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Elasticity

LEARNING OBJECTIVES

1. Evaluate how consumers respond to price changes
2. Interpret values of the price elasticity of supply
3. Determine whether goods are complements or substitutes
4. Determine whether goods are normal or inferior
5. Discuss the relevance of elasticity to tax policy

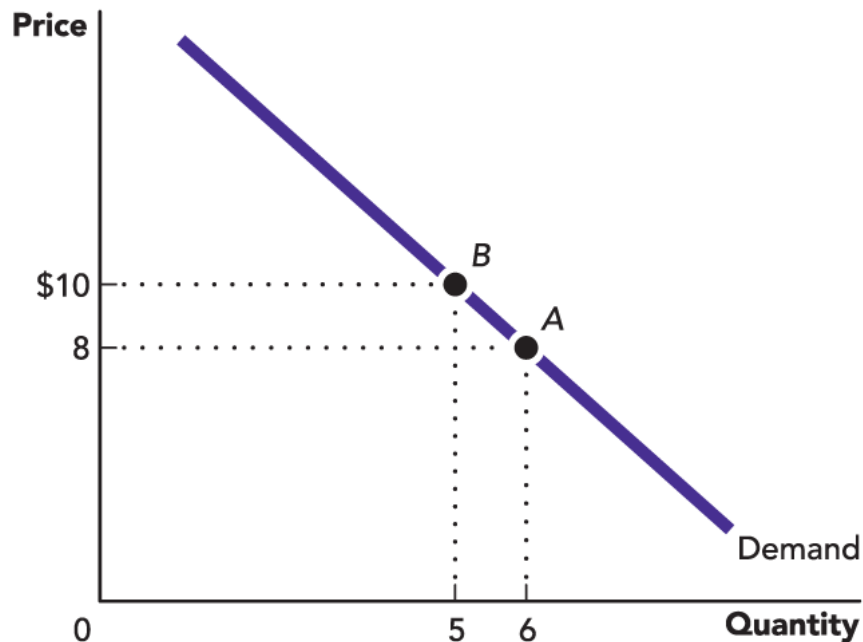
PRICE ELASTICITY OF DEMAND PART 1

- A measure of consumers' sensitivity to price changes:

$$\text{price elasticity of demand} = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in price}}$$

- Large values of elasticity mean that a change in price results in a large change in quantity demanded.
- Small values of elasticity mean that a change in price results in a small change in quantity demanded.

PRICE ELASTICITY OF DEMAND PART 2



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Food	Price Elasticity
Grapes	1.180
Tomatoes	0.622
Beef	0.621
Cheese	0.247
Butter	0.243
Apples	0.190
Coffee and tea	0.176
Eggs	0.110
Lettuce	0.090
Sugar	0.037
Margarine	0.009

- To find the price elasticity of demand, divide the percentage change in the quantity by the percentage change in the price.
- The table shows the price elasticity of demand for some common food items.

INELASTIC DEMAND

- When the elasticity is less than 1, demand is **inelastic**.
- Demand is likely to be inelastic for goods that:
 - **require only a small fraction of consumers' income**, such as pencils, newspapers, and bubble gum
 - **are necessary**, such as medical treatments and required textbooks
 - **have few substitutes**, such as gasoline and computer operating systems
 - **are addictive**, such as tobacco and alcohol
 - **must be purchased quickly**, such as car repairs and funeral arrangements

ELASTIC DEMAND

- When the elasticity is greater than 1, demand is **elastic**.
- Demand is likely to be elastic for goods that:
 - **require a large portion of consumers' income**, such as homes and country club memberships
 - **are luxury items**, such as name-brand watches and designer clothing
 - **have many substitutes**, such as Burger King hamburgers and Nike-brand soccer balls
 - **can be purchased after a longer period** of thought-about various alternatives, such as hairstyling services and running shoes

