-Flow Diagram

Businesses, households, and governments interact in two types of markets:

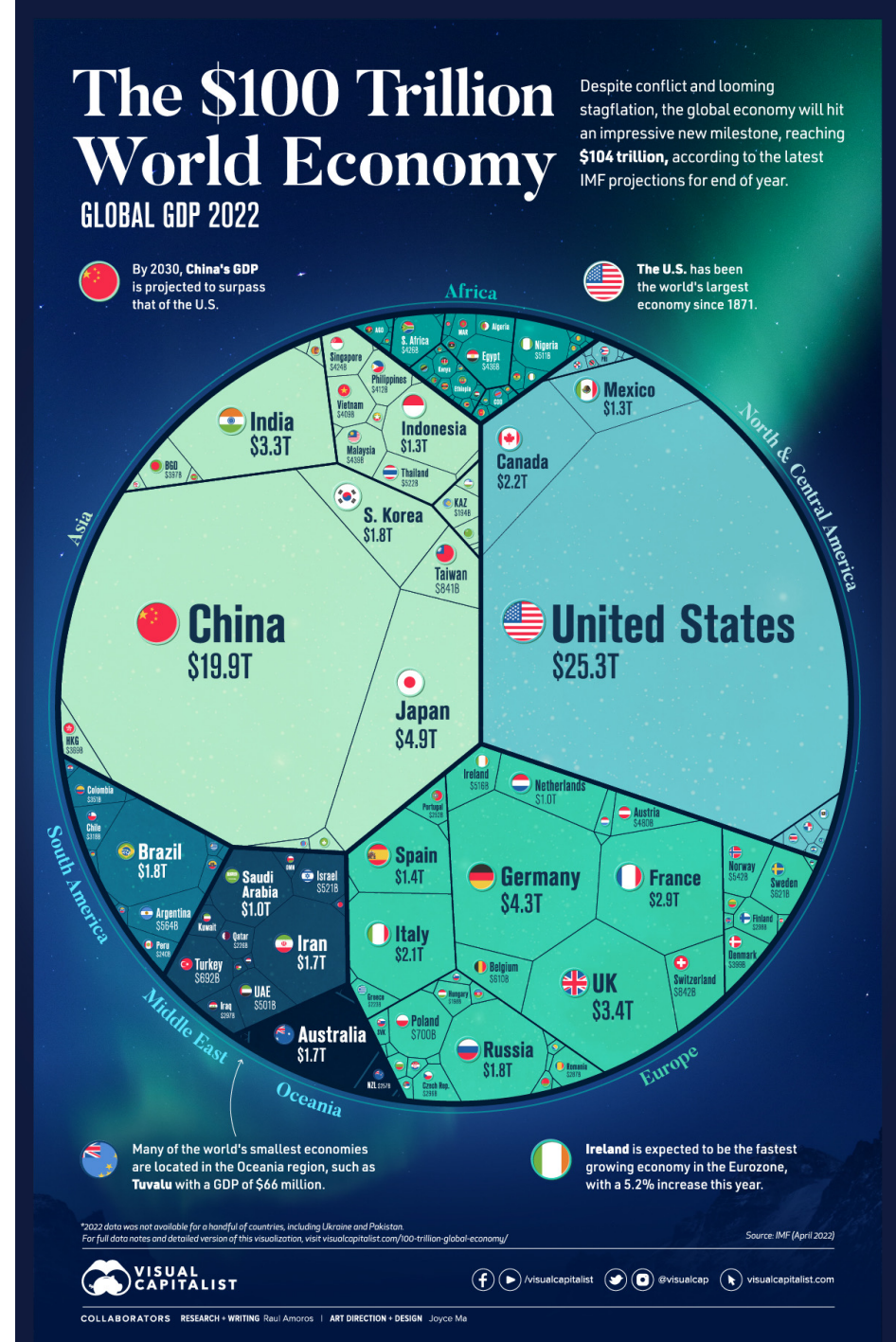
Product markets: where goods and services are bought and sold

