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## Chapter Overview

The concept of elasticity is thoroughly covered in this chapter, from the definition, to the calculation, and finally to the application. Price elasticity of demand is covered first, followed by income and cross price elasticities. The price elasticity of supply is covered, and the chapter concludes with an analysis of tax burdens based on differences in the price elasticities of demand and supply.

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## Chapter Outline

### Elasticity of Demand

- Price Elasticity of Demand as an Absolute Value

- Measuring Elasticity with Percentages

- Elastic and Inelastic Demand

  - Elastic

  - Inelastic

  - Unitary Elasticity

- Determinants of Elasticity

  - Substitutability

  - Proportion of Income Spent on a Product

  - Luxuries Versus Necessities

  - Time Period

- Computing Price Elasticities

  - Using Midpoints to Compute Elasticity

- Checkpoint:* Elasticity of Demand

### Total Revenue and Other Measures of Elasticity

- Elasticity and Total Revenue

  - Inelastic Demand

  - Elastic Demand

  - Unitary Elasticity

  - Elasticity and Total Revenue Along a Straight-Line (Linear) Demand Curve

- Other Elasticities of Demand

  - Cross Elasticity of Demand

  - Income Elasticity of Demand

*Issue:* Using Loss Leaders to Generate Higher Total Revenue

*Checkpoint:* Total Revenue and Other Measures of Elasticity

#### Elasticity of Supply

Time and Price Elasticity of Supply

The Market Period

The Short Run

The Long Run

*Checkpoint:* Elasticity of Supply

#### Taxes and Elasticity

Taxes on Income Sources and Their Economic Burden

Taxes on Spending and the Incidence of Taxation

Elasticity of Demand and Tax Burdens

Elasticity of Supply and Tax Burdens

*Issue:* Are Sales Taxes Fair to Low-Income Households?

*Checkpoint:* Taxes and Elasticity Elasticity of Supply

### Ideas for Capturing Your Classroom Audience

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- Make it visual! Bring in a piece of elastic and illustrate responsiveness.
- Keep it current! Bring in advertisements for sales on different products. Use these ads to discuss which sales are more enticing and why.

### Chapter Checkpoints

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#### Elasticity of Demand

*Question:* Using your knowledge of the determinants of elasticity, why is gasoline inelastic in the short term but elastic in the long term? Explain why automobiles tend to have the opposite effect, being elastic in the short term but inelastic in the long term.

*The point is to check that students can:* apply the determinants of demand to the two different goods in the short run and the long run..

#### Total Revenue and Other Measures of Elasticity

*Question:* Two clothing stores located in the same shopping center have a big sale: 20% off on everything in the store. After the sale, store 1 finds that its total revenue has increased, while store 2 finds that total revenue has decreased. What does this tell you about the price elasticity of demand for the clothes in stores 1 and 2?

*The point is to check that students can:* explain the relationship between the price elasticity of demand and total revenue.

#### Elasticity of Supply

*Question:* A number of products are made in preparation for the annual flu season, although the types of goods vary in terms of their elasticity of supply. Rank the following goods from most elastic to least elastic: (a) over-the-counter flu remedies, (b) flu shots, (c) chicken soup, and (d) boxes of tissue.

*The point is to check that students can:* connect the differences in the nature of supply in different industries with the ability of firms to change the amount supplied (measured in percentage terms) in response to a given percentage change in price. The industries and businesses listed as least elastic are those which require substantial investments in capital goods in order to produce, and such investment takes time and significant amounts of financial resources.

### Taxes and Elasticity

*Question:* Excise taxes were the principal taxes levied in the United States for the first 100 years or so after the Revolutionary War. Today, excise taxes fall mainly on cigarettes, liquor, luxury cars and boats, telephones, gasoline, diesel fuel, aviation fuel, bows and arrows, gas-guzzling vehicles, and vaccines. What do all of these products seem to have in common?

*The point is to check that students can:* discern that these products have inelastic demands and that the more inelastic the demand the less the response in quantity demanded to a given change in price. As a result, when taxes are imposed, the quantity demanded does not decrease by much (hence, little impact on the industry), and since people still buy the product (and pay the tax), there are high tax revenues.

## Debate the Issues

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### Are Sales Taxes Fair to Low-Income Households?