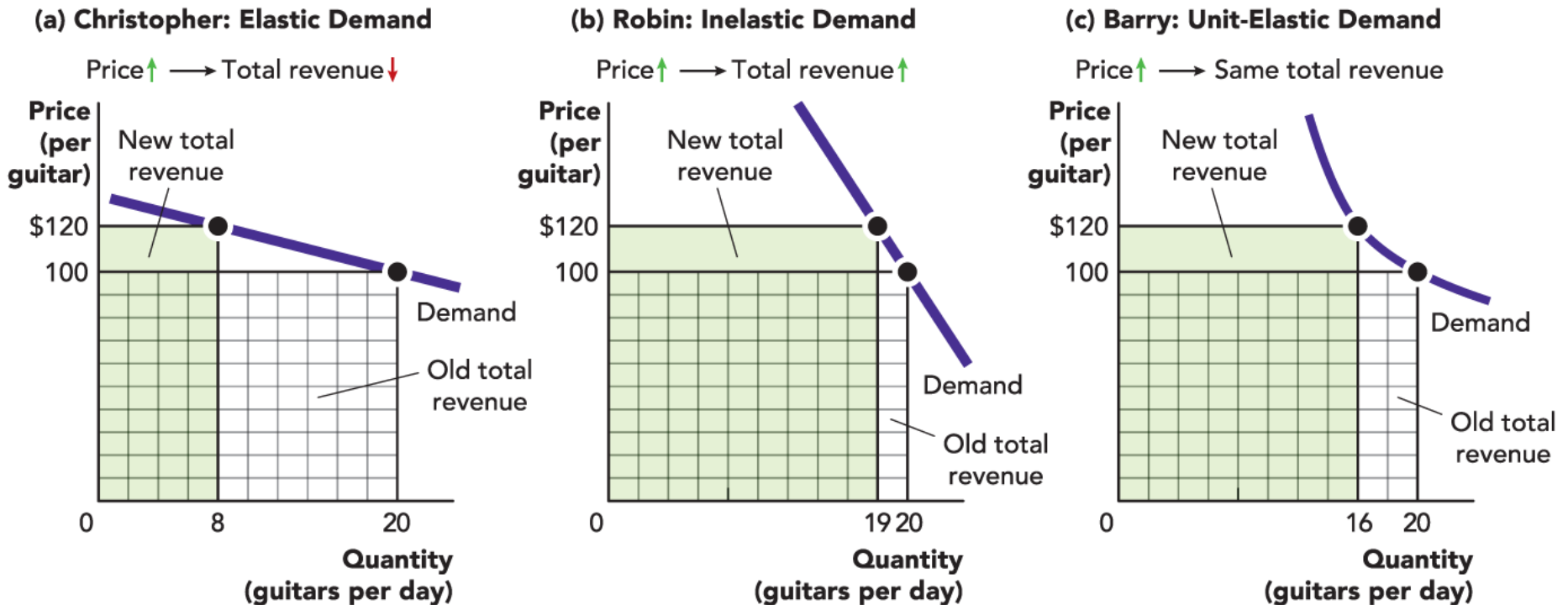
UNIT-ELASTIC DEMAND

- When the elasticity is equal to 1, demand is **unit-elastic**.
- Demand is likely to be unit-elastic for goods that:
 - **are purchased on a strict budget**, such as goods purchased using gift cards.

Type of Demand	Meaning	Example	Price Elasticity of Demand
Inelastic	Demand is not very sensitive to price changes	Emergency medical care	Less than 1.0
Elastic	Demand is very sensitive to price changes	Burger King hamburgers	Greater than 1.0
Unit-elastic	Demand is proportionately sensitive to price changes	Goods purchased on a strict budget, such as music downloads purchased with a \$20 iTunes gift card	Equal to 1.0

TOTAL REVENUE AND THE PRICE ELASTICITY OF DEMAND

- If demand is elastic, a price increase causes total revenue to decrease.

