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Gwartney - Stroup
Sobel - Macpherson

Supply and Demand: *Applications and Extensions*


Full Length Text — Part: 2 Chapter: 4
Micro Only Text — Part: 2 Chapter: 4
Macro Only Text — Part: 2 Chapter: 4

To Accompany "Economics: Private and Public Choice 12th ed."
James Gwartney, Richard Stroup, Russell Sobel, & David Macpherson
Slides authored and animated by:
James Gwartney, David Macpherson, & Charles Skipton

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The Linkage Between Resource & Product Markets

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Linkage Between Resource and Product Markets

- The markets for resources and products are closely linked.
- In the resource market, businesses demand resources, while households supply them.
 - Firms demand resources in order to produce goods and services.
 - Households supply them to earn income.
 - The labor market is an important resource market.

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Linkage Between Resource and Product Markets

- An increase in the demand for a product will lead to an increase in the demand for the resources used to produce it.
- In contrast, a reduction in the demand for a product will lead to a reduction in the demand for the resources used to produce it.
- An increase in the price of a resource will increase the cost of producing products that use it, shifting their supply curve to the left.
- A reduction in resource prices will have just the opposite affect.

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Resource Prices and Product Markets

- Suppose there is a reduction in the supply of young workers which pushes the wages of restaurant waiters / waitress up.
- The higher wages increase the restaurant's cost, causing a reduction in supply in the product market ... leading to higher meal prices.

Resources Market

Price (wage)
\$10
\$8
Employment (waitstaff)
 E_2 E_1

Product Market

Price
\$12
\$11
Quantity of meals
 Q_2 Q_1

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The Economics of Price Controls

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Price Ceilings

- A **price ceiling** establishes a maximum price that sellers are legally permitted to charge.
 - Example: rent control
- When a price ceiling keeps the price of a good below the market equilibrium, there will be both direct and indirect effects.
 - (*Direct effect*) A **shortage**: the quantity demanded will exceed the quantity supplied. Waiting lines may develop.
 - (*Indirect effects*) Quality deterioration and changes in other non-price factors that are favorable to sellers & unfavorable to buyers.
 - The quantity exchanged will fall and the gains from trade will be less than if the good were allocated by markets.

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The Impact of a Price Control

Consider the **rental housing market** where the price (*rent*) P_0 would bring the quantity of rental units **demanded** into balance with the quantity **supplied**.

- A **price ceiling** like P_1 imposes a price below market equilibrium ... causing quantity demanded Q_D ... to exceed quantity supplied Q_S ... resulting in a **shortage**.
- Because prices are not allowed to direct the market to equilibrium, non-price elements will become more important in determining where the scarce goods go.

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Effects of Rent Control

- Shortages and black markets will develop.
- The future supply of housing will decline.
- The quality of housing will deteriorate.
- Non-price methods of rationing will increase in importance.
- Inefficient use of housing will result.
- Long-term renters will benefit at the expense of newcomers.

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Price Floor

- A **price floor** establishes a minimum legal price for the good or service.
 - Example: minimum wage
- When a price floor keeps the price of a good above the market equilibrium, it will lead to both direct and indirect effects.
 - (*Direct effect*) A **surplus**: sellers will want to supply a larger quantity than buyers are willing to purchase.
 - (*Indirect effects*) Changes in non-price factors that are favorable to buyers and unfavorable to sellers.
 - The quantity exchanged will fall and the gains from trade will be less than if the good were allocated by markets.

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The Impact of a Price Floor

- A **price floor** like P_1 imposes a price above market equilibrium ... causing quantity supplied Q_S ... to exceed quantity demanded Q_D ... resulting in a **surplus**.
- Because prices are not allowed to direct the market to equilibrium, non-price elements of exchange will become more important in determining where scarce goods go.

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Minimum Wage: An Example of a Price Floor

- When the minimum wage is set above the market equilibrium for low-skill labor, the following will occur:
 - Direct effect:
 - Reduces employment of low-skilled labor.
 - Indirect effects:
 - Reduction in non-wage component of compensation
 - Less on-the-job training
 - May encourage students to drop out of school

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Questions for Thought:

2. How would an increase in the minimum wage from the current level to \$10 per hour affect:

- a. Employment in skill categories previously earning less than \$10 per hour
- b. The unemployment rate of teenagers
- c. The availability of on-the-job training for low-skill workers
- d. The demand for high-skill workers who provide good substitutes for the labor offered by low-skill workers who are paid higher wage rates due to the increase in the minimum wage.

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Black Markets and the Importance of the Legal Structure

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Black Markets

- **Black market:**
A market that operates outside the legal system.
- The primary sources of black markets are:
 - Evasion of a price control
 - Evasion of a tax
(e.g. high excise taxes on cigarettes)
 - Legal prohibition on the production and exchange of a good
(e. g., prostitution, marijuana and cocaine)
- **Black markets** have a higher incidence of defective products, higher profit rates, and greater use of violence to resolve disputes.

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Importance of the Legal System

- A legal system that provides secure property rights and unbiased enforcement of contracts enhances the operation of markets.
- Markets will exist in any environment, but they can be counted on to function efficiently only when property rights are secure and contracts enforced in an evenhanded manner.
- The inefficient operation of markets in countries like Russia following the collapse of communism illustrates the importance of an even-handed legal system.

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Questions for Thought:

1. How will the operation of black markets differ from the operation of markets where property rights are clearly defined and contracts are legally enforceable?

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The Impact of a Tax

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Tax Incidence

- The legal assignment of who pays a tax is called the **statutory incidence**.
- The actual burden of a tax (**actual incidence**) may differ substantially.
 - The actual burden does not depend on who legally pays the tax (statutory incidence).

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Impact of a Tax Imposed on Sellers

- Consider the **used car** market where a price of \$7,000 **would** bring the quantity of used cars **demand** into balance with the quantity **supplied**.
- When a \$1,000 tax is imposed on the sellers of used cars, the **supply curve** shifts vertically upward by the amount of the tax.
- The new price for used cars is \$7,400 ... sellers netting \$6,400 (\$7,400 - \$1000 tax).
- Consumers end up paying \$7,400 instead of \$7,000 and bear \$400 of the **tax burden**.
- Sellers end up receiving \$6,400 (after taxes) instead of \$7000 and bear \$600 of the **tax burden**.

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Impact of a Tax Imposed on Sellers

- The new quantity of used cars that clear the market is 500,000.
- Consumers bear \$400 of the **tax burden** and so, as there are 500,000 units sold per month, tax revenues derived from consumers = \$200,000,000.
- Sellers bear \$600 of the **tax burden** and so, as there are 500,000 units sold per month, tax revenues derived from the sellers = \$300,000,000.
- As only 500,000 cars are sold after the tax (instead of 750,000), the area above the old supply curve and below the demand curve represents the consumer and producer surplus lost from the levying of the tax, called the **deadweight loss to society**.

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Elasticity and Incidence of a Tax

- The **actual burden** of a tax depends on the elasticity of supply relative to demand.
 - As supply becomes more inelastic, more of the burden will fall on sellers and resource suppliers.
 - As demand becomes more inelastic, more of the burden will fall on buyers.

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Tax Burden and Elasticity

- Consider the markets for **Gasoline** and **Luxury Boats**, individually, each beginning in equilibrium.
- If we impose a \$.50 tax on **gasoline** suppliers, the **supply curve** moves vertically by the amount of the tax. Price goes up \$.40 and output falls by 6 million gallons per week.
- If we impose a \$25K tax on **Luxury Boat** suppliers, the **supply curve** moves vertically by the amount of the tax. Price goes up by \$5K and output falls by 5 thousand units.
- In the **gas** market, the **demand** is **relatively more inelastic** than its **supply**; hence, buyers bear a larger share of the burden of the tax.
- In the **luxury boat** market, **supply** is **relatively more inelastic** than its **demand**; thus, sellers bear a larger share of the tax burden.

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Tax Rates, Tax Revenues, and the Laffer Curve

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Average Tax Rate

- The **average tax rate** equals tax liability divided by taxable income.
- A **progressive tax** is one in which the average tax rate *rises* with income.
- A **proportional tax** is one in which the average tax rate *stays the same* across income levels.
- A **regressive tax** is one in which the average tax rate *falls* with income.

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Marginal Tax Rate

- Marginal tax rate:** calculated as the change in tax liability divided by the change in taxable income.
- The marginal tax rate is highly important because it determines how much of an additional dollar earned must be paid in taxes (and therefore, how much one gets to keep). In this way, the marginal tax rate directly impacts an individual's incentive to earn.

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Marginal Tax Rate

- An excerpt from the 2006 federal income tax table is shown here.
- Note, for single individuals, as income increases from \$32,000 to \$32,100 ... their tax liability increases from \$4,564 to \$4,589.
- In this range, what is the individual's marginal tax rate?
- What is the individual's average income tax rate?

2006 Tax Table *Continued*

If line 40 (taxable income) is		And you are			
At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household
Your tax is ...					
\$32,000					
32000	32050	4564	4049	4564	4286
32050	32100	4576	4056	4576	4274
32100	32150	4589	4064	4589	4281
32150	32200	4601	4071	4601	4289
32200	32250	4614	4079	4614	4296
32250	32300	4626	4086	4626	4304
32300	32350	4639	4094	4639	4311
32350	32400	4651	4101	4651	4319
32400	32450	4664	4109	4664	4326
32450	32500	4676	4116	4676	4334
32500	32550	4689	4124	4689	4341
32550	32600	4701	4131	4701	4349

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Tax Rate and Tax Base

- **Tax rate:**
the rate (%) at which an activity is taxed.
- **Tax base:**
the amount of the activity that is taxed.
 - The tax base is inversely related to the rate at which the activity is taxed.
- **Tax revenues:**
tax rate multiplied by tax base.

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Laffer Curve

- The **Laffer curve** illustrates the relationship between tax rates and tax revenues.
 - As tax rates increase from low levels, tax revenues will also increase even though the tax base is shrinking.
 - As rates continue to increase, at some point, the shrinkage in the tax base will dominate and the higher rates will lead to a reduction in tax revenues.
 - The Laffer Curve shows that tax revenues are low for both high and low tax rates.

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The Laffer Curve

- At a tax rate of 0%, tax revenues would also be equal to \$0.
- At a tax rate of 100%, nobody would work, and thus, tax revenues would be equal to \$0.
- As tax rates increase from 0% to some level like **A**, tax revenues increase despite the fact some individuals work less.
- As rates continue to increase (to, for example, **B**), higher rates will eventually cause revenues to fall.
- Still higher rates will lead to even less tax revenue (move from **B** to **C**). This is because the tax base shrinks faster than the increased revenues from higher tax rates.
- There is no presumption that the level of taxes at **B** is the **ideal tax rate**, only that **B maximizes** the tax revenue in the current period.

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Laffer Curve and Tax Changes in the 1980s

- During the 1980s, the top marginal income tax rate fell from 70% to 33%.
- It is important to distinguish between changes in *tax rates* and changes in *tax revenues*.
- Even though the top *rates* were cut sharply during the 1980s, the *tax revenues* and the share of personal income tax paid by high earners rose during the decade. See the following slide for details.

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Changes in Taxes Paid in the 1980s

Personal Income Taxes Paid
(by group, billions of 1982-1984 \$)

Group	1980 (billions)	1990 (billions)
Top 1%	58	87
Top 10%	149	192
Other 90%	153	153

- Measured in 1982-1984 dollars, personal income taxes paid by the top 1 and 10 percent of income recipients increased between 1980 and 1990 even though their rates were reduced.
- Tax revenues collected from the other taxpayers were virtually unchanged during the decade.

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The Impact of a Subsidy

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The Impact of a Subsidy

- A **subsidy** is a payment to either the buyer or seller of a good, usually on a per unit basis.
- The supply and demand framework can be used to analyze the impact of a subsidy just as it was used to analyze impact of a tax.
- As in the case of a tax, the division of the benefit from a subsidy is determined by the relative elasticities of demand & supply rather than to whom the subsidy is actually paid.
 - When supply is highly inelastic relative to demand, sellers will derive most of the benefits of a subsidy.
 - When demand is highly inelastic relative to supply, the buyers will reap most of the benefits of a subsidy.

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The Impact of a Subsidy

- When a \$20 per textbook subsidy is given to students, the **demand** for textbooks shifts up vertically by the amount of the subsidy.
- The market price for textbooks rises from \$80 to \$90. This is the new **gross price** for students.
- With the \$20 subsidy, buyers now pay a new **net price** of \$70 per text, \$10 less than before.
- Text book buyers only get \$10 of the benefits stemming from the subsidy; the supply side of the market enjoys the other \$10 of the subsidy in the form of higher textbook prices.

Price

\$20 subsidy

new gross price
 $P_2 = \$90$

$P_1 = \$80$

new net price
\$70

S

D_2
(D_1 plus subsidy)

D_1

of textbooks per year (in millions)

100 110

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The Impact of a Subsidy

- Regardless of whether the buyer or seller is subsidized, subsidies increase the subsidized activity. This often means the cost of subsidy programs will exceed initial projections.
- Sometimes subsidies are combined with price controls and restrictions on the amount that can be produced.
 - Example: Agricultural programs
- Sometimes subsidies are granted to some (*e. g. the elderly or the poor*) but not others. When this is the case, the group that is not subsidized is generally harmed.
 - They often have to pay higher prices than would otherwise be the case.

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Questions for Thought:

1. The Laffer Curve indicates that:
 - a. an increase in tax rates will always lead to an increase in tax revenues.
 - b. when tax rates are low, an increase in tax rates will generally lead to a reduction in tax revenues.
 - c. when tax rates are high, a rate reduction may lead to an increase in tax revenue.
 - d. the deadweight losses resulting from taxation are small at the tax rate that maximizes the revenues derived by the government.

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Questions for Thought:

2. The burden of an excise tax imposed on a product will fall primarily on buyers when:
 - a. the demand for the product is highly inelastic and supply is relatively elastic.
 - b. the demand for the product is highly elastic and the supply is relatively inelastic.
 - c. the tax is legally imposed on the seller.
 - d. the tax is legally imposed on the buyer.
3. "We should impose a 20 percent luxury tax on expensive automobiles (those with a sales price of more than \$80,000) in order to collect more tax revenue from the wealthy." Will the burden of this tax fall primarily on the wealthy?

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Questions for Thought:

4. Several cities and states have recently increased the taxes levied on cigarettes by a dollar or more per pack. How will these taxes affect:
 - (a) the quantity of cigarettes sold in the city or state,
 - (b) the tax revenues collected from the tax,
 - (c) the incidence of smoking.
5. Congress recently passed a new program that will subsidize the purchase of prescription drugs by the elderly. What impact will this program have on the demand for and price of prescription drugs? How will the non-elderly be affected by this program? Explain.

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