What is meant by “fairness” with regard to taxes anyway? Look at the editorial titled “Sales Tax Fairness” from the *New York Times* for a discussion about applying sales taxes to Internet purchases ([http://www.nytimes.com/2013/03/27/opinion/sales-tax-fairness.html?\\_r=0](http://www.nytimes.com/2013/03/27/opinion/sales-tax-fairness.html?_r=0)).

Visit an article on the Tax Foundation Web site to learn how sales taxes vary by state. The page is located at <http://taxfoundation.org/article/state-and-local-sales-tax-rates-2013>.

The Tax Foundation points out that sales taxes are a relatively transparent way to collect taxes. Compare the purchase of clothing or something subject to sales tax in your state with the purchase of gasoline or cigarettes (where the posted price generally includes the tax). Explain the difference between an excise tax and a sales tax.

## Examples Used in the End-of-Chapter Questions

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Question 13 references the creation of express toll lanes. For an international twist, consider the imposition of a congestion charge for cars or trucks entering the central city area of London. Students can learn more about the congestion charge by visiting the Transport for London Web site at <http://www.tfl.gov.uk/roadusers/congestioncharging>.

In a BBC News story from April 1, 2005 (the date of the increase in the congestion charge to £8), a representative of the London Green Party, Jenny Jones, was quoted speaking in favor of the increase. According to the story, “She said: ‘Personally, I welcome the charge. Putting the charge up to £8 is designed to deter people from bringing their cars into town. Fewer cars means [sic] cleaner air, less noise, a reduc-

tion in road deaths and casualties, and a more pleasant city for everyone. It's not a money-maker. If you wanted to make money, you would reduce the charge, because then more drivers would be happy to pay it.'" What assumption is she making about the elasticity of demand? (*Answer: She stated that reducing the charge would lead to an increase in revenue. That would be true if the demand were elastic, meaning that a percentage reduction in the price would result in a greater percentage increase in the quantity, thereby increasing the revenue from the congestion charge.*)

## Economics Is Everywhere

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The following short synopsis, selected from the many vignettes in *Economics Is Everywhere* by Daniel S. Hamermesh (packaged for free with any Worth Principles text), corresponds to the material covered in this chapter of the text. The question that accompanies each vignette appears as an essay-type question in the Hamermesh text; for use with the Chiang text, those questions are adapted to a multiple-choice format and are also assignable in LaunchPad. The correct answers are indicated and feedback is provided here.

5.1 This vignette considers the price elasticity of demand for attending a particular college or university.

Q: Suppose it was announced that tuition at your college or university is going to rise by 8% for the next academic year. Are your freshman friends more or less likely to return to your school than your friends who are juniors?

- a. The freshmen are more likely to return.
- b. The juniors are more likely to return.
- c. There is no difference in the likelihood of returning for the two groups.
- d. The answer cannot be determined from the information provided.

A: Correct: b. The juniors have a less elastic demand than the freshmen and so are more likely to return.

5.6 This vignette applies material about price elasticity of demand to pricing of subscriptions to academic journals.

Q: Which of the following statements is correct?

- a. If a seller believes the demand for his/her product is elastic, he/she should raise its price.
- b. If a seller believes the demand for his/her product is inelastic, he/she should raise its price.
- c. If a seller believes the demand for his/her product is elastic, he/she should lower its price.
- d. If a seller believes the demand for his/her product is unit elastic, he/she should raise its price.

A: Correct: b. When demand is inelastic an increase in price will result in an increase in total revenue. While the quantity demanded will decrease due to the higher price, the percentage decrease will be less than the percentage increase in price, resulting in higher overall revenue.

## For Further Analysis

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### Analyzing the Effect of Demand and Supply Inelasticity on Tax Burdens

This example can be used as an in-class small group exercise or as an individual in-class exercise. It is designed to complement the text's material on tax burdens and extend the analysis of graphs used to demonstrate the effect of inelasticity of demand or supply. Students are provided with template graphs and are asked to make a comparison between inelastic and elastic demand curves, and then elastic and inelastic supply curves. Based on that analysis they are asked to evaluate the circumstances under which deadweight loss is larger. *[NOTE: the important insight here is that taxes create deadweight loss when they affect decisions in a way that reduces efficiency. When demand and supply are more elastic, meaning more responsive, a greater distortion in decisions occurs.]*

**Learning objectives:** review of elasticity and inelasticity; application of the analysis of the effects on inelasticity on tax burdens; practice in using graphs in constructing an analysis; and reinforcement of critical thinking skills.