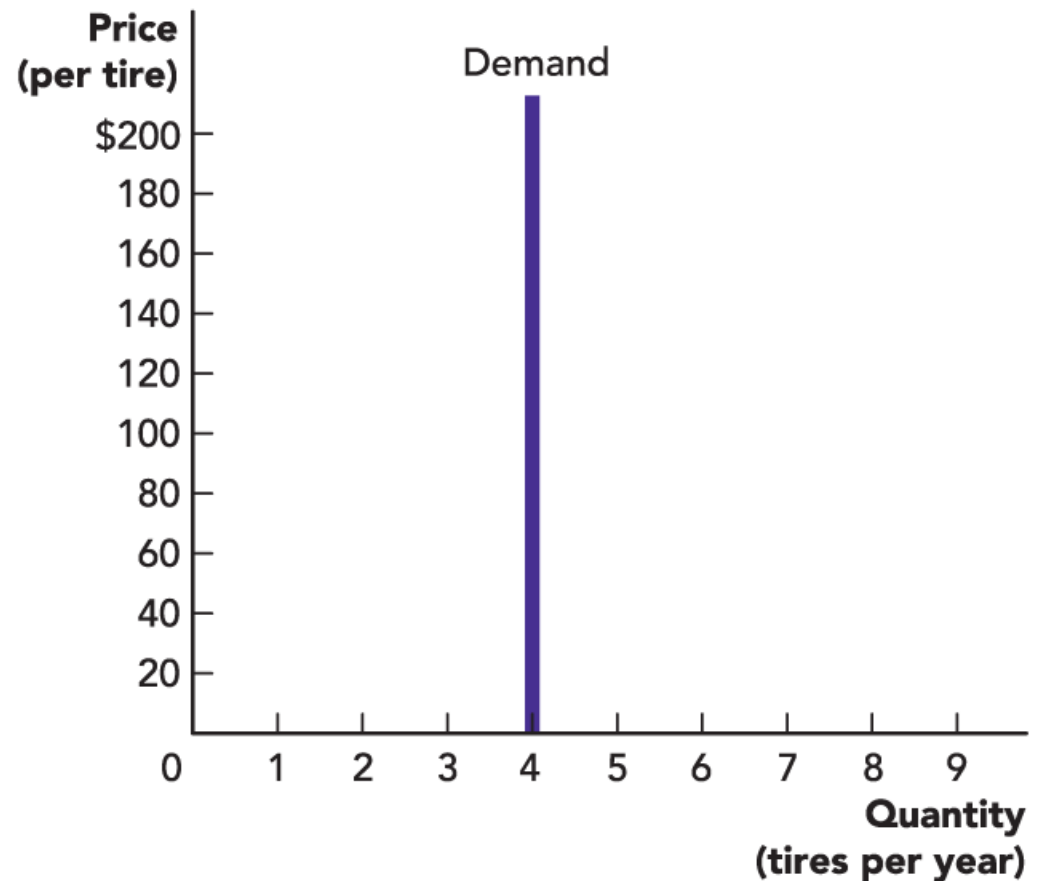


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- If demand is inelastic, a price increase causes total revenue to increase.