Factor markets: where factors of production (land, labor, capital, entrepreneurship) are bought and sold





- GDP is equal to the value of all *final goods and services* produced in an economy over a certain period of time (usually one year)
- In 2022, the U.S. GDP was \$26.1 *trillion* (\$78,300 per person)



GDP: The Expenditure Approach

The *expenditure approach* is the most-common way to calculate GDP

$$\text{GDP} = C + I + G + (X - M)$$



GDP: The Income Approach

The *income approach* adds all the income earned by selling resources:

Wages earned from labor	Interest earned from loans	Rent earned from leasing land and buildings	Profits earned by businesses
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Gross Domestic Product

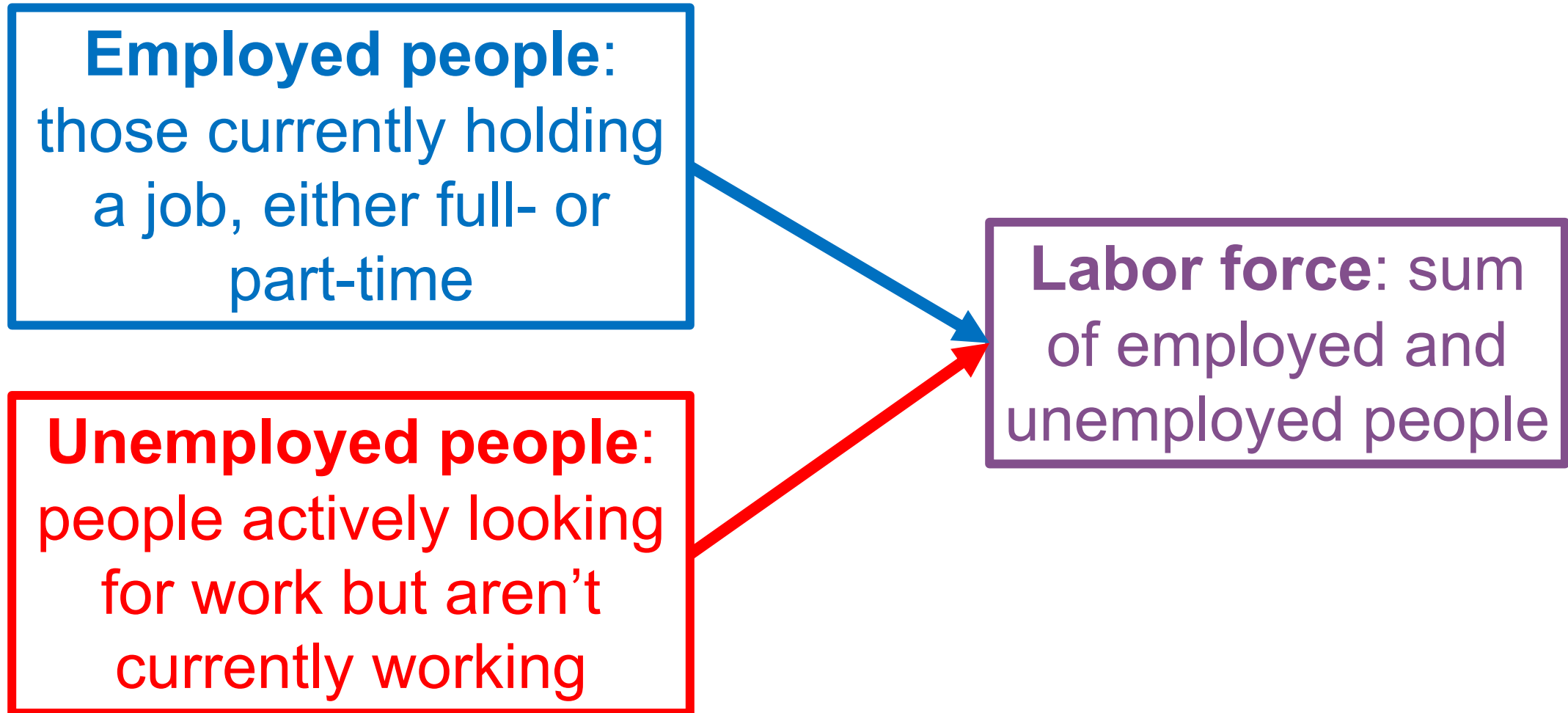
Included in GDP:

- Domestically produced final goods and services
- Capital goods
- New construction of structures
- Changes to inventories

Not included in GDP:

- Intermediate goods and services
- Inputs
- Used goods
- Nonmarket transactions (e.g., home maintenance, illegal activities)
- Financial assets
- Imports

The Labor Force



Employment Measures

Labor force participation rate: percent of the population aged 16 or older that is in the labor force

$$\frac{\text{labor force}}{\text{population age 16 and older}}$$

Unemployment rate: percent of labor force who are unemployed

$$\frac{\text{\# of unemployed}}{\text{labor force}}$$

Limitations of the Unemployment Rate

The unemployment rate is a good indicator of how hard it is to find work given the state of the economy, **but it isn't perfect**

- **Discouraged workers** are those who could work but have given up looking
- **Underemployed workers** are those who want to work more hours or are overqualified

The unemployment rate does not count these workers, so it understates the percent of people who are unable to find work

Types of Unemployment

There are three types of unemployment

- 1) **Frictional unemployment:** caused by constant job creation and destruction and addition of new workers to labor force

These workers are typically unemployed for short durations

Types of Unemployment

There are three types of unemployment

2) Structural unemployment: workers lack the skills required for available jobs, or when job-seekers outweigh number of jobs at current wage

- **Causes**
 - Mismatch between skills and job requirements
 - Technological change or automation
 - Geographic changes
 - Minimum wage effects

Natural Rate of Unemployment

The **natural rate of unemployment** is the rate of unemployment that arises from the effects of frictional and structural unemployment

Natural unemployment

= fictional unemployment + structural unemployment

“Natural” because frictional is inevitable, and most economies have some structural unemployment

Types of Unemployment

There are three types of unemployment

- 3) Cyclical unemployment:** unemployment caused by downturns in the economy
- This unemployment is a deviation of the unemployment rate above the natural rate

$$\begin{aligned} \text{Actual unemployment} \\ = \text{natural unemployment} + \text{cyclical unemployment} \end{aligned}$$

Inflation, Deflation, and Price Stability

Over the last 30 years, the economy has experienced significant **inflation**: a rise in the overall level of prices

Deflation is a decline in overall level of prices

Inflation and deflation affect households and businesses behave:

- Inflation (or fear of rising prices) discourages people from holding cash, so they begin to spend more
- Deflation (or expected declines in prices) encourages people to hold cash, so they begin to spend less

How We Measure Inflation

To determine rates of inflation, economists use a three-step process:

- 1) Determine current price levels
- 2) Compare current price levels to previous price levels by calculating price indices
- 3) Compare price indices over time to calculate the inflation rate