### Web-Based Exercise

#### Estimates of Price Elasticities of Demand

The Mackinac Center for Public Policy has estimates of actual demand elasticities on its site. Data are available at <http://www.mackinac.org/article.aspx?ID=1247>.

Using the data provided, ask students to explain why they believe the demand for each product is elastic or inelastic. For example, is it due to a lack of substitutes? Is the product a luxury or a necessity?

## Tips from a Colleague

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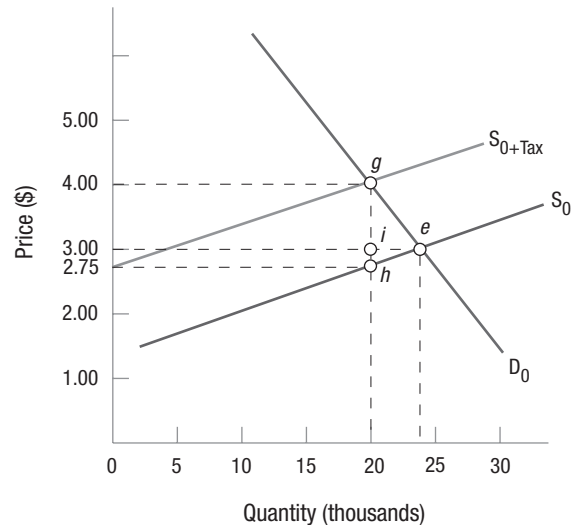
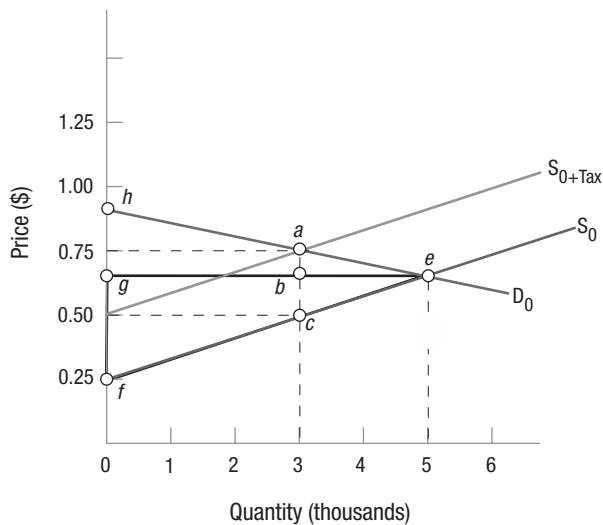
Students may have a good intuitive grasp of the idea of elasticity but a difficult time with the calculations. Emphasize why businesses would want to know how elastic or inelastic the demand for their product is likely to be (that way they can make better decisions about changing prices). Use advertising examples to illustrate how sellers try to make the demand for their product more inelastic (for example, ads that include language like “accept no substitutes!”).



# HANDOUT 5-1

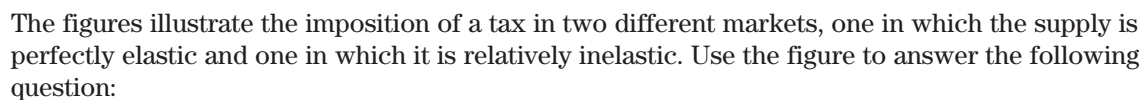
Date \_\_\_\_\_ Name \_\_\_\_\_ Class \_\_\_\_\_ Professor \_\_\_\_\_

## Analyzing the Effect of Demand and Supply Inelasticity on Tax Burdens



The figures illustrate the imposition of a tax in two different markets, one in which the demand is relatively elastic and one in which it is relatively inelastic. Use the figure to answer the following question:

- 1) In which market do buyers bear most of the tax burden? Why?