PERFECTLY INELASTIC DEMAND

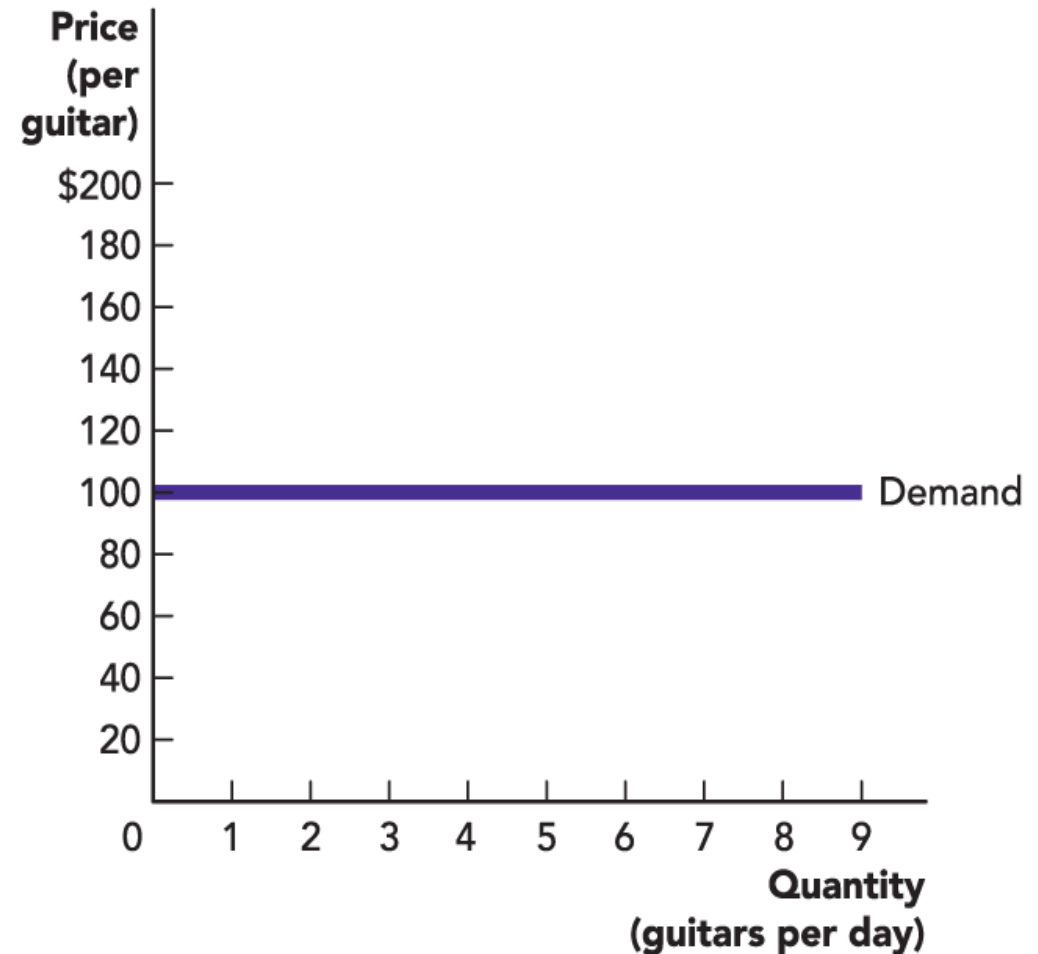
- When consumers always want to buy the same number of goods, regardless of price, the price elasticity of demand is 0, and demand is **perfectly inelastic**.
- Examples include life-saving surgery and insulin.



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PERFECTLY ELASTIC DEMAND

- When any price increase causes the quantity demanded to fall to 0, the price elasticity of demand is infinite, and demand is **perfectly elastic**.
- This occurs when there are a large number of sellers of identical products.



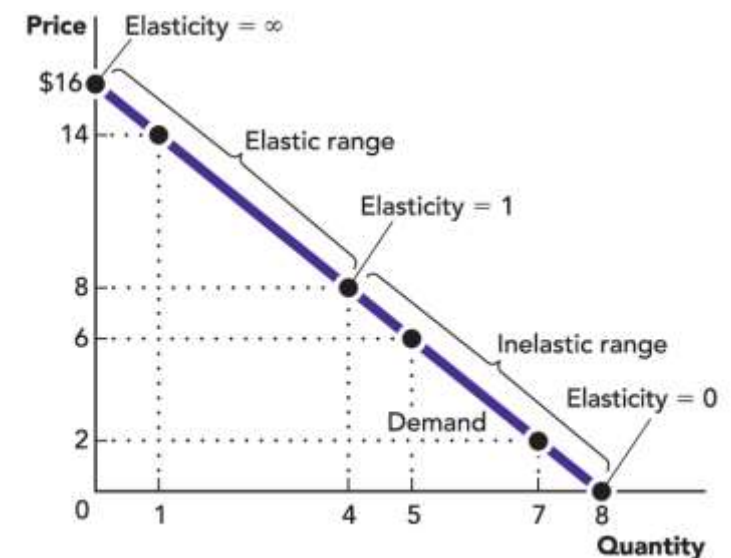
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PRICE ELASTICITY AND SLOPE

- The price elasticity does not equal the slope.
- In the figure below, slope is constant, but elasticity varies from infinity to 0.
- At a given quantity and price, a shallow slope has a higher elasticity than a steep slope.