How We Measure Inflation

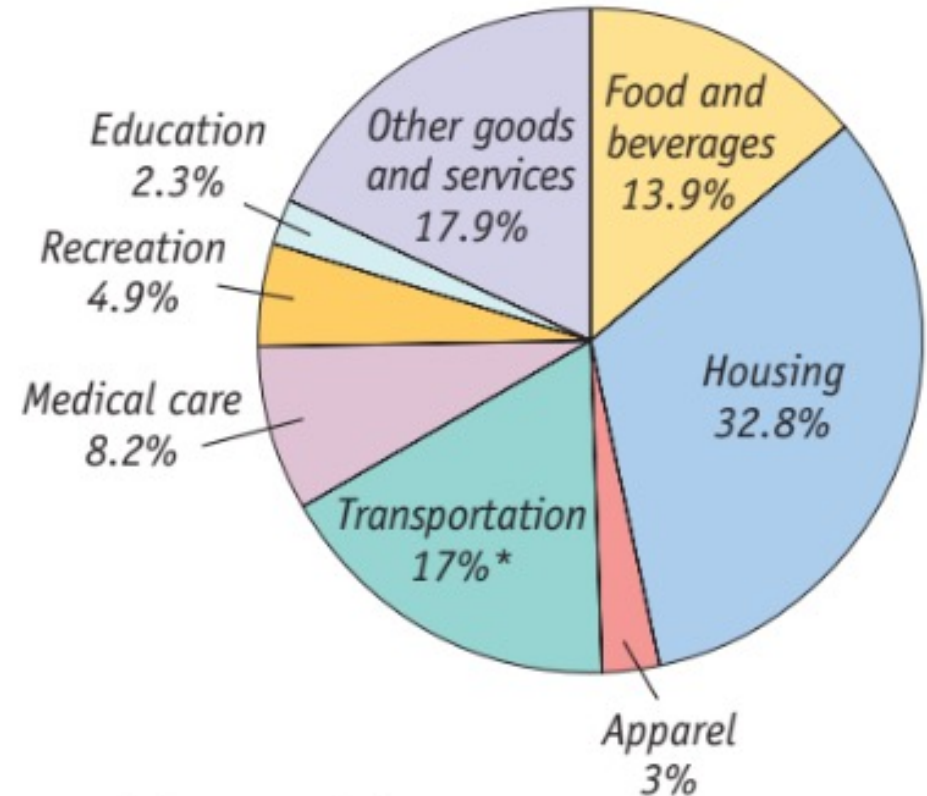
Step 1: Determine current price levels

- Economists use **aggregate price levels** to represent the overall level of prices in an economy
- To do this, economists assess the cost of a typical consumers' consumption bundle – a group of goods and services average consumers purchase regularly
- This **market basket** is used to measure overall changes in price levels

How We Measure Inflation

Step 1: Determine current price levels

- In 2019, the market basket used to measure overall prices included:
 - Housing
 - Transportation
 - Food and beverages
 - Medical care
 - Recreation
 - Others



How We Measure Inflation

Step 2: Determine price index

- After calculating the price of a market basket, economists compare the current price to a previous base year price
- Comparing the two prices, we calculate a **price index** for the current year

$$\text{Current year price index} = \frac{\text{Current cost of the market basket}}{\text{Cost of market basket in base year}} \times 100$$