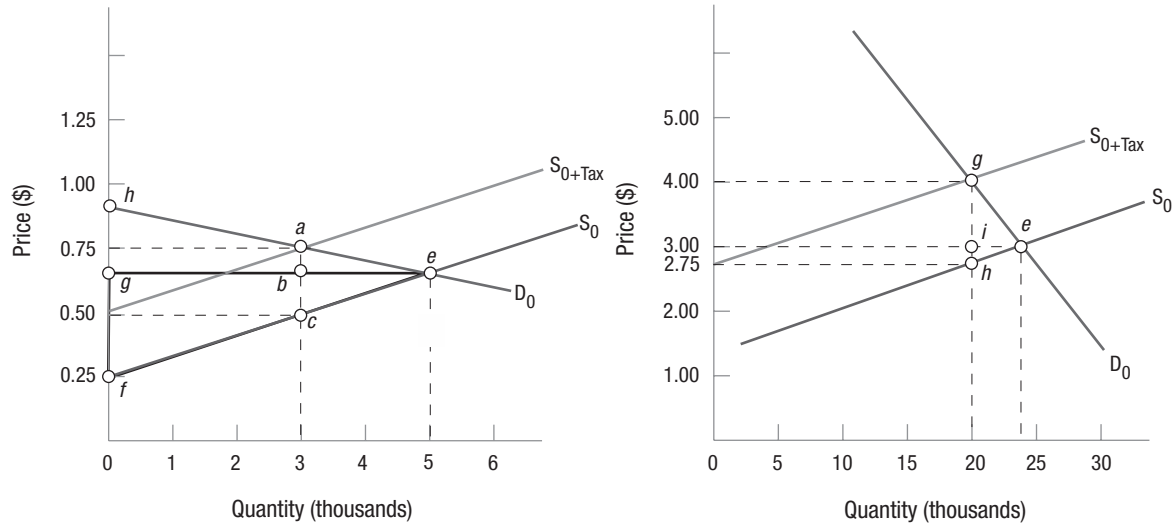


- 2) In which market do sellers bear most of the tax burden? Why?
- 3) Based on your analysis, in which cases would the deadweight loss be larger (for instance, when demand is elastic or inelastic or when supply is elastic or inelastic)?