$$\text{slope} = \frac{\text{change in quantity}}{\text{change in price}}$$

$$\text{price elasticity} = \frac{\frac{\text{change in quantity}}{\text{quantity}}}{\frac{\text{change in price}}{\text{price}}}$$



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PRICE ELASTICITY OF SUPPLY

- A measure of firms' sensitivity to price changes:

$$\text{price elasticity of supply} = \frac{\text{percentage change in quantity supplied}}{\text{percentage change in price}}$$

- Just like demand, there are perfectly elastic, elastic, unit-elastic, inelastic, and perfectly inelastic supplies.

SUPPLY OF TAYLOR SWIFTS

- Regardless of price, only one Taylor Swift can be hired.
- The supply of Taylor Swifts is perfectly inelastic.



Dimitrios Kambouris/LP5/Getty Images

CROSS-PRICE ELASTICITY OF DEMAND

- A measure of how the price of one good affects the quantity demanded of another good.

$$\text{cross-price elasticity of demand} = \frac{\text{percentage change in quantity of Good A demanded}}{\text{percentage change in price of Good B}}$$

- **Substitutes in consumption** have a positive cross-price elasticity.
- **Complements in consumption** have a negative cross-price elasticity.

LEARN BY DOING: PRACTICE QUESTION 1

Which of these statements are true?

- I. The price elasticity of demand for bread is less than 1.
 - II. The demand for butter is price elastic.
 - III. The cross-price elasticity of demand between bread and butter is negative.
- a) I and II only
 - b) II and III only
 - c) I and III only
 - d) I, II, and III

LEARN BY DOING: PRACTICE QUESTION 1

(Answer)

Which of these statements are true? The price elasticity of demand for bread is less than 1.

- I. The demand for butter is price elastic.
 - II. The cross-price elasticity of demand between bread and butter is negative.
- a) I and II only
 - b) II and III only
 - c) I and III only (correct answer)**
 - d) I, II, and III

SUBSTITUTES AND COMPLEMENTS

Relationship	Meaning	Example	Cross-Price Elasticity Value
Substitutes	An increase in the price of one leads to an increase in demand for the other	Fender-brand guitars and Gibson-brand guitars	Positive
Complements	An increase in the price of one leads to a decrease in demand for the other	Guitars and guitar strings	Negative

INCOME ELASTICITY OF DEMAND

- A measure of how changes in income affect the demand for a good.

$$\text{income elasticity of demand} = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in income}}$$

- **Normal goods** are goods that you buy more of as your income increases. They have a positive income elasticity.
- **Inferior goods** are goods that you buy less of as your income increases. They have a negative income elasticity.

NECESSITIES AND LUXURIES

- A **necessity** is a good that you buy more of as your income increases, but the percentage of your income spent on the good decreases as your income increases.
 - These have an income elasticity between 0 and 1.
- A **luxury** is a good that you spend a larger percentage of your income on as your income increases.
 - These have an income elasticity greater than 1.
- A good can be a necessity to you, a luxury to someone else, and an inferior good to someone else.

TYPES OF GOODS AS DETERMINED BY INCOME ELASTICITY

Type of Good	Meaning	Examples	Income Elasticity Value
Inferior	Less is purchased when income increases	Used cars, staycations, gas station coffee	Negative
Normal	More is purchased as income increases	New cars, cruises, premium coffee	Positive
Necessity	Purchases increase less than in proportion to income	Basic food, clothing, medical care	Between 0 and 1.0
Luxury	Purchases increase more than in proportion to income	Restaurant meals, airline tickets	Greater than 1.0

INCOME ELASTICITY, ADVERTISING, AND FOOD

- Income elasticity is important to advertisers, who can advertise inferior goods during tough economic times and can advertise luxury goods when people's incomes are rising.
- The table on the right shows overall income elasticity for certain foods.

