


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 11th 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 to produce it.
- An increase in resource prices will increase the cost of products which use them, which will reduce supply (*shift the product's entire supply curve to the left*) in the product market.
 - A reduction in resource prices will have just the opposite affect.

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Resource Prices, Opportunity Cost, and Product Markets

- Suppose there is a reduction in the supply of young, inexperienced labor ...which pushes the wage rates of workers hired by fast-food restaurants upward.
- The higher wages increase the restaurant's opportunity cost, causing a reduction in supply in the product market ... leading to higher hamburger prices.

Resources Market

Product Market

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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 **demand** 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 ceiling 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
- A higher minimum wage does little to help the poor.

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Employment and the Minimum Wage

- Consider the market for **low-skill labor** where a price (wage) of \$4.00 *could* bring the quantity of labor **demand**ed into balance with the quantity **supply**ed.
- A **minimum wage** (price floor) of \$5.15 would increase the earnings of those who were able to maintain employment (E_1), but would reduce the employment of others.
- Those who lose their job (E_0 to E_1) would be pushed into either the unemployment rolls or some other less preferred form of employment.

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Questions for Thought:


1. Which of the following can be expected to result from a price ceiling that keeps the price of a product below the market equilibrium?
 - a. A surplus of the product will result.
 - b. A shortage of the product will result.
 - c. Changes in non-price factors that will be favorable to buyers and unfavorable to sellers will occur.
 - d. Changes in non-price factors that will be favorable to sellers and unfavorable to buyers will occur.

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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 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 *demanded* into balance with the quantity *supplied*.
- When a \$1,000 tax is imposed on sellers of used cars, the *supply curve* shifts vertically 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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Impact of a Tax Imposed on Buyers

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

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Impact of a Tax Imposed on Buyers

- 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.
- The area above the supply curve and below the old demand curve represents consumer & producer surplus lost due to the tax – the **deadweight loss to Society**.
- The **incidence of the tax** is the same regardless of whether it is imposed on buyers or sellers.

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Deadweight Loss


- The **deadweight loss of taxation** is the loss of the gains from trade as a result of the imposition of a tax.
 - It imposes a burden of taxation over and above the burden of transferring revenues to the government.
 - It is composed of losses to both buyers and sellers.
 - The deadweight loss of taxation is sometimes referred to as the "excess burden of the tax."

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Elasticity and Incidence of a Tax

- The actual burden of a tax depends on the elasticity of supply and 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.
- The deadweight loss rises as the elasticity of either the supply curve or the demand curve rises.


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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 of income must be paid in taxes (and so, 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 2003 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 \$4,816 to \$4,841.
- In this range, what is the individual's marginal tax rate?
- What is the individual's average income tax rate?

If line 40 (taxable income) is		And you are			
		Single At least	Married filing jointly	Married filing separately	Head of a household
\$32,000					
32000	32050	4816	4101	4816	4304
32050	32100	4829	4111	4829	4311
32100	32150	4841	4119	4841	4319
32150	32200	4854	4126	4854	4326
32200	32250	4866	4134	4866	4334
32250	32300	4879	4141	4879	4341
32300	32350	4891	4149	4891	4349
32350	32400	4904	4156	4904	4356
32400	32450	4916	4164	4916	4364
32450	32500	4929	4171	4929	4371
32500	32550	4941	4179	4941	4379
32550	32600	4954	4186	4954	4386

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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.

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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 the tax rates increase from 0% to some level **A**, tax revenues increase despite the fact some individuals choose not to work.
- After some level **B**, increases in tax rates actually cause tax revenues to fall.
- As tax rates approach level **C**, tax revenues continue to fall. 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 the 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	1990
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 or service, 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 vertically by the amount of the subsidy (\$20).
- 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

$P_2 = \$90$

$P_1 = \$80$

\$70

new net price

of textbooks per year (in millions)

100 110

S

D_2 (D_1 plus subsidy)

D_1

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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:

- The Laffer Curve indicates that:
 - an increase in tax rates will always lead to an increase in tax revenues.
 - when tax rates are low, an increase in tax rates will generally lead to a reduction in tax revenues.
 - when tax rates are high, a rate reduction may lead to an increase in tax revenue.
 - 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:

- The burden of an excise tax imposed on a product will fall primarily on buyers when:
 - the demand for the product is highly inelastic and supply is relatively elastic.
 - the demand for the product is highly elastic and the supply is relatively inelastic.
 - the tax is legally imposed on the seller.
 - the tax is legally imposed on the buyer.
- "We should impose a 20 percent luxury tax on expensive automobiles (those with a sales price of more than \$60,000) 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:

- During the summer of 2001, the combination of city and state taxes on cigarettes sold in New York City rose from \$1.19 to \$3.00 per pack. How will this tax increase affect ...
 - the quantity of cigarettes sold in New York City,
 - the tax revenues derived by the city and state from the cigarette tax,
 - the internet purchases of cigarettes by New Yorkers, and,
 - the incidence of smoking by New Yorkers?

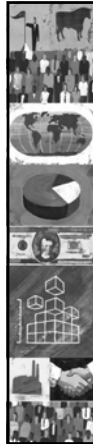
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Questions for Thought:

- 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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**End
Chapter 4**

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