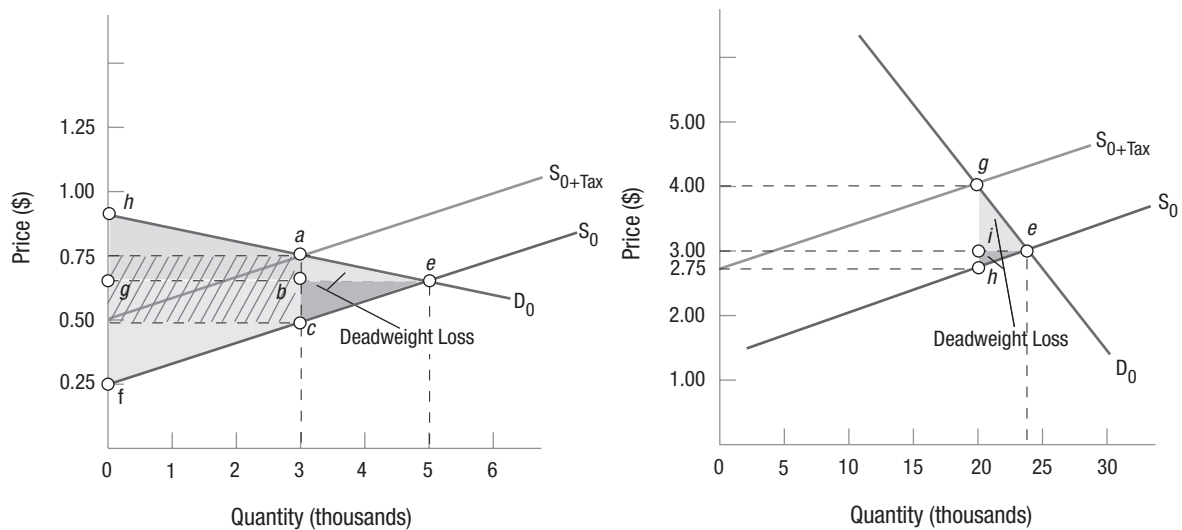
## ANSWERS TO HANDOUT 5-1

## Analyzing the Effect of Demand and Supply Inelasticity on Tax Burdens



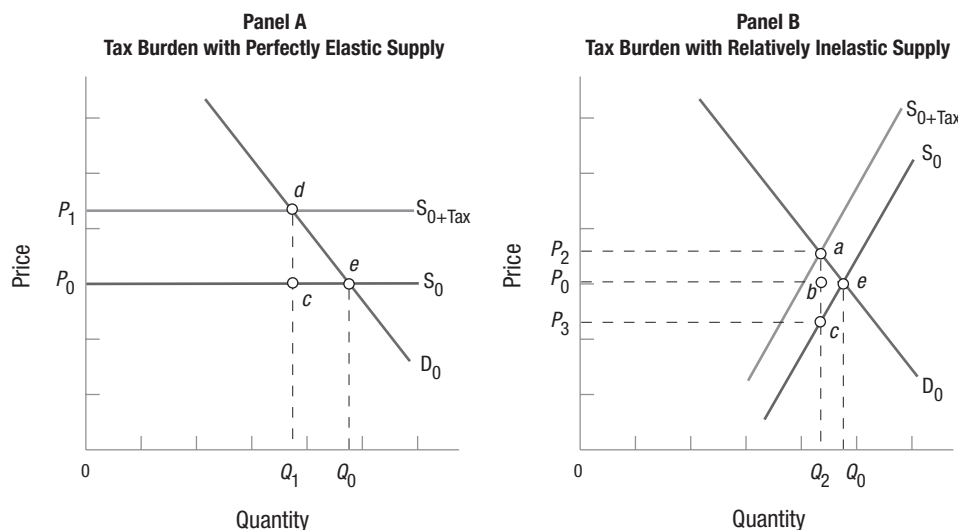
The figures illustrate the imposition of a tax in two different markets, one in which the demand is relatively elastic and one in which it is relatively inelastic. Use the figure to answer the following questions:

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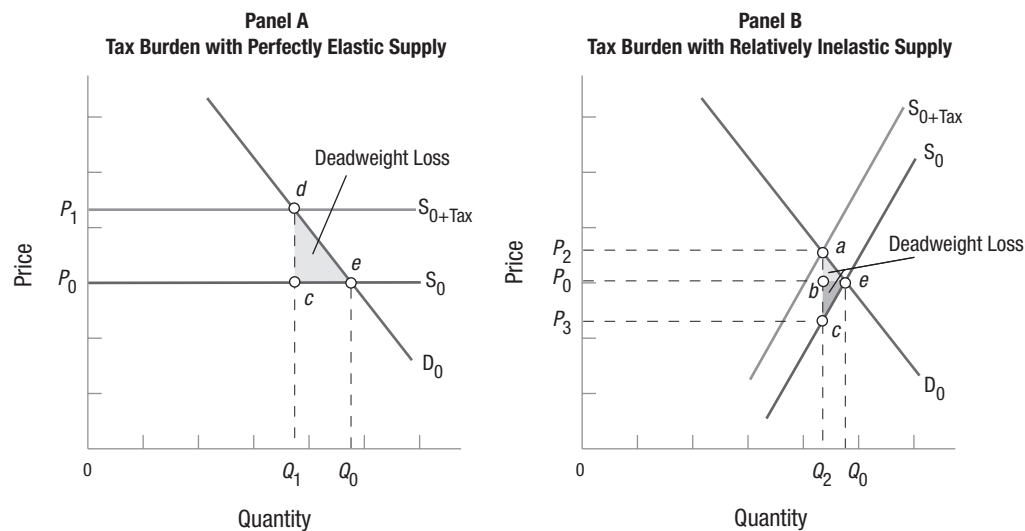
Consumers bear more of the tax burden in the market in which demand is inelastic. That's because consumers are not as price-sensitive and sellers can therefore pass more of the tax along to them ("shift" it to them) in the form of a higher price. When demand is inelastic, the seller can raise the price without the risk of losing many customers.

## ANSWERS TO HANDOUT 5-1 (continued)



The figures illustrate the imposition of a tax in two different markets, one in which the supply is perfectly elastic and one in which it is relatively inelastic. Use the figure to answer the following question:

- 2) In which market do sellers bear most of the tax burden? Why?



*Sellers bear more of the tax burden in the market in which supply is inelastic. That's because sellers cannot pass the tax along to buyers ("shift" it to them) in the form of a higher price. When supply is elastic, the seller can raise the price without the risk of losing customers and the price rises by the full amount of the tax.*

- 3) Based on your analysis, in which cases would the deadweight loss be larger (for instance, when demand is elastic or inelastic or when supply is elastic or inelastic)?

*Based on the analysis above, deadweight loss is relatively larger when demand is elastic and also relatively larger when supply is elastic.*