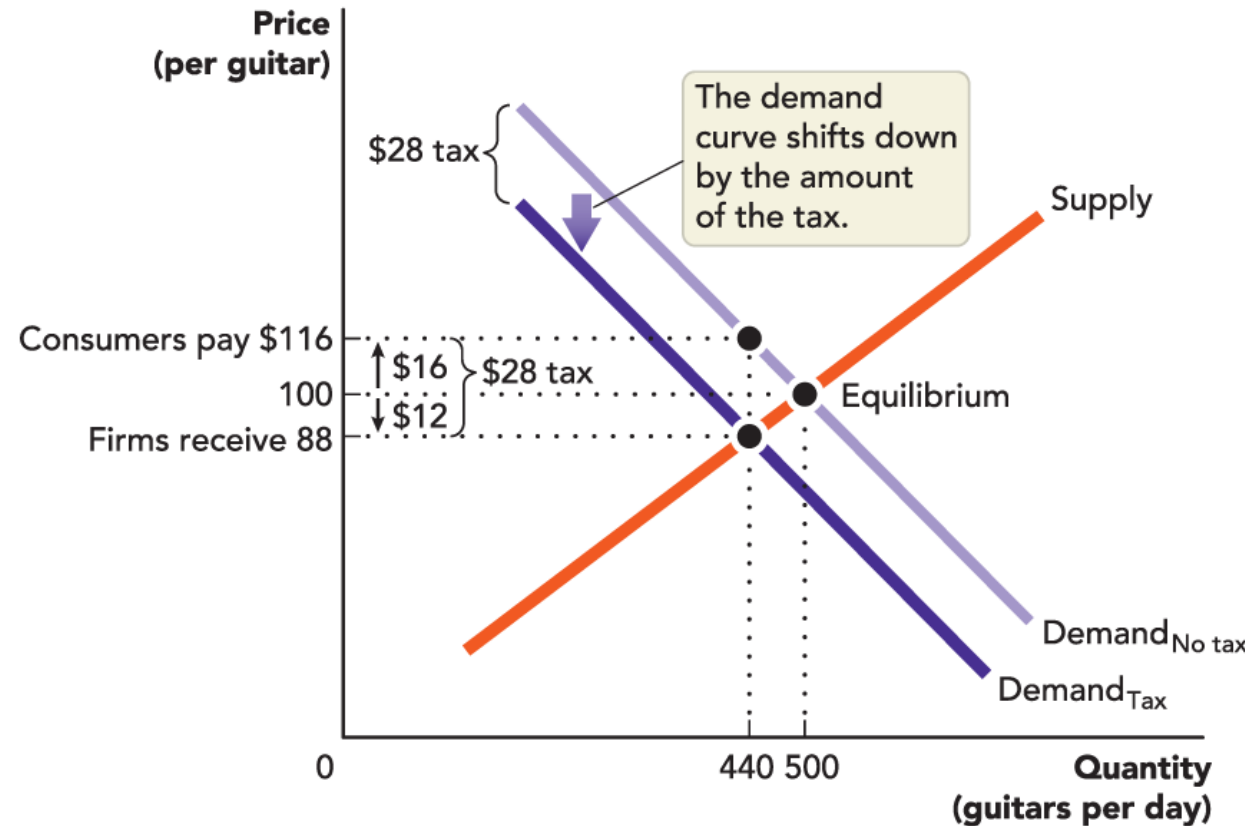
Food	Income Elasticity
Apples	-0.362
Margarine	-0.336
Sugar	0.006
Eggs	0.287
Lettuce	0.372
Beef	0.392
Cheese	0.418
Butter	0.539
Grapes	0.561
Coffee and tea	0.818
Tomatoes	0.918

ELASTICITY AND TAXES

- Taxes affect both buyers and sellers.
- The way the burden of a tax is divided among the affected parties is known as **tax incidence**.

A TAX ON CONSUMERS

- When the government collects a tax from consumers, the amount that consumers are willing to pay firms for each unit decreases by the amount of the tax.

