

Save the Date: April 15th, 6:15pm

Principles of Microeconomics: Elasticities Taxes & Subsidies

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2015

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Bitcoin and other digital currencies: opportunities and threats

We invited Frank Braun, a computer scientist, for this talk. His interests include IT security, digital currencies, and economics.

The talk is highly relevant for any student of Business Administration, Management, Finance, and Economics.

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Advertising and Price Elasticity of Demand

I am Canadian

1. How can a successful advertising campaign reduce consumers' responsiveness to changes in price of a good like Molson beer?
2. Why is it in the interest of a firm like Molson to decrease the price elasticity of demand for its product?

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Joe's Pig Palace sells barbecue plates for \$4.50 each, and serves an average of 525 customers per week. During a recent promotion, Joe cut his price to \$3.50 and observed an increase in sales to 600 plates per week.

How price sensitive are Joe's customers?

Calculate Joe's (arc) price elasticity of demand.

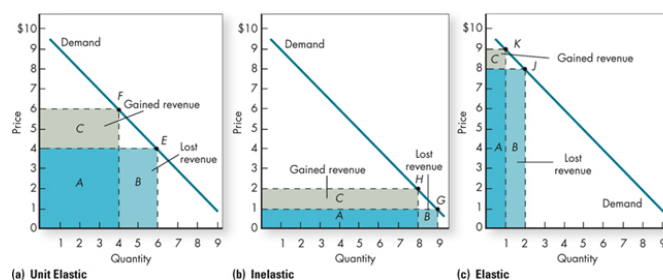
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Joe's Pig Palace sells barbecue plates for \$4.50 each, and serves an average of 525 customers per week. During a recent promotion, Joe cut his price to \$3.50 and observed an increase in sales to 600 plates per week.

Joe is considering permanently lowering his price to \$4.00 to increase revenue. Does the move make sense in the light of Joe's desire to increase revenue?

Elasticity, Total Revenue, and Demand

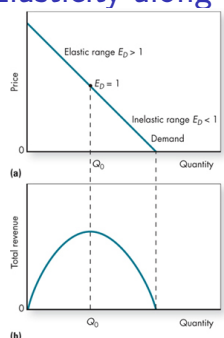
- ▶ The elasticity of demand tells suppliers how their total revenue will change if their price changes
- ▶ Total revenue is price multiplied by quantity, $TR = P \times Q$



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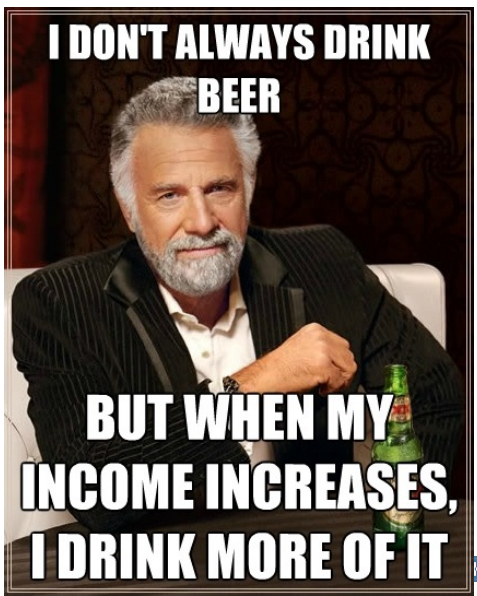
Elasticity along Straight-Line Curves: Revenues



- ▶ If $E_D > 1$, an increase in price decreases total revenue
- ▶ If $E_D = 1$, an increase in price leaves total revenue unchanged
- ▶ If $E_D < 1$, an increase in price increases total revenue

	Price Rise	Price Decline
Elastic ($E_D > 1$)	TR decreases	TR increases
Unit Elastic ($E_D = 1$)	TR constant	TR constant
Inelastic ($E_D < 1$)	TR increases	TR decreases

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Other Elasticity Concepts – Income elasticity

▶ **Income elasticity** of demand measures the responsiveness of demand to changes in income

$$E_I = \frac{\text{relative change in Demand}}{\text{relative change in Income}}$$

- ▶ **Normal goods** are those whose consumption increases with an increase in income
 - ▶ **Necessity:** $0 < E_I < 1$
 - ▶ **Luxury:** $E_I > 1$

▶ **Inferior goods** are those whose consumption decreases with an increase in income, $E_I < 0$

Product	Income Elasticity of Demand	
	Short – Run	Long – Run
Motion pictures	0.81	3.41
Foreign travel	0.24	3.09
Hard liquor	–	2.5
Jewelry and watches	1.00	1.64
Dental services	–	1.60
Tobacco products	0.21	0.86
Beer	–	0.84

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Other Elasticity Concepts – Cross-price elasticity

▶ **Cross-price elasticity** of demand measures the responsiveness of demand to changes in prices of other goods

$$E_{\text{cross-price}} = \frac{\text{relative change in Demand}}{\text{relative change in P of related good}}$$

- ▶ **Substitutes** are goods that can be used in place of another, $E_{\text{cross-price}} > 0$
- ▶ **Complements** are goods that are used conjunction with other goods, $E_{\text{cross-price}} < 0$