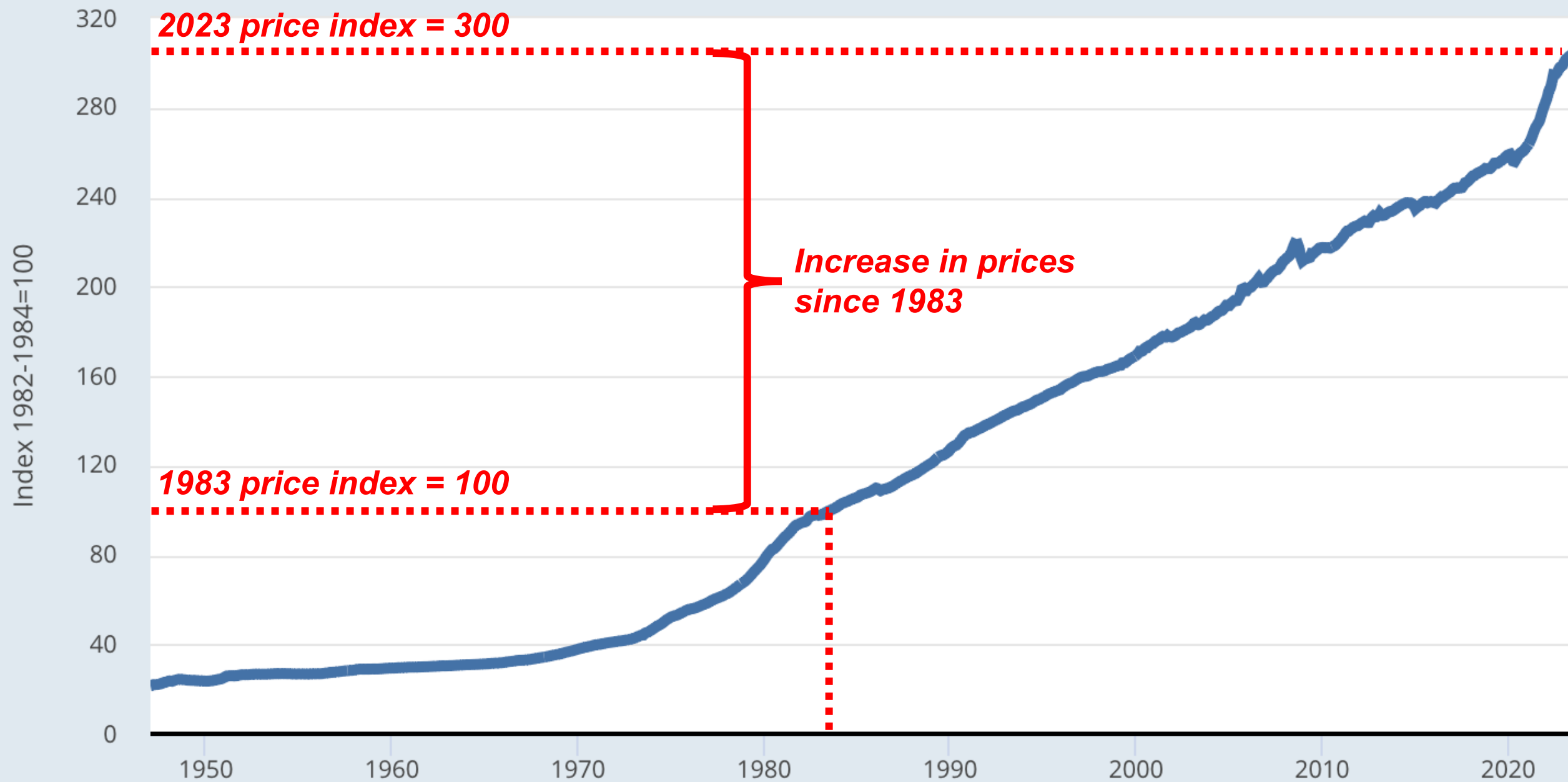
How We Measure Inflation

Step 2: Determine price index

- Price index is always measured in comparison to the stated base year
 - *If the price index is above 100, price levels are higher than the base year*
 - *If the price index is lower than 100, price levels are lower than the base year*

The U.S. uses 1983 as its base year, so....

2023's price index of 300 means prices have tripled in 40 years



How We Measure Inflation

Step 3: Determine inflation rate

- Economists use price indices to calculate the **inflation rate** – the percentage increase (or decrease) in price levels in a year
- Use the *rate of change* formula to calculate the inflation rate:

$$\text{Inflation rate} = \frac{\text{price index in year 2} - \text{price index in year 1}}{\text{price index in year 1}} \times 100$$

or

$$\text{Inflation rate} = \left[\frac{\text{price index in year 2}}{\text{price index in year 1}} - 1 \right] \times 100$$

How We Measure Inflation

Step 3: Determine inflation rate

Example:

- In June 2021, the **price index** was 270.6
- In June 2022, the **price index** was 294.7

What was the annual inflation rate in June 2022?

How We Measure Inflation

Step 3: Determine inflation rate

Example:

- In June 2021, the **price index** was 270.6
- In June 2022, the **price index** was 294.7

$$\text{Inflation rate} = \frac{\text{price index in year 2} - \text{price index in year 1}}{\text{price index in year 1}} \times 100$$

$$\begin{array}{l} \text{June 2022} \\ \text{Inflation rate} \end{array} = \frac{294.7 - 270.6}{270.6} \times 100 = \mathbf{8.9\%}$$

The average price of goods and services rose 8.9% between June 2021 and June 2022