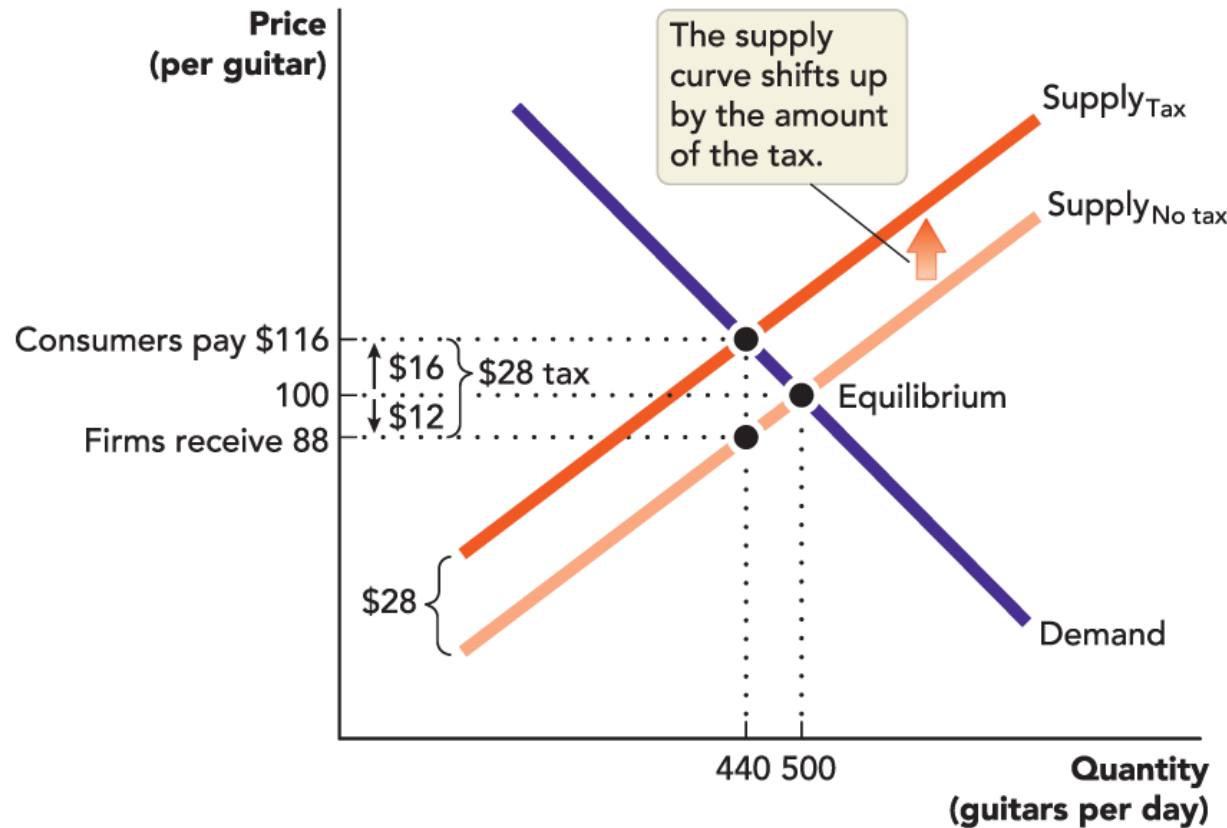


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- This shifts the demand curve down by the amount of the tax.

A TAX ON FIRMS

- When the government collects a tax from firms, the amount that firms must receive for each unit increases by the amount of the tax.
- This shifts the supply curve up by the amount of the tax.



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TAXES AND TAX INCIDENCE

- The final amount that consumers pay and the final amount that firms receive are unaffected by which party actually pays the tax.
- The price elasticities of supply and demand determine how the burden of the tax is divided.
- When demand is more elastic, the majority of the tax burden falls on the firms.
- When supply is more elastic, the majority of the tax burden falls on the consumers.

LEARN BY DOING: PRACTICE QUESTION 2

Elasticity is useful in determining:

- I. whether two goods are complements or substitutes.
 - II. how taxes affect firms and consumers.
 - III. how changing income affects consumption of specific goods.
- a) I and II only
 - b) II and III only
 - c) I and III only
 - d) I, II, and III

LEARN BY DOING: PRACTICE QUESTION 2

(Answer)

Elasticity is useful in determining:

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