Commodities	Cross-Price Elasticity
Beef in response to price changes in pork	0.11
Beef in response to price changes in chicken	0.02
U.S. cars in response to price changes in European and Asian cars	0.28
European cars in response to price changes in U.S. and Asian cars	0.61
Beer in response to price changes in wine	0.23

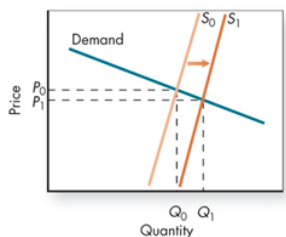
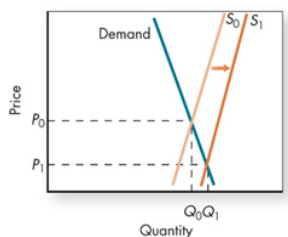
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Elasticity and Shifting Supply and Demand

▶ The more elastic the demand (supply), the greater the effect of a supply (demand) shift on quantity and the smaller the effect on price

$$\% \text{ change in P} = \frac{\% \text{ change in Demand}}{E_D + E_S}$$

$$\% \text{ change in P} = \frac{\% \text{ change in Supply}}{E_D + E_S}$$



(a) Inelastic Supply and Inelastic Demand

(b) Inelastic Supply and Elastic Demand

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When the patent expires on a brand-name drug and 5 generic drugs come on the market, what happens to elasticity of demand?

1. It rises
2. It falls

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The elasticity of demand for eggs has been estimated to be 0.1. If egg producers raised their prices by 10 percent, what will happen to their total revenue?

1. It will increase
2. It will decrease
3. It won't change

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If a fashionable clothing store raised its prices by 25 percent, what does that tell you about the store's estimate of the elasticity of demand for its products?

1. They think it's elastic
2. They think it's inelastic

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A computer manufacturer makes an experimental computer chip that critics praise, leading to a huge increase in the demand for the chip. How elastic is supply in the short run? What about the long run?

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The price of Good B increases by 4%, causing the quantity demanded of Good A to decrease by 6%. The cross-price elasticity of demand is ..., and the goods are

1. 1.5; substitutes
2. -1.5; complements
3. 0.67; complements
4. -2.4; substitutes

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Death and Taxes

The Journal of Socio-Economics
Volume 45, August 2013, Pages 113–123

Timing of death and the repeal of the Swedish inheritance tax

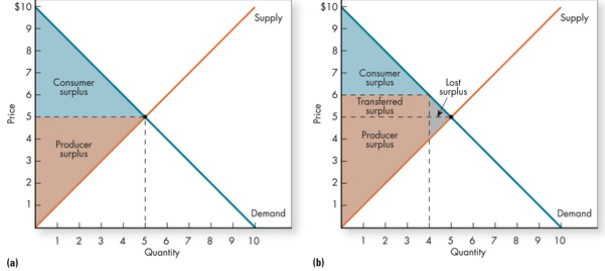
M. Eliason, H. Ohlsson

In response to the repeal of the Swedish inheritance tax people postponed death to avoid taxes. This is an example of the far-reaching behavioral effects of economic incentives and of unintended consequences of policy changes. Using individual data, including information on taxable estates, we find that deceased with, compared to those without, tax incentives to postpone death were 10 percentage points more likely to die the day after rather than the day before the repeal. An extended analysis suggests that the timing of deaths was affected not only during these two days but during a longer surrounding period.

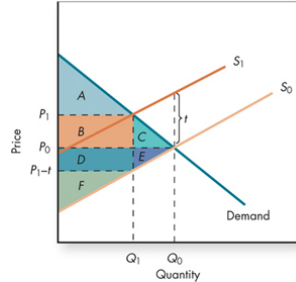
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Producer and Consumer Surplus

- ▶ **Consumer surplus** is the value the consumer gets from buying a product, less its price
 - ▶ It is the area below the demand curve and above the price
- ▶ **Producer surplus** is the value the producer sells a product for less the cost of producing it
 - ▶ It is the area above the supply curve but below the price the producer receives



The Burden of Taxation



- ▶ A tax paid by the supplier shifts the supply curve up by the amount of the tax
- ▶ Both producer and consumer surplus decrease
- ▶ Government earns some revenue
- ▶ Deadweight loss exists

The costs of taxation include:

- ▶ Direct cost of the tax paid to the government by consumers and producers
- ▶ The deadweight loss which is the loss of consumer and producer surplus that is not gained by the government
- ▶ The administrative costs of compliance which are the resources used by the government to administer the tax and individuals and businesses to comply with it

The Tax Wedge

The Burden of Taxation

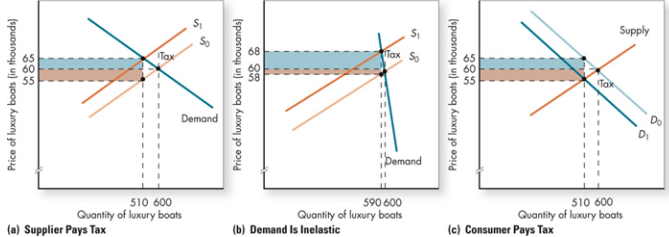
Who is paying the tax?

The Burden of Taxation

- ▶ The person who physically pays the tax is not necessarily the person who bears the burden of the tax
- ▶ The more inelastic one's relative demand and supply, the larger the tax burden one will bear
- ▶ If demand is more inelastic than supply, consumers will pay the higher share
- ▶ If supply is more inelastic than demand, suppliers will pay the higher share

What Goods Should Be Taxed?

- Goal of the government
- ▶ Raise revenue, limit deadweight loss
 - ▶ Change behavior



What Goods Should Be Taxed?

Goal of Government	Most effective when
Raise revenue, limit deadweight loss	Demand or supply is <i>inelastic</i>
Change behavior	Demand or supply is <i>elastic</i>

Who bears the burden of taxation?

Elasticity	Who bears the burden?
Demand <i>inelastic</i> and supply <i>elastic</i>	Consumers
Supply <i>inelastic</i> and demand <i>elastic</i>	Producers
Both supply and demand <i>elastic</i>	Shared, but the group whose S or D is more <i>inelastic</i> pays more

How to calculate the fraction of the tax borne by consumers and producers:

Fraction of tax borne by demander: $\frac{E_S}{E_D + E_S}$

Fraction of tax borne by supplier: $\frac{E_D}{E_D + E_S}$

Tax Incidence and Current Policy Debates Social Security Taxes

- ▶ Both employer and employee contribute the same percentage of before-tax wages to the Social Security fund

Often politicians and union representations argue employers should pay a larger share...


The Burden of Taxation

Who bears the burden of taxation?


- ▶ Demand inelastic and supply elastic
- ▶ Supply inelastic and demand elastic
- ▶ Both supply and demand elastic

The Extra-Burden of Taxation

SEE THE INVISIBLE HAND



This pleasure boat seems like a good thing to tax...
 Or not: The Omnibus Budget Reconciliation Act of 1990 applied a 10% federal luxury tax to the retail sale of luxury goods like pleasure boats with a sales price above \$100,000.
Expected tax revenue? \$9 billion. Reality?



The federal luxury tax was repealed in 1993.

- Sales of boats **down 52.7%**;
- Net **loss of 30,000 jobs**;
- The federal government paid out > \$7 million more in unemployment benefits to those workers *than if collected in luxury tax revenues*

Tax Incidence and Current Policy Debates Social Security Taxes

- ▶ Both employer and employee contribute the same percentage of before-tax wages to the Social Security fund
- ▶ Although the employer and employee contribute the same percentage, they do not share the burden equally
- ▶ On average, labor supply tends to be less elastic than labor demand, so the Social Security tax burden is primarily on employees

Subsidies

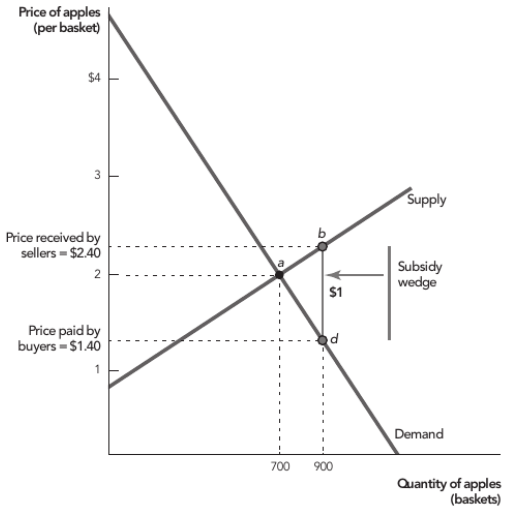
A subsidy is a reverse tax where the government gives money to consumers (or producers).

$$\text{Subsidy} = \text{Price Received by Sellers} - \text{Price Paid by Buyers}$$

Some facts about subsidies:

1. Who gets the subsidy does not depend on who receives the check from the government;
2. Who benefits from the subsidy does depend on the relative elasticities of demand and supply;
3. Subsidies must be paid for by taxpayers and they create inefficient increases in trade (deadweight loss).

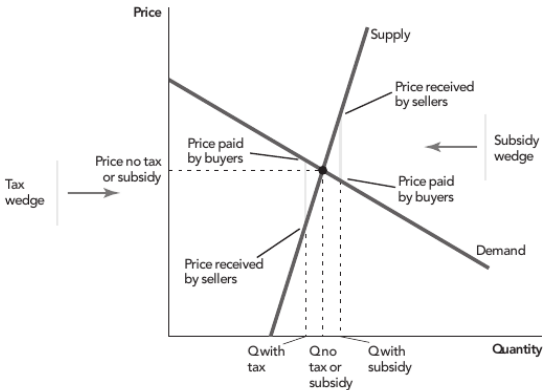
Subsidies



Taxes & Subsidies — Burdens & Benefits

Who benefits more from a subsidy?

Taxes & Subsidies — Burdens & Benefits



When demand is more elastic than supply, suppliers bear more of the burden of a tax and receive more of the benefit of a